Resolved: Countries ought to prohibit the production of nuclear power.

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Topic Overview

Part I: Introduction

The best place to start with this topic is probably an understanding of what nuclear energy is and how it works. The Nuclear Energy Institute sums this up nicely writing, "Nuclear plants, like plants that burn coal, oil and natural gas, produce electricity by boiling water into steam. This steam then turns turbines to produce electricity. The difference is that nuclear plants do not burn anything. Instead, they use uranium fuel, consisting of solid ceramic pellets, to produce electricity through a process called fission. Nuclear power plants obtain the heat needed to produce steam through a physical process. This process, called fission, entails the splitting of atoms of uranium in a nuclear reactor. The uranium fuel consists of small, hard ceramic pellets that are packaged into long, vertical tubes. Bundles of this fuel are inserted into the reactor."[1] The institute goes on to explain that there are two types of uranium used in this process. "Nuclear fuel consists of two types of uranium, U-238 and U-235. Most of the uranium in nuclear fuel is U-238, but U-235 splits—or fissions—easily. In U-235 atoms, the nucleus, which is composed of protons and neutrons, is unstable. As the nuclei break up, they release neutrons. When the neutrons hit other uranium atoms, those atoms also split, releasing neutrons of their own, along with heat. These neutrons strike other atoms, splitting them. One fission triggers others, which triggers still more until there is a chain reaction. When that happens, fission becomes self-sustaining. Rods inserted among the tubes holding the uranium fuel control the nuclear reaction. Control rods, inserted or withdrawn to varying degrees, slow or accelerate the reaction. Water separates fuel tubes in the reactor. The heat produced by fission turns this water

[1] Nuclear Energy Institute, "How Nuclear Reactors Work," http://www.nei.org/Knowledge-Center/How-Nuclear-Reactors-Work

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into steam. The steam drives a turbine, which spins a generator to create electricity."[2] They further explain that there are essentially two types of power plants used in the USA writing, "Commercial nuclear power plants in the United States are either boiling water reactors or pressurized water reactors. Both boiling water reactors and pressurized water reactors are cooled by ordinary water. The water is the main link in the process that converts fission energy to electrical energy. Boiling water reactors heat the water surrounding the nuclear fuel directly into steam in the reactor vessel. Pipes carry steam directly to the turbine, which drives the electric generator to produce electricity. Pressurized water reactors heat the water surrounding the nuclear fuel, but keep the water under pressure to prevent it from boiling. The hot water is pumped from the reactor vessel to a steam generator. There, the heat from the water is transferred to a second, separate supply of water. This water supply boils to make steam. The steam spins the turbine, which drives the electric generator to produce electricity."[3]

So, what is the hubbub? Well to begin nuclear power plants are cheap to operate but expensive to construct. "a new1,000-megawatt (MW) nuclear power plant would cost on the order of $2 billion and take five years to build. By contrast, a new 1,000-MW pulverized coal plant would cost $1.2 billion and take three to four years to build."[4] Of course this is not probably one of the issues most rounds will focus on. There are other controversial aspects to nuclear energy. "For one thing, there has long been concern in the United States about the safety of commercial nuclear reactors, concern that predated the ac-cident at Three Mile Island in 1979, where the core of one of the reactors was damaged."[5] There have been smaller, less well known

[2] IBID
[3] IBID
[4] Paul R. Portney, "Nuclear Power: Clean, Costly, and Controversial," Resources for the Future, http://www.rff.org/files/sharepoint/WorkImages/Download/RFF_Resources_156_nuclear.pdf
[5] IBID

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incidents but the more famous problems with the plants in Chernobyl and Fukushima have not assuaged the concerns of those objecting to nuclear power. Then there are issues with storage of nuclear waste, "Opponents of nuclear power also point to the risk that the spent fuel from nuclear plants could be stolen and diverted to the production of so-called dirty bombs or even thermo-nuclear weapons."[6] A second issue with waste storage is, "where in the world they will be stored. Currently, almost all the wastes that result from nu-clear-powered electricity generation are being stored on the grounds of the power plants. No one believes this is the best place for these wastes, and at some plants storage capacity has been or soon will be exceeded."[7] To put it bluntly, no one wants nuclear waste stored in their back yard.

Thankfully for debaters, there is another side which answers each of these objections. Patrick Moore, the founder of Greenpeace who now advocates for nuclear power as the best way to solve for climate change argues that concerns over nuclear accidents are not grounded in reality writing, "As Stewart Brand and other forward-thinking environmental-ists and scientists have made clear, technology has now progressed to the point where the activist fear-mongering about the safety of nuclear energy bears no resemblance to reality. The Chernobyl and Three Mile Island reactors, often raised as examples of nuclear catastrophe by activists, were very differ-ent from today's rigorously safe nuclear energy technology. Chernobyl was actually an accident waiting to happen—bad de-sign, shoddy construction, poor maintenance, and unprofessional operation all combined to cause the only terrible accident in re-actor history. In my view, the Chernobyl accident was the ex-ception that proves the rule that nuclear reactors are generally safe. Three Mile Island was actually a success story in that the radiation from the partially melted core was contained by the over 400 worldwide that are producing electricity

[6] IBID
[7] IBID

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every day with-out serious incident."[8] Moore also explains that concerns over storage are inflated as well, "The fact that reactors produce nuclear waste is often used to support opposition to them. First, there is no technical obstacle to keeping nuclear waste from entering the environment at harmful levels. Second, this is already being accomplished at hundreds of nuclear power sites around the world. It is simply an issue of se-cure containment and maintenance. Most important, the spent fuel from reactors still has over 95 percent of its potential energy con-tained within it. Therefore, spent fuel should not be disposed of, it should be stored securely so that in the future we can use this en-ergy productively."[9]

After researching the topic, the heart of the topic, the areas that are going to be the most generic topic areas on this topic are likely to be whether or not nuclear power is a solution to global warming. Opponents say no, advocates say yes. Both opponents and advocates can be very credible environmentalists who are concerned with climate change. Of course the impacts of climate change are potential very big and nasty. Both sides are likely to grant this and then claim solvency. Another generic topic area is ending reliance on Middle East oil. This has economic advantages as well as terrorism and war advantages. A third generic topic area is likely going to be the issue of storing nuclear waste where the affirmative paints a picture of storing something safely that has a half-life longer than humans have been civilized and the negative who claims that this is not the issue it once was and that these half-lives can be reduced to manageable time frames. Another generic area will be nuclear bombs and nuclear proliferation as peaceful nuclear power can be easily turned into violent nuclear power and so

[8] Patrick Moore, chairman and chief scientist of Greenspirit Strate-gies Ltd, "Greenpeace founder makes the case for nuclear," Nuclear News, June 2005, http://nature.berkeley.edu/er100/readings/Moore_2005.pdf
[9] IBID

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even if nuclear power itself is safe, the doors it opens are scary. Of course people will come up with non-generic positions, but debaters should start by addressing these arguments.

Part II: The Affirmative

There are some affirmative approaches that could be taken that have yet to be mentioned. One of them is another issue with the storage of nuclear waste. The nuclear industry often targets the lands of indigenous peoples for storing toxic waste. This could be a very persuasive case of environmental racism. Another issue for the affirmative could be the fact that there is risk at every level of development or production of nuclear power from uranium mining, to enriching uranium, to transportation of materials to storage of waste. The problem is not even that there is some risk as many will agree the risk is low but the impact of the risk is high. The impact to a nuclear accident, according to many, would be catastrophic. One of the major issues that the affirmative will want to be well prepared for is to argue that nuclear power is not the panacea for climate change advocates of nuclear power claim it to be. There are many potential ways to approach this such as nuclear power cannot provide enough energy, we will run out of uranium in the near future, but probably the most persuasive argument is that nuclear power is not emission free.

All of the cases we offer defend the value of morality because the word ought in the resolution is, according to the Random House Dictionary, used to express duty or moral obligation. As such it is the only normative term in the resolution meaning it is the only word in the resolution that could provide guidance as to how to begin to answer the question of the resolution. So, the resolution is asking if countries have a moral duty to ban nuclear power. Thus each of the cases vary on the criterion level. The first affirmative case defends one of the most common criteria in all of LD debate, utilitarianism. It argues that a government must

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achieve the greatest good for the greatest number. This case then tries to approach the resolution from the perspective of the second idea mentioned in the prior paragraph. The first point in this case discusses the risks of mining uranium which allows radioactive material to escape into the biosphere. The second point discusses the processing of uranium as dangerous which creates routine emissions that endanger workers at plants and local communities. The third point discusses the environmental and health risks of the mere existence of nuclear power plants. The final point discusses the idea that as long as there is nuclear power we will have nuclear weapon proliferation meaning nuclear power increases the risk of nuclear war.

The second affirmative case we offer argues that the way to achieve morality is to stop climate change. The case quotes General Secretary of the United Nations, Ban Ki-moon, to support this where he writes, "If ever there were an issue that requires unity of purpose, it is climate change. Science tells us we are far off track from reducing global emissions sufficient to keep global temperature rise below 2° C. We are currently on course for a rise of 4-5° C. That would alter life on Earth as we know it. This is morally indefensible."[10] The rest of the case attempts to preempt negative arguments that might claim that nuclear power is essential to fight climate change. The first point in this case argues that nuclear power is not carbon free and because of this will emit carbons and so cannot be a cure for climate change. The second point in this case argues that solutions to climate change must be nuclear free. This point advocates a fuller embrace of renewable energy. The last point in this case has two cards. The more important card in this case makes the argument that nuclear and renewable energy cannot coexist. It describes the infrastructure needed for both and explains that because the

[10] Ban Ki-moon (General Secretary United Nations), "Protecting Environment Is 'an Urgent Moral Imperative', Sacred Duty for All People of Faith, Secretary-General Tells Vatican Workshop on Climate Change," United Nations, April 28, 2015, http://www.un.org/press/en/2015/sgsm16710.doc.htm

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infrastructures are incompatible the two types of energy are also incompatible. This tries to preempt negative arguments that we might need nuclear and renewable together to solve for climate change.

Another couple of issues with nuclear power that have only been briefly mentioned but that deserve more attention are supply and proliferation. On the supply side, opponents of nuclear power argue there just isn't enough of it. "Even if we could find enough feasible sites for a new generation of nuclear plants, we're running out of the uranium necessary to power them. Scientists in both the US and UK have shown that if the current level of nuclear power were expanded to provide all the world's electricity, our uranium would be depleted in less than ten years. As uranium supplies dwindle, nuclear plants will actually begin to use up more energy to mine and mill the uranium than can be recovered through the nuclear reactor process. Dwindling supplies will also trigger the use of ever lower grades of uranium, which produce ever more climate-change-producing emissions – resulting in a climate-change catch 22. To increase our access to uranium, there will be heightened pressure to open new mines and expand existing mines, including in fragile or protected areas, bringing increased risk to mine workers and local communities, and contributing to the overall issue of increases in background radiation local to the mines and globally."[11] As for proliferation, "In discussing the nuclear proliferation issue, Al Gore said, "During my eight years in the White House, every nuclear weapons proliferation issue we dealt with was connected to a nuclear reactor program." Iran and North Korea are reminding us of this every day. We can't develop a domestic nuclear energy program without confronting proliferation in other countries. Here too, nuclear power proponents hope that the reduction of nuclear waste will reduce the risk of proliferation from any given plant, but again, the technology

[11] Green America, "Ten Strikes Against Nuclear Power," http://www.greenamerica.org/programs/climate/dirtyenergy/nuclear.cfm

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is not yet proven – and reduced risk doesn't mean no risk of proliferation. If we want to be serious about stopping proliferation in the rest of the world, we need to get serious here at home, and not push the next generation of nuclear power forward as an answer to climate change. There is simply no way to guarantee that nuclear materials will not fall into the wrong hands."[12]

Part III: The Negative

There are many arguments in defense of nuclear power. Perhaps one of the best places to start is with one of the last ones mentioned in the affirmative section. That argument would be the scarcity of uranium. After all, if there is very little uranium thus making the effectiveness of nuclear power, especially long term, quite minimal, then it would seem to not outweigh the risks of using it. Advocates of nuclear power argue we have a bumper supply of uranium. The World Nuclear Association writes on the supply of uranium, "Uranium is a relatively common metal, found in rocks and seawater. Economic concentrations of it are not uncommon. Its availability to supply world energy needs is great both geologically and because of the technology for its use. Quantities of mineral resources are greater than commonly perceived. The world's known uranium resources increased by at least one-quarter in the last decade due to increased mineral exploration." It would be difficult for non-experts to know who is correct on this argument so weighing between authors could be crucial to winning the argument. There are also arguments responding to the nuclear proliferation such as it will thwart proliferation and arguments that even if nuclear power leads to proliferation that does not justify banning the peaceful use of nuclear power.

The first negative case argues that the way to achieve morality is through the criterion of maximizing happiness. Essentially this is the same as utilitarianism and it is warranted by James

[12] IBID

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Mill, the father of the famous utilitarian John Stuart Mill. Mill argues that the ultimate goal of power is maximizing happiness. This case simply attempts to outweigh the affirmative. The affirmative will have all kinds of potential issues and risks but few empirically verifiable actual harms. This case argues that the use of nuclear power has saved millions of lives and continued use of nuclear power will save millions more. These lives are saved by reducing pollution. The case also argues that nuclear power can help stop climate change and thus save all the lives that are at risk from climate change.

The second negative case we offer argues that the way to achieve the value of morality is by embracing environmental pragmatism. This criterion is meant to argue that environmentalists should stop seeking the perfect, the ideal at the expense of real and practical solutions that may not be perfect or ideal but are more effective at achieving environmental goals. Joel A. Mintz elaborates, "environmental pragmatists are not wedded to any particular theoretical framework from which to evaluate specific problems, but [they] can choose the avenue which best protects the long-term health and stability of the environment, regardless of its theoretical origin."[60] For Light and other environmental pragmatists, the "truth" of various environmental theories is thus not always important in environmental practice."[13] The first point in this case discusses how nuclear energy is a proven alternative to fossil fuels as it successfully provides a significant amount of energy now. The second point in this case argues that if we do not rely on nuclear we are going to increase our use of fossil fuels because renewables are far from ready to pick up the slack of a loss of nuclear power.

[13] Joel A. Mintz (tenured full professor at Nova Southeastern University Law Center in Fort Lauderdale, Florida), "SOME THOUGHTS ON THE MERITS OF PRAGMATISM AS A GUIDE TO ENVIRONMENTAL PROTECTION," Boston College, http://www.bc.edu/content/dam/files/schools/law/lawreviews/journals/bcealr/31_1/01_TXT.htm

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There are other arguments that the negative could attempt to utilize such as nuclear power being reliable, cheap and good for the economy, but the negative will need to research and be very well aware of the facts surrounding the big three nuclear accidents, Three Mile Island, Chernobyl, and Fukushima. Both sides will concede Chernobyl was a deplorable mess, but there is a great deal of disagreement over the effects of Three Mile Island and Fukushima. Opponents of nuclear power point to various harms from both, some they claim are underreported or even covered up. Pro nuclear power people argue the effects of these two accidents were minimal, contained, and no reason to cease nuclear power. One way that the negative could approach the issue of leaks, and the topic altogether, is to discuss innovative ideas in nuclear power. There are theories and approaches to nuclear power that are rare, new, etc. The reason for going for innovation is to be able to argue that all of the affirmative case applies to X style, or Y method of nuclear power, the affirmative did not discuss the negative's Z style or method so even if the affirmative wins their case we do not affirm because the affirmative did not prove that all forms of nuclear power ought to be banned.

This is a complex topic. Both sides vehemently disagree on the issue and the facts involved. Winning rounds could boil down to the credibility of authors, especially since the scientific nature and scope of the topic make it difficult for any of us to know fully which side is telling the truth. It would be very wise of debaters to grow quite good at author and source indicts. The affirmative will need to show that their criticism applies to any and all forms of nuclear power while the negative could try to turn the round into whack-a-mole by finding innovative approaches to nuclear power that the negative case did not thwack on the head and win rounds this way. It is an important topic as nuclear power, depending on the truth, could either be an energy panacea or it could be a nightmare. It is surely worth becoming more

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knowledgeable on the subject as our future might hang in the balance. Rounds should be challenging and fun. Best of luck from The Forensics Files!

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Definitions

Resolved: Countries ought to prohibit the production of nuclear power.

Country 1 A nation with its own government, occupying a particular territory:
2 The people of a nation:
Source: Oxford Dictionaries

Country 1.
a. A nation or state.
b. The territory of a nation or state; land.
c. The people of a nation or state; populace: The whole country will profit from the new economic reforms.
2. The land of a person's birth or citizenship: Foreign travel is restricted in his country.
3. A region, territory, or large tract of land distinguishable by features of topography, biology, or culture:
Source: American Heritage Dictionary of the English Language

Country 1 a territory distinguished by its people, culture, language, geography, etc
2 an area of land distinguished by its political autonomy; state
3 the people of a territory or state
Source: Collins English Dictionary

Country 1: an area of land that is controlled by its own government
2: the country : the people who live in a country
3: an area or region that has a particular quality or feature or is known for a particular activity.
Source: Merriam-Webster's Online Dictionary, 11th Edition

Ought 1 Used to indicate duty or correctness, typically when criticizing someone’s actions:
2 Used to indicate a desirable or expected state:
3 Used to give or ask advice:
4 Used to indicate something that is probable:
Source: Oxford Dictionaries

Ought 1. Used to indicate obligation or duty: You ought to work harder than that.
2. Used to indicate advisability or prudence: You ought to wear a raincoat.
3. Used to indicate desirability: You ought to have been there; it was great fun.
4. Used to indicate probability or likelihood: She ought to finish by next week.
Source: American Heritage Dictionary of the English Language

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Ought
1 to indicate duty or obligation ⇒ "you ought to pay your dues"
2 to express prudent expediency ⇒ "you ought to be more careful with your money"
3 (usually with reference to future time) to express probability or expectation ⇒ "you ought to finish this work by Friday"
4 to express a desire or wish on the part of the speaker ⇒ "you ought to come next week"
Source: Collins English Dictionary

Ought
1 used for saying what is the right or sensible thing to do, or the right way to behave
2 used when you have strong reasons for believing or expecting something
Source: Macmillan Dictionary

Prohibit
1 Formally forbid (something) by law, rule, or other authority:
2 (prohibit someone/something from doing something) Formally forbid a person or group from doing something:
3 (Of a fact or situation) prevent (something); make impossible:
Source: Oxford Dictionaries

Prohibit
1. To forbid by authority: Smoking is prohibited in most theaters.
2. To prevent; preclude: Modesty prohibits me from saying what happened.
Source: American Heritage Dictionary of the English Language

Prohibit
1 to forbid by law or other authority
2 to hinder or prevent
Source: Collins English Dictionary

Prohibit
1: to order (someone) not to use or do something
2: to say that (something) is not allowed
3: to make (something) impossible to do
Source: Merriam-Webster's Online Dictionary, 11th Edition

Production
1 The action of making or manufacturing from components or raw materials, or the process of being so manufactured:
2 The harvesting or refinement of something natural:
3 The total amount of something that is manufactured, harvested, or refined:
4 The creation or formation of something as part of a physical, biological, or chemical process:
Source: Oxford Dictionaries

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Production 1.
a. The act or process of producing: timber used for the production of lumber and paper.
b. The fact or process of being produced: a movie going into production.
2. The creation of value or wealth by producing goods and services.
3. The total output, as of a commodity: increased production at the plant.
4. Something produced; a product: "Of all the productions of land, milk is perhaps the most perishable" (Adam Smith).
5.
a. A work of art or literature.
b. A work produced for the stage, screen, television, or radio.
c. A staging or presentation of a theatrical work: a new Broadway production of a musical.
6. A situation or display that is exaggerated or unduly complicated:
Source: American Heritage Dictionary of the English Language

Production 1 the act of producing
2 anything that is produced; product
3 the amount produced or the rate at which it is produced
4 (economics) the creation or manufacture for sale of goods and services with exchange value
5 any work created as a result of literary or artistic effort
6 the organization and presentation of a film, play, opera, etc
7 (British) the artistic direction of a play
8 a) the supervision of the arrangement, recording, and mixing of a record
b) the overall sound quality or character of a recording ⇒ the material is very strong but the production is poor
9 (modifier) manufactured by a mass-production process ⇒ a production model of a car
10 See make a production out of
Source: Collins English Dictionary

Production 1: the process of making or growing something for sale or use
2: the process of making something naturally
3: the process of making a play, movie, television show, record, etc.
Source: Merriam-Webster's Online Dictionary, 11th Edition

Nuclear Power Electric or motive power generated by a nuclear reactor.
Source: Oxford Dictionaries

Nuclear Power 1. Power, especially electricity, the source of which is nuclear fission.
2. A nation or group possessing nuclear weapons.
Source: American Heritage Dictionary of the English Language

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Nuclear Power power, esp electrical or motive, produced by a nuclear reactor
Source: Collins English Dictionary

Nuclear Power power, usually in the form of electricity, that is produced by nuclear energy
Source: Macmillan Dictionary

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Affirmative Cases

First Affirmative

I affirm the resolution, "Resolved: Countries ought to prohibit the production of nuclear power." Affirming achieves the value of morality. Morality is the correct value for the round because the word ought in the resolution is, according to the Random House Dictionary, used to express duty or moral obligation. As such it is the only normative term in the resolution meaning it is the only word in the resolution that could provide guidance as to how to begin to answer the question of the resolution. So, the resolution is asking if countries have a moral duty to ban nuclear power. We should look to the resolution to identify values because failing to do so would mean the question of the resolution is avoided or unanswered at the end of the round. For example, proving it would be just to ban nuclear weapons would not necessarily prove it is moral as the words, while bot normative, do not mean the same thing. Thus, you prefer my value and you can disregard offense that accesses an alternative value. To achieve morality, we must achieve the greatest good for the greatest number.

It is well established that government coercion is morally justified when it achieves the greatest good.

Ito, Trelaine, "An Ethical Justification of State Paternalism: Restricting Individuals' Freedoms and Rights to Maximize Group Utility" (2011). Humanities. Paper 3.

Philosophers, politicians, and ordinary people might agree that individuals are guaranteed the freedom to do as they please. This is the notion of autonomy that is very well-guarded and protected by legal rights (Alexander). But in many cases, such as smoking in public areas, the state denies or mitigates those freedoms to promote the "greater good." This is part of the utilitarian idea that we should consider all our options and make the choice which maximizes utility—utility, in this argument, being the measure of an individual's well-being. Determining the amount of utility does not merely take into account the number of people affected, although utilitarianism considers each involved individual

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equally, but also the total utility of each individual. Furthermore, maximum utility is determined by the potential outcome of a situation— i.e. the consequences, taking into consideration both the potential positive and negative effects. This theory is a form of direct utilitarianism—the idea that "any object of moral assessment (e.g. action, motive, policy, or institution) should be assessed by and in proportion to the value of its consequences for the general happiness"—and is known as act-utilitarianism: the justification of an action is determined by the value of the consequences of that particular act (Brink; Mautner).

So the criterion for the round becomes achieving the greatest good for the greatest number. My opponent cannot refute this criterion without also proving why other laws meant to achieve the common good such as prohibitions on drunk driving, guarantees of safe food, emergency medical services and all such laws are unjustified. So, failing this, you default to my criterion so if I prove banning nuclear power will achieve the greatest good for the greatest number then you affirm.

I contend that nuclear power is so dangerous that it will achieve the greatest good for the greatest number to ban them.

1. **Uranium mining has lasting lethal effects.**

Dave Sweeney (Australian Conservation Foundation) and Dimity Hawkins (independent activist, researcher, writer), "Poisoned pathways: the impacts of the nuclear fuel cycle on human health, culture, and the environment," "Costs, risks, and myths of nuclear," Reaching Critical Will a project of the Women's International League for Peace and Freedom, 2011, https://www.mapw.org.au/files/downloads/reaching%20critical%20will.pdf

While the impacts of uranium mining affect many communities, 70% of the world's uranium lies on Indig-enous lands.[2] Therefore Indigenous people bear a dis-proportionate burden at this end of the nuclear chain. These impacts, which also adversely affect broader communities, can be wide ranging and include both environmental and

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cultural/social, as shown in Table 1 Before mining, the radioactive elements in uranium are generally locked in an impervious rock cocoon, so little radioactivity reaches the open environment. Once these materials are mined, radioactive elements become far more bio-available and can readily escape into waterways and the atmosphere. Uranium is also chemically toxic at high concentrations and can cause damage to internal organs. Uranium has been linked with adverse impacts on reproduction, foetal develop-ment, and an increased risk of cancer and leukaemia. Even after mining ceases, uranium tailings retain about 80% of the radioactivity of the original ore body. These tailings contain over a dozen radioactive materi-als that pose significant health hazards, including tho-rium-230, radium-226, and radon gas. These materials can emit radioactivity into the environment for tens of thousands of years. Global experience has shown that most areas exploited for uranium extraction remain contaminated in perpetuity with limited or no effective rehabilitation.

This means that even at the beginning of the nuclear power process there are great risks to the people and so banning nuclear power would achieve the greatest number and so you can affirm.

2. **Uranium processing carry multiple risks regardless of the purpose of the processing.**

Dave Sweeney (Australian Conservation Foundation) and Dimity Hawkins (independent activist, researcher, writer), "Poisoned pathways: the impacts of the nuclear fuel cycle on human health, culture, and the environment," "Costs, risks, and myths of nuclear," Reaching Critical Will a project of the Women's International League for Peace and Freedom, 2011, https://www.mapw.org.au/files/downloads/reaching%20critical%20will.pdf

Once mined, uranium is processed to facilitate its use in both the civil and military nuclear sectors. De-spite persistent denial by the nuclear industry, these sectors have been and remain inextricably linked. The difference between these two sectors is more an issue of political will rather than technical capacity and remains more psychological than real. With over 20,000 nuclear weapons in the world today, the impacts of this link in Costs, risks, and myths of nuclear power34 the nuclear chain cast a huge shadow over humanity and our environment. It diverts precious human, tech-nical, and financial resources into maintaining weapon stockpiles and

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generates a climate of fear that actively undermines global security. There are now nine identi-fied nuclear weapon states, however, with another 44 holding nuclear power capacity, there is increasing rec-ognition of the potential and risk of nuclear breakout. The processes required for uranium conversion, enrichment, and fuel fabrication further contribute to environmental and social risks and contamination loads. These processes generate 'routine' emissions, occupational exposures, and liquid, gaseous, and solid radioactive wastes, the management of which remains contentious and unresolved.

This means that nuclear power is dangerous to people even during the processing stage and so banning nuclear power would achieve the greatest good for the greatest number and so you can affirm.

3. **Nuclear reactors are responsible for multiple health and environmental risks.**

Dave Sweeney (Australian Conservation Foundation) and Dimity Hawkins (independent activist, researcher, writer), "Poisoned pathways: the impacts of the nuclear fuel cycle on human health, culture, and the environment," "Costs, risks, and myths of nuclear," Reaching Critical Will a project of the Women's International League for Peace and Freedom, 2011, https://www.mapw.org.au/files/downloads/reaching%20critical%20will.pdf

After processing the uranium is ready for use as fuel in nuclear reactors. Currently there are 4403 reactors operating in the world and despite repeated claims of a 'nuclear renaissance', there is little factual data to support this. Following the Fukushima tragedy the in-ternational industry has come and will remain under increased public, governmental, and regulatory scru-tiny. Several nations have committed to end, reduce, or defer reactor programmes. Germany's commitment in May to close its nuclear reactors within 11 years has provided a welcome sign of international leadership following the Fukushima emergency. Reactor operations at the continuing facilities around the world are responsible for site-specific and regional public health and environmental impacts. These are exacerbated by the fact that many of the ex-isting plants are aging facilities rapidly reaching the end of their approved operating life.

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Attempts to ex-tend the operations of these facilities have led to in-creased concerns about their vulnerability.

This means the very existence of nuclear reactors is very dangerous to people and so banning nuclear power would achieve the greatest good for the greatest number and so you can affirm.

4. **Continuing to use nuclear power assures the spread of nuclear weapons.**

Ray Acheson (Reaching Critical Will of WILPF), "Nuclear weapons and nuclear power," "Costs, risks, and myths of nuclear," Reaching Critical Will a project of the Women's International League for Peace and Freedom, 2011, https://www.mapw.org.au/files/downloads/reaching%20critical%20will.pdf

The continued existence of nuclear fuel cycle fa-cilities, technology, and material makes it extremely difficult to envisage reaching a world free of nuclear weapons. Since 1945, many scientists, activists, and government officials have pointed out that nuclear ma-terial, technology, and facilities are dangerous whether they are in weapons form or for "peaceful uses"."Whatever its source, the harm to health of ion-izing radiation is the same. The same chain reaction drives nuclear fission in reactors and bombs," argued Tilman Ruff, co-chair of the In-ternational Campaign to Abol-ish Nuclear Weapons, at a 6 Au-gust 2011 commemoration of the atomic bombing of Hiroshima. "Releases of radioactivity similar to or larger than those from a nuclear bomb can come from nuclear reactors and spent fuel ponds."[10] Eliminat-ing all nuclear materials and technology, whatever its designated purpose, is the only way to ensure that it is does not result in catastrophe, by accident or design.

This means that the mere existence of nuclear power threatens the world with nuclear war and so banning nuclear power would achieve the greatest good for the greatest number and so you can affirm.

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Second Affirmative

I affirm the resolution, "Resolved: Countries ought to prohibit the production of nuclear power." Affirming achieves the value of morality. Morality is the correct value for the round because the word ought in the resolution is, according to the Random House Dictionary, used to express duty or moral obligation. As such it is the only normative term in the resolution meaning it is the only word in the resolution that could provide guidance as to how to begin to answer the question of the resolution. So, the resolution is asking if countries have a moral duty to ban nuclear power. We should look to the resolution to identify values because failing to do so would mean the question of the resolution is avoided or unanswered at the end of the round. For example, proving it would be just to ban nuclear weapons would not necessarily prove it is moral as the words, while bot normative, do not mean the same thing. Thus, you prefer my value and you can disregard offense that accesses an alternative value. To achieve morality, we must combat climate change.

We have a moral duty to do all we can to protect the environment and stop climate change.

Ban Ki-moon (General Secretary United Nations), "Protecting Environment Is 'an Urgent Moral Imperative', Sacred Duty for All People of Faith, Secretary-General Tells Vatican Workshop on Climate Change," United Nations, April 28, 2015, http://www.un.org/press/en/2015/sgsm16710.doc.htm

Mitigating climate change and adapting to its effects are necessary to eradicate extreme poverty, reduce inequality and secure equitable, sustainable economic development. That is why I say climate change is the defining issue of our time. Responding to it effectively is essential for sustainable development. Climate change is intrinsically linked to public health, food and water security, migration, peace and security. It is a moral issue. It is an issue of social justice, human rights and fundamental ethics. We have a profound

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responsibility to protect the fragile web of life on this Earth, and to this generation and those that will follow. That is why it is so important that the world's faith groups are clear on this issue — and in harmony with science. Science and religion are not at odds on climate change. Indeed, they are fully aligned. Together, we must clearly communicate that the science of climate change is deep, sound and not in doubt. Climate change is occurring — now — and human activities are the principal cause. The facts of climate change are upheld by the Intergovernmental Panel on Climate Change and the major scientific bodies of every Government in the world, including the Vatican's Pontifical Academy of Sciences. Our response has to be global, holistic and rooted in universal values. Climate change affects us all, but not equally. Those who suffer first and worst are those who did least to cause it: the poor and most vulnerable members of society. While they did not do much, they are affected much more severely than the developed world. Of course, they do not have any means or resources to mitigate and adapt to this changing situation. Around the world, I have seen how floods, droughts, rising sea levels and increasingly severe storms are causing terrible harm, and prompting families to migrate, often at great peril. I'm not an economist. I'm not a scientist either, but I only know that climate change is happening. But, I did not have much knowledge and that's why during the past eight and a half years I have been travelling all around the world wherever I could see, with my own eyes, so I could sound the alarm to the world. I have been to Antarctica, North Pole, Greenland, Iceland, Aral Sea — anyplace you name, I have been there! In July, I will be going to the North Pole again to see how much the situation has changed there. As His Holiness Pope Francis has said, "We need to see, with the eyes of faith … the link between the natural environment and the dignity of the human person." The most vulnerable must be foremost in our thoughts this year as Governments construct a global response to climate change and a new framework for sustainable development. The new sustainable development goals, which will be adopted in September, will provide a holistic approach that puts social and environmental objectives on par with economic objectives. Eradicating extreme poverty, ending social exclusion of the weak and marginalized, and protecting the environment are values that are fully consistent with the teachings of the great religions. Yesterday, I, together with Prime Minister Matteo Renzi and EU [European Union] High Representative Mogherini, went out to see how the operation that rescues migrants coming from Africa is being done. I was briefed on the naval ship, the San Giusto. I was briefed about Mare Sicura. The Mediterranean Sea, known as tranquil and peaceful, has become now a sea of misery and sea of tears. Why do they have to risk their lives, be drown to death? Because they have no hope. Either they stay in their home or they come to the sea. They know that they either die or leave. They risk their lives for a better chance. That we have to address with compassionate leadership and warm hands. I really appreciate the Italian Government, and many European Governments, who really send their helping hands. Particularly, the Italian Government and people. The United Nations, too, champions the disadvantaged and the vulnerable. We share a belief in the inherent dignity of all individuals and the sacred duty to care for and wisely manage our natural capital. And we believe that when people strive toward a common goal, transformational change is possible. That is why we work in partnership with Governments, the private sector, civil society and faith-based groups. If ever there were an issue that requires unity of purpose, it is climate change. Science tells us we are far off track from reducing global emissions sufficient to keep global temperature rise below 2° C. We are currently on course for a rise of 4-5° C. That would alter life on Earth as we know it. This is morally indefensible. It contradicts our responsibility to be good stewards of creation. People everywhere are realizing we must fundamentally change our ways. Some world leaders have called for the creation of an "ecological civilization," others for "development without destruction". Many countries are moving down a low-carbon pathway and investing in clean energy that can power truly sustainable development. To transform our economies, however, we must first transform our thinking, and our

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values. In this, the world's religions can provide valuable leadership. As the Holy See has said, "there is a moral imperative to act, for we all bear the responsibility to protect and to value creation for the good of this and future generations".

So the criterion for the round to achieve the morality is to combat climate change. This criterion precedes any others because protecting the environment is essential for people to pursue any values now or in the long run. If we destroy the environment we are destroying humanity so if I prove affirming helps combat climate change then you affirm because it outweighs any other concern.

I contend that banning nuclear power is essential to combat climate change.

1. **Nuclear power is not carbon free and so not effective at climate change.**

Jürgen Scheffran (International Network of Engineers and Scientists Against Proliferation), "Nuclear energy and climate change: limits and risks," "Costs, risks, and myths of nuclear," Reaching Critical Will a project of the Women's International League for Peace and Freedom, 2011, https://www.mapw.org.au/files/downloads/reaching%20critical%20will.pdf

Nuclear power is not carbon-free if the whole life-cycle of electricity production is taken into con-sideration. According to the GEMIS (Global Emission Model for Integrated Systems) database of the German Öko-Institut, a 1 GWe nuclear power reactor plant in Germany causes indirect emissions of 200,000 tonnes of CO2 per year, which is comparable to hydropower, lower than photovoltaic, and higher than for wind or improved efficiency of electricity generation and use.[3]Thus, nuclear power is not an effective means to miti-gate climate change and there are alternatives that avoid its negative side effects.

This means that while nuclear power might be lower in carbon emissions, they cannot solve for climate change because they are not carbon free giving you your first reason to affirm.

2. **Solutions to climate change should be nuclear free.**

Jürgen Scheffran (international Network of Engineers and Scientists Against Proliferation), "Nuclear energy and climate change: limits and risks," "Costs, risks, and myths of nuclear," Reaching Critical Will a project of the Women's International League for Peace and Freedom, 2011, https://www.mapw.org.au/files/downloads/reaching%20critical%20will.pdf

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Rather than burying or correcting the consequences of nuclear and fossil energies through nuclear waste disposal and climate engineering, it is more appropri-ate to avoid the problems in the first place. To this end, it is essential to establish a nuclear-free, carbon-free, and sustainable energy system.[9] Because of the adverse linkages between nuclear and climate risks, it is time to develop a new thinking that synergizes solutions in both nuclear security and climate policy with an inte-grated framework of sustainable peace. Finding solutions to one problem area could help to find solutions in the other. Preventing the dangers of climate change and nuclear war requires an integrated set of strategies that address the causes as well as the impacts on the natural and social environment. Insti-tutions are needed to strengthen common, ecological, and human security, build and reinforce conflict-res-olution mechanisms and low-carbon energy alterna-tives, and create sustainable lifecycles that respect the capabilities of the living world.

So clearly to solve for climate change we must ban nuclear power and so we must affirm.

3. **Renewable energy is better for climate change than is nuclear power.**

Jürgen Scheffran (international Network of Engineers and Scientists Against Proliferation), "Nuclear energy and climate change: limits and risks," "Costs, risks, and myths of nuclear," Reaching Critical Will a project of the Women's International League for Peace and Freedom, 2011, https://www.mapw.org.au/files/downloads/reaching%20critical%20will.pdf

Given the high economic costs of nuclear power, cheap nuclear electricity has remained a fiction. Al-though nuclear power has been heavily subsidized by governments and external costs have not been in-ternalised into its market price, nuclear energy is not commercially competitive compared to advanced re-newable energies that receive similar financial support. In a comprehensive environmental and economic as-sessment, including external costs from waste disposal, uranium mining, fuel processing, and

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radioactive emis-sions during normal operations, most renewable ener-gy sources look better than nuclear energy.

And nuclear power is not compatible with renewable energy.

Antony Froggatt (Independent energy consultant) and Mycle Schneider (Independent energy and nuclear policy consultant), "Nuclear power vs. renewable energy," "Costs, risks, and myths of nuclear," Reaching Critical Will a project of the Women's International League for Peace and Freedom, 2011, https://www.mapw.org.au/files/downloads/reaching%20critical%20will.pdf

From a systemic point of view there is a conflict be-tween an electricity grid that is designed and operated with nuclear at its core to one that focuses on a com-bination of energy efficiency and renewables. This is becoming increasingly transparent in countries or re-gions where renewable energy is taking a large share of electricity generation, i.e. in Germany and Spain. The main reasons are as follows.•Competition for limited investment funds. A euro, dollar, or yuan can only be spent once and it should be spent for the options that provide the largest emission reductions the fastest. Nuclear power is not only one of the most expensive but also the slowest option.•Overcapacity kills efficiency incentives. Central-ized, large, power-generation units tend to lead to structural overcapacities. Overcapacities leave no room for efficiency.•Flexible complementary capacity needed. Increas-ing levels of renewable electricity sources will need flexible, medium-load complementary facilities and not inflexible, large, baseload power plants.•Future grids go both ways. Smart metering, smart appliances and smart grids are on their way. The logic is an entirely redesigned system where the user gets also a generation and storage function. This is radically different from the top-down cen-tralized approach.

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So this is the clearest reason to affirm because nuclear power which will not solve for climate change actually thwarts renewable energy efforts and so we have to affirm to to stop climate change.

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Negative Cases

First Negative

I negate the resolution, "Resolved: Countries ought to prohibit the production of nuclear power." Negating achieves the value of morality. Morality is the correct value for the round because the word ought in the resolution is, according to the Random House Dictionary, used to express duty or moral obligation. As such it is the only normative term in the resolution meaning it is the only word in the resolution that could provide guidance as to how to begin to answer the question of the resolution. So, the resolution is asking if countries have a moral duty to ban nuclear power. We should look to the resolution to identify values because failing to do so would mean the question of the resolution is avoided or unanswered at the end of the round. For example, proving it would be just to ban nuclear weapons would not necessarily prove it is moral as the words, while bot normative, do not mean the same thing. Thus, you prefer my value and you can disregard offense that accesses an alternative value. To achieve morality, we must maximize happiness.

Power should be the means to the end of the greatest happiness.

James Mill, 'Essay on Government' Utilitarian Logic and Politics, Ed. Jack Lively and John Rees, 1978, pg 64

Power is a means to an end. The end is, everything, without exception, which the human being calls pleasure, and the removal of pain. The grand instrument for attaining what a man likes is the actions of other men. Power, in its most appropriate signification, therefore, means, security for the conformity between the will of one man and the acts of other men. This, we presume, is not a proposition which will be disputed. The master has power over his servant, because when he wills him to do so and so, -in other words, expresses a desire that he would do so and so, he possesses a kind of security that the actions of the man will correspond to his desire. The general commands of his soldiers to perform certain operations, the King commands his subjects to act in a certain manner, and their power is complete or not complete between the

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> actions willed and the actions performed. The actions of other men, considered as means for the attainment of the objects of our desire, are perfect or imperfect, in proportion as they are not certainly and invariably correspondent to our will. There is not limit, therefore, to the demand of security for the perfection of that correspondence.

Thus the criterion for the round must be maximizing happiness. On the most basic level this means saving and protecting life because life is a means to happiness and the happiness of others as loved ones feel pain when those they love die. So if I can prove that nuclear power preserves life then that would be enough to negate because it would mean that happiness is maximized.

I contend nuclear power saves lives and so is moral.

1. **Nuclear power has saved nearly two million lives.**

David Biello (associate editor at Scientific American), "How Nuclear Power Can Stop Global Warming," Scientific American, December 12, 2013, http://www.scientificamerican.com/article/how-nuclear-power-can-stop-global-warming/

In addition to reducing the risk of nuclear war, U.S. reactors have also been staving off another global challenge: climate change. The low-carbon electricity produced by such reactors provides 20 percent of the nation's power and, by the estimates of climate scientist James Hansen of Columbia University, avoided 64 billion metric tons of greenhouse gas pollution. They also avoided spewing soot and other air pollution like coal-fired power plants do and thus have saved some 1.8 million lives. And that's why Hansen, among others, such as former Secretary of Energy Steven Chu, thinks that nuclear power is a key energy technology to fend off catastrophic climate change. "We can't burn all these fossil fuels," Hansen told a group of reporters on December 3, noting that as long as fossil fuels are the cheapest energy source they will continue to be burned. "Coal is almost half the [global] emissions. If you replace these power plants with modern, safe nuclear reactors you could do a lot of [pollution reduction] quickly."

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So nuclear power saves millions of lives and so maximizes happiness and so is moral thus you can negate.

2. **Nuclear power has saved millions of lives and could save millions more.**

Mike Rencheck (president and CEO of AREVA Inc), "Nuclear power meets the challenges of climate change and better health," The Hill, January 27, 2014, http://thehill.com/blogs/congress-blog/energy-environment/196361-nuclear-power-meets-the-challenges-of-climate-change

Nuclear energy facilities prevented the equivalent production of 570 million metric tons of carbon dioxide emissions in the United States in 2012, according to the Nuclear Energy Institute (NEI). This is nearly equivalent to the amount of carbon dioxide that is released annually from 110 million cars. Not only that, but NASA scientists James Hansen and Pushker Kharecha published a study last year in the journal Environmental Science and Technology noting that global nuclear power has prevented an average of 1.8 million air pollution-related deaths that would otherwise have resulted from the burning of fossil fuels. If nuclear energy technologies replaced fossil fuels on a large scale, that number could grow to 7 million lives saved over the next 40 years.

This means nuclear power has the potential to save millions of more lives and so maximizes happiness and thus is moral and so you can negate.

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Second Negative

I negate the resolution, "Resolved: Countries ought to prohibit the production of nuclear power." Negating achieves the value of morality. Morality is the correct value for the round because the word ought in the resolution is, according to the Random House Dictionary, used to express duty or moral obligation. As such it is the only normative term in the resolution meaning it is the only word in the resolution that could provide guidance as to how to begin to answer the question of the resolution. So, the resolution is asking if countries have a moral duty to ban nuclear power. We should look to the resolution to identify values because failing to do so would mean the question of the resolution is avoided or unanswered at the end of the round. For example, proving it would be just to ban nuclear weapons would not necessarily prove it is moral as the words, while bot normative, do not mean the same thing. Thus, you prefer my value and you can disregard offense that accesses an alternative value. To achieve morality, we must embrace environmental pragmatism.

Morality demands we embrace environmental pragmatism in regard to environmental issues.

Joel A. Mintz (tenured full professor at Nova Southeastern University Law Center in Fort Lauderdale, Florida), "SOME THOUGHTS ON THE MERITS OF PRAGMATISM AS A GUIDE TO ENVIRONMENTAL PROTECTION," Boston College, http://www.bc.edu/content/dam/files/schools/law/lawreviews/journals/bcealr/31_1/01_TXT.htm

Environmental pragmatism is a relatively new direction in modern philosophy.34 A product of the late 1980s and 1990s, it attempts to connect the precepts and methods of philosophical pragmatism to the solution of real environmental issues.35 The most comprehensive collection of essays by environmental pragmatists may be found in Environmental Pragmatism, edited by Andrew Light and Eric Katz.36 In their introduction to this work, Light and Katz accurately observe that environmental pragmatism refers to "a cluster of related and overlapping concepts," as opposed to a single view.37 They note that it may take at least four distinct forms: (1) examinations into the connection between classical American philosophical pragmatism and environmental issues; (2) the articulation of practical strategies for bridging gaps between environmental theorists, policy analysts, activists, and the public; (3) theoretical investigations into the overlapping normative bases of specific environmental organizations and movements in order to provide grounds for the convergence of activists on policy choices; and (4) general arguments for theoretical and meta-theoretical moral pluralism in environmental normative theory.38

What all of the environmental pragmatist approaches share, however, is a rejection of the view that "adequate and workable environmental ethics must embrace non-

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anthropocentrism, holism, moral monism, and, perhaps, a commitment to some form of intrinsic value."[39] [*PG7] For Kelly Parker, the principal insight of environmental pragmatism is that "the human sphere is embedded at every point in the broader natural sphere, that each inevitably affects the other in ways that are often impossible to predict, and that values emerge in the ongoing transactions between humans and environments."[40] Parker defines environment as "the field where experience occurs, where my life and the lives of others arise and take place."[41] He believes that pragmatism commits us to treating all places where experience unfolds, i.e., all environments, with "equal seriousness."[42] Moreover, under Parker's pragmatic approach, people are encouraged to "restructure our social institutions" so that the public is afforded "a real voice in determining the kinds of environments we inhabit."[43] Like Parker, Sandra B. Rosenthal and Rogene A. Buckholz also emphasize the organic unity of the individual embedded in his or her environment.[44] To them, human beings are biological creatures, part of, and continuous with, nature.[45] In light of this, the philosophical argument over anthropocentrism is meaningless since no real line may be drawn between human and environmental well-being.[46] Rosenthal and Buckholz see the "systematic focus" of pragmatism as being on "science as method, or as lived through human activity, on what the scientist does to gain knowledge."[47] Humans exist in the world as active experimenters who create knowledge and formulate ethical values by integrating "potentially conflicting values and viewpoints."[48] Another leading environmental pragmatist, Bryan G. Norton, also advocates a pluralistic approach.[49] In Norton's opinion: [T]he goal of seeking a unified, monistic theory of environmental ethics represents a misguided mission, a mission that was formulated under a set of epistemological and moral assumptions that harks back to Descartes and Newton. . . . The search for a "Holy Grail" of unified theory in environmental [*PG8]values has not progressed towards any consensus regarding what inherent value in nature is, what objects have it, or what it means to have such a value.[50] Norton's expressed preference is for the integration of multiple values on three "scales" of human concern and valuation: (1) locally developed values that reflect the preferences of individuals; (2) community values that protect and contribute to human and ecological communities; and (3) global values, which express a hope for the long-term survival of our species.[51] As Norton views it: A good environmental policy will be one that has positive implications for values associated with the various scales on which humans are in fact concerned, and also on the scales on which environmentalists think we should be concerned if we accept responsibility for the impacts of our current activities on the life prospects and options—the "freedom"of future generations.[52] One particularly provocative aspect of environmental pragmatic thought is its desire for compatibilism, i.e., a philosophical framework within which competing environmental theories may be compatible in practice.[53] Andrew Light is an advocate for this view.[54] Light contrasts the views of social ecologists and materialists, such as Murray Bookchin and Herbert Marcuse,[55] who view environmental degradation as presupposed by a capitalist economy, and ontologists, including "deep ecologists" like Arne Naess,[56] whose focus is on reform of the self, and one's relationship with the non-human world, as expressed in individual identity.[57] To harmonize these mutually antagonistic schools of environmental thought, Light proposes a pragmatic "principle of tol[*PG9]erance."[58] Under it, theorists and practitioners are required to communicate a "straightforward public position" that endorses the considerations on which they agree, and the practices best suited to meeting their mutually desired goals, while leaving some questions that divide them to private dispute.[59] As Light sees it, "environmental pragmatists are not wedded to any particular theoretical framework from which to evaluate specific problems, but [they] can choose the avenue which best protects the long-term health and stability of the environment, regardless of its theoretical origin."[60] For Light and other environmental pragmatists,

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the "truth" of various environmental theories is thus not always important in environmental practice.61 Instead, "the appropriateness of any one theory in a particular case is contingent on historical, cultural, social and resource conditions."62

So the criterion to achieve morality becomes embracing environmental pragmatism. In other words, we should only adopt environmental policies that are effective at achieving their prescribed environmental goal. As reducing climate change by ending reliance on fossil fuels is the most important environmental issue of our time, we must opt for the best alternative to fossil fuels even if that alternative is not perfect as it would the pragmatic option.

I contend nuclear power is the best alternative to fossil fuels making them moral.

1. **Nuclear power is a proven alternative to fossil fuel.**

Patrick Moore, chairman and chief scientist of Greenspirit Strate-gies Ltd, "Greenpeace founder makes the case for nuclear," Nuclear News, June 2005, http://nature.berkeley.edu/er100/readings/Moore_2005.pdf

Indeed, nuclear power is already a proven alternative to fossil fuels. The United States relies on nuclear power for some 20 percent of its electricity production, and produces nearly one-third of global nuclear energy. Despite its current limited supply, nuclear energy now provides the vast majority (76.2 percent) of the U.S.'s emission-free gen-eration. (Others include hydroelectric, geothermal, wind, biomass,and solar.) In 2002, the use of nuclear energy helped the U.S. avoid the re-lease of 189.5 million tons of carbon into the air, if this electric-ity had been produced by coal. In fact, the electric sector's carbon emissions would have been 29 percent higher without nuclear power. And while hydro, geothermal, and wind energy all form an im-portant part of reducing our reliance on fossil fuels, without nu-clear energy that reliance will likely not diminish. In 2002, car-bon emissions avoided by nuclear power were 1.7 times larger than those avoided by all renewables combined. But let me make it clear at this point that I believe there should also be a much greater emphasis on renewable energy produc-tion. I believe the two most important renewable energy tech-nologies are wind energy, which has great potential, and ground-source heat pumps, known as geothermal or GeoExchange. Solar panels will not be cost-effective for mass application until their cost is reduced by 5–10 times. I would not be inclined to support an energy policy that focused

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exclusively on nuclear but would rather insist that an equal emphasis be placed on renewables, even though it is not possible, given present technologies, that renew-ables could produce the same quantity of power as nuclear plants.

This means that nuclear power is the best alternative to fossil fuels as it is more effective than renewable alternatives and so you can negate.

2. **Realistically, if we ban nuclear power we will grow more dependent on coal, not less.**

Michael H. Fox (Emeritus Professor in the Department of Environmental and Radiological Health Sciences at Colorado State University) , "The environmental case for nuclear power," Oxford University Press Blog, August 13, 2014, http://blog.oup.com/2014/08/environmental-case-nuclear-power/

I am an environmentalist but most environmental groups are opposed to nuclear power. I challenge environmentalists to look at the environmental cost of depending on coal and measure that against the actual risks from nuclear power. Even in the worst accident — Chernobyl — the effects were localized, but the atmospheric effects of burning coal are worldwide. If environmentalists continue to oppose nuclear power, coal will still be providing most of the world's electricity 50 years from now and the earth will be on a path to catastrophic warming. The choice is ours. I believe the best choice is to reduce global warming by replacing most coal power plants with nuclear power. I hope we have the wisdom to take that path.

This means that if we affirm we will rely more on fossil fuels and not less. The affirmative cannot solve this by simply also fiating that we reduce fossil fuels or become more energy efficient as either would be ludicrously extra topical and beyond your jurisdiction to vote for, thus nuclear power is the most pragmatic realistic alternative and so you can negate.

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Affirmative Extensions

There is no way to guarantee the safety of nuclear waste hundreds of thousands of years into the future.
Greenpeace, "The Deadly Legacy of radioactive waste," Greenpeace.org, July, 2010, http://www.greenpeace.org/france/PageFiles/266521/dechets-nucleaires-un-herita.pdf

For over 50 years the nuclear industry has produced large volumes of hazardous radioactive waste along the whole nuclear chain - from uranium mining and enrichment to reactor operation, waste reprocessing and decommissioning. Today, nuclear energy is being sold to politicians and consumers as one of the options for fighting climate change that will also deliver energy security. However, nuclear energy is a dangerous obstacle on the road to a clean energy future.1 On top of other substantial problems related to safety and costs, nuclear waste remains a major flaw of nuclear energy.The International Atomic Energy Agency (IAEA) estimates that the industry annually produces 1 million barrels (200,000 m3) of what it considers 'low and intermediate-level waste' and about 50,000 barrels (10,000 m3) of the even more dangerous 'high-level waste'.2 These numbers do not include spent nuclear fuel, which is also high-level waste.It takes 240,000 years for radioactive plutonium to decay to a level that is safe for human exposure, which is an even longer period than modern humans have been on the Earth (200,000 years). There is no way to guarantee that these substances can be kept safe for this amount of time. It is senseless to allow the nuclear industry to continue producing more nuclear waste.

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Despite billions spent over decades, there is no safe storage solution to nuclear waste.
Greenpeace, "The Deadly Legacy of radioactive waste," Greenpeace.org, July, 2010, http://www.greenpeace.org/france/PageFiles/266521/dechets-nucleaires-un-herita.pdf

Billions of euros have been spent over the past half-century on finding a solution to the nuclear waste problem. The attempts have all been unsuccessful. For years, low level radioactive waste was dumped at sea, 'out of sight and out of mind'. Disintegrating barrels brought the waste back into the environment and dangerous substances accumulated in the bodies of animals. After 15 years of campaigning by Greenpeace, an international treaty was signed in 1993 banning all dumping of radioactive waste at sea. In Asse, Germany, an experimental radioactive waste dump was set up in the 1960s in salt formations deep underground. A few years ago it was discovered that it had started leaking water in 1988 and is currently flooding with 12,000 litres of water each day. As a result, all 126,000 barrels of waste already placed in the dump now need to be cleared out. Asse was envisaged as a pilot project for a final storage solution in the salt layers under Gorleben, but there is now serious doubt in Germany about the viability of salt layers as storage for nuclear waste. One of the largest nuclear dumps in the world, the Centre de Stockage de La Manche (CSM) in northern France was opened in 1969 to store low-level waste. It was closed in 1994. It currently stores 520,000 m3 of radioactive materials from waste reprocessing and French nuclear reactors. A 1996 commission set up by the French government concluded that the site also contained long-living waste and high-level waste, and that the true inventory was effectively unknown. In 2006 it was found that contaminated water from the site had already been leaking into an underground aquifer, threatening the surrounding agricultural land. In 1987, Yucca Mountain - about 80 miles north of Las Vegas - was designated as the site for long-term disposal of radioactive wastes in the United States. However, the US Geological Survey has found a seismic fault line under the site and there are serious doubts about the long-term movements of underground water that can transport deadly contamination into the environment. As a result of these problems and billions of dollars in cost overruns, the US government stopped funding the project in early 2010.

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Proposed solutions to storing nuclear waste safely are flawed.
Greenpeace, "The Deadly Legacy of radioactive waste," Greenpeace.org, July, 2010, http://www.greenpeace.org/france/PageFiles/266521/dechets-nucleaires-un-herita.pdf

Sweden plans to pack waste in cast iron inserts in copper canisters and place them in holes bored in tunnel floors, deep underground (400-500 metres), surrounded by bentonite clay. Water is expected to make the bentonite clay expand so that it fills the cavities in the surrounding granite rock which would reduce groundwater movement. Finland adopted the same system and Switzerland and the UK are considering this option. But there are already major concerns. The copper canisters were expected to survive corrosion for at least 100,000 years but recent research shows that they can fail in just 1,000 years or less3. There are also concerns about the build-up of hydrogen produced as a result of corrosion. High temperatures from the canisters could also affect the clay buffer, while groundwater flows could bring contaminants from any compromised containers into the biosphere. Furthermore, Nordic countries will face at least one Ice Age in the coming 100,000 years4, entailing extremely violent earthquakes, penetration of permafrost to the disposal depth and below, potential intrusion of water and unpredictable changes in groundwater flows. Unlike Sweden and Finland, which rely on man-made barriers to prevent leakage, France and Belgium are exploring clay as a natural barrier. The waste is to be contained in simple stainless steel canisters, which can corrode much faster than the Swedish copper ones. Hence the French/Belgium concept relies on the natural clay formation to contain radioactivity. The crucial question is whether it can be guaranteed – for hundreds of thousands of years – that no cracks or channels will form in the clay layers, which would cause water to leak in and out again, poisoning nearby aquifers.

New nuclear plants will produce a form of super waste.
Greenpeace, "The Deadly Legacy of radioactive waste," Greenpeace.org, July, 2010, http://www.greenpeace.org/france/PageFiles/266521/dechets-nucleaires-un-herita.pdf

Nuclear waste research has so far focused on waste produced by existing reactors. However, the nuclear industry is pushing new, so-called 'Generation III' designs, which are designed to use nuclear fuel more efficiently. The amount of dangerous materials in spent nuclear fuel significantly increases with the time the fuel stays in the reactor. Consequently, the spent fuel becomes more hazardous as more energy is extracted from the fuel. This so-called high burn-up of fuel should increase electricity output for a certain amount of fuel, and hence the economic profit for the operators. Recent studies show that spent nuclear fuel from the European Pressurised Reactor (EPR), a French design currently under construction in Finland, France and China, will be up to seven times more hazardous per unit of electric output, because of drastic increases in the amount of easily released, dangerous and long-living radioactive isotopes such as iodine-1295 than that produced by existing nuclear reactors6. The spent fuel also becomes hotter, more brittle and more likely to lose integrity in accident situations or in storage. This means that not only will waste produced by the EPR be more dangerous to health, but also the technical demands, risks, costs of storage and disposal will be far more challenging, likely increasing the overall cost of nuclear waste disposal.

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There is no proposed solution to securing nuclear waste for the duration of its half-life.
Greenpeace, "The Deadly Legacy of radioactive waste," Greenpeace.org, July, 2010, http://www.greenpeace.org/france/PageFiles/266521/dechets-nucleaires-un-herita.pdf

Once placed into final storage, nuclear waste also needs to be monitored and secured from human interference as well as natural events. Stored civilian and military nuclear waste, such as plutonium or uranium, are sources of radioactive material that can be used for the production of nuclear bombs. A few kilograms of these substances would be sufficient to make bombs similar to the ones used on Japan during World War II. Even a very modest amount of radioactive material from waste storage sites would be sufficient to make a 'dirty bomb', which could contaminate an entire city. To deal with the problem, the nuclear industry proposes, at the very best, to guard storage sites for 300 years. But there is no proposal to ensure security for the other 239,700 years.

Often storage of nuclear waste defies science.
Greenpeace, "The Deadly Legacy of radioactive waste," Greenpeace.org, July, 2010, http://www.greenpeace.org/france/PageFiles/266521/dechets-nucleaires-un-herita.pdf

Several countries have attempted to find a suitable location for waste disposal. However, science is often not the decisive criteria – usually, sites with low local resistance are preferred over those with best geological conditions. With few exceptions, sites right next to an existing nuclear plant are chosen. In Finland, more than 100 locations were found to be potentially suitable. However, public opposition in those locations made the authorities change the criteria for site selection from 'best available' to 'good enough', allowing for inclusion of Loviisa and Olkiluoto. These towns already host nuclear power stations and resistance against a nuclear waste storage was relatively low. The final site choice was for Olkiluoto – conveniently on the same peninsula that also hosts a low-level waste storage, two nuclear power stations and a third one under construction.

Interim storage of nuclear waste is highly risky.
Greenpeace, "The Deadly Legacy of radioactive waste," Greenpeace.org, July, 2010, http://www.greenpeace.org/france/PageFiles/266521/dechets-nucleaires-un-herita.pdf

Some countries, like the Netherlands, have set up interim storage for 100 years to safeguard the dangerous waste for a definite period of time. In the meantime, leakages and accidents need to be prevented. The large amounts of highly radioactive waste in storage could lead to massive contamination in the event of failure of the containers or the buildings themselves, either through deterioration or due to external events such as natural disasters (earthquakes, flooding) or malevolent acts. While the nuclear waste debate focuses on final storage, most spent nuclear fuel remains in poorly safeguarded interim storage for decades to come; addressing the flaws in intermediate storage should be the first priority.

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Reprocessing nuclear waste is a myth that actually increases the risks from nuclear waste.
Greenpeace, "The Deadly Legacy of radioactive waste," Greenpeace.org, July, 2010, http://www.greenpeace.org/france/PageFiles/266521/dechets-nucleaires-un-herita.pdf

The nuclear industry talks about the 'nuclear fuel cycle' and claims that, after use, nuclear fuel is recycled. In reprocessing facilities, the plutonium and unused uranium are separated out from other waste with the intention to reuse it in nuclear plants. In reality, the term 'reprocessing' or 'recycling' is misleading, since a lot of the recovered materials are not reused. For example, the UK now has a 100 tonne stockpile of separated plutonium. Thousands of tonnes of reprocessed uranium from France are exported to Russia, where 90% is stored without any further foreseen use. Reprocessing does not get rid of any of the radioactivity in the spent fuel - but the process does spread it about through discharges to the environment and through creating a larger volume of low, intermediate and high-level wastes.

The transportation of nuclear waste is extremely dangerous.
Greenpeace, "The Deadly Legacy of radioactive waste," Greenpeace.org, July, 2010, http://www.greenpeace.org/france/PageFiles/266521/dechets-nucleaires-un-herita.pdf

Nuclear waste, such as spent nuclear fuel, plutonium and other highly radioactive material, is transported all over the planet, often passing through large inhabited areas. These deadly convoys pose a serious risk to populations and ecosystems along the routes. If an accident were to occur, radioactivity could contaminate several square kilometres or more. The convoys are also at risk of terrorist attack. Nuclear transports are regularly met with huge protests because of the risks and the lack of a solution to deal with the dangerous waste. The annual transport of nuclear waste from France to Gorleben in Germany draws tens of thousands of demonstrators. Tonnes of plutonium resulting from reprocessing are also regularly shipped from France and the UK to Japan, crossing the territorial waters of many countries on the way, as well as important marine ecosystems. Depleted uranium from Europe has been transported to Russia, where thousands of barrels are dumped in large open-air storage sites in the Urals.

Storing nuclear waste is very costly.
Greenpeace, "The Deadly Legacy of radioactive waste," Greenpeace.org, July, 2010, http://www.greenpeace.org/france/PageFiles/266521/dechets-nucleaires-un-herita.pdf

Because it is as yet unclear how nuclear waste can be safely stored for the amount of time necessary, it is very difficult to make a full projection of costs. In many countries, nuclear energy companies are required to reserve money for waste processing and storage in the future. In several countries, however, these waste funds appear to be far too small and have in the past been used for new risky investments. When the UK privatised nuclear utility British Energy, the State had to spend £5.3 billion (€6.6 billion) of taxpayers' money to fill a hole in the company's reserves for decommissioning and waste. British Energy's fund would only cover a fraction of the total cost for decommissioning and waste for all 45 existing British nuclear reactors, so far estimated to be around £70 billion (€88 billion). It is likely that the cost for dealing with all of this will continue to rise.

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Despite solid preparations, natural disaster still wreaked havoc on Fukushima and Japan.
Kozue Akibayashi (WILPF Japan), "Preface," "Costs, risks, and myths of nuclear," Reaching Critical Will a project of the Women's International League for Peace and Freedom, 2011, https://www.mapw.org.au/files/downloads/reaching%20critical%20will.pdf

Six months have already passed since the earthquake and tsunami that literally devastated the Tohoku, the northeast area of Japan, on 11 March 2011. In Japan, not a single day has gone by without hearing about the victims. More than 20,000 people have died or are still missing as a result of the magnitude 9.0 earthquake and a series of tsunamis that surpassed what had been predicted. More than 80,000 have lost their homes and in many cases their entire community, and remain dis-placed to this day. Even to the people of Japan—pos-sibly the best-prepared for large-scale earthquakes and tsunamis because of the country's long earthquake-prone history—the power of this catastrophe was be-yond our imagination. The reconstruction of the re-gion will require long-term efforts of the entire nation and international cooperation.The earthquake and tsunamis are gone, but we are now left to cope with something very different: ra-diation. The Fukushima Dai-ichi Nuclear Power Station, one of the oldest nuclear power plants in Ja-pan, with some of its reactors hav-ing been in operation for nearly 40 years, was severely wrecked by the earthquake and tsunami on 11 March 2011. Soon after that, the plant managers lost control; explo-sions, meltdowns, and the release of radioactive materials followed. We were not told what was actually going on at the time. The Japanese government's daily press confer-ence did not confirm what many suspected: that massive radiation was leaking into the soil, water, and air. We first learned from foreign sources about the hydrogen explo-sions of the plant's containment buildings on 14 March and after.

The public is poorly informed on how to react in nuclear crisis.
Kozue Akibayashi (WILPF Japan), "Preface," "Costs, risks, and myths of nuclear," Reaching Critical Will a project of the Women's International League for Peace and Freedom, 2011, https://www.mapw.org.au/files/downloads/reaching%20critical%20will.pdf

It has been reported recently that many residents in the surrounding areas of the Fukushima Dai-ichi plant had to make decisions about evacuation without suf-ficient information and headed to locations that were later revealed to have been contaminated with higher levels of radiation, because their assumption of the wind direction was incorrect. If the Japanese govern-ment, the Nuclear Safety Committee, the Ministry of Economy, Trade and Industry, the Nuclear and Indus-trial Safety Agency, and the Tokyo Electric Power Com-pany had provided the information on wind direction and the simulation of radiation spread that they had already had, these residents could have made different decisions. Now many residents are struggling with very little help to figure out what safety measures they can take, especially to protect children who are more vulner-able to radiation. Such stories of undermining the safe-ty of people are, very unfortunately, legion, and even to this day we feel left in dark with no good information.

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Nuclear accidents will contaminate local food supply.
Kozue Akibayashi (WILPF Japan), "Preface," "Costs, risks, and myths of nuclear," Reaching Critical Will a project of the Women's International League for Peace and Freedom, 2011, https://www.mapw.org.au/files/downloads/reaching%20critical%20will.pdf

Now we, in Japan, are facing serious radiation spread nationwide, if not worldwide. The leak and contami-nation have been continuing. Radioactive cesium has been detected in beef from the region that was earlier considered far enough from the Fukushima Dai-ichi photo: NHK Tv; A member of the 'Fukushima 50,' workers who remainedonsite after the disaster to bring the reactors under control. Costs, risks, and myths of nuclear power7plant. Agricultural soils contaminated with cesium have already been sold throughout Japan. With the rice harvest season approaching, everyone is anxious to know whether our staple food will be safe. Farmers, fishermen, and dairy farmers in Fukushima and adja-cent areas are struggling because their products may not be safe, or may not be sold as consumers are deeply dubious about the food safety and fearful of exposure to radiation, contrary to the government's repeated comment that the low-level radiation, even when de-tected, will not have immediate danger to our health. But who can ensure long-term safety?

Nuclear accidents are far from rare or geographically isolated.
M.V. Ramana (Program on Science and Global Security, Princeton University), "Costs, risks, and myths of nuclear power26No escape from accidents," "Costs, risks, and myths of nuclear," Reaching Critical Will a project of the Women's International League for Peace and Freedom, 2011, https://www.mapw.org.au/files/downloads/reaching%20critical%20will.pdf

There are two ways of approaching this question. First, there is a history of small and large accidents at nuclear reactors. This history shows us that accidents occur in most, if not all, countries, involving various re-actor designs, initiated by internal and external events, and with different patterns of progressions. Many of these accidents did not escalate purely by chance, often involving the intervention of human operators rather than any technical safety feature. Such interventions cannot be taken for granted and so it seems all but in-evitable that nuclear reactors will experience accidents.

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There is a limit to how safe nuclear power plants could become.
M.V. Ramana (Program on Science and Global Security, Princeton University), "No escape from accidents," "Costs, risks, and myths of nuclear," Reaching Critical Will a project of the Women's International League for Peace and Freedom, 2011, https://www.mapw.org.au/files/downloads/reaching%20critical%20will.pdf

Second, at a deeper level, all nuclear power plants share some common structural features, though to dif-ferent extents. The most influential work that explored these features was Charles Perrow's conceptualization of what happened at Three Mile Island in 1979 as a "normal accident" whose origins lay in the structural characteristics of the system.1 Normal Accident Theory (NAT) identifies two characteristics, interactive com-plexity and tight coupling, that make nuclear reactors and similar technologies prone to catastrophic acci-dents. Interactive complexity pertains to the potential for hidden and unexpected interactions between dif-ferent parts of the system, and tight coupling refers to the time dependency of the system and the presence of strictly prescribed steps and invariant sequences in operation that cannot be changed. According to Per-row, these are inherent features of nuclear reactors, and there is a limit to how far they can be reduced through engineering efforts.

Fukushima proves that multiple safety systems can fail at once.
M.V. Ramana (Program on Science and Global Security, Princeton University), "No escape from accidents," "Costs, risks, and myths of nuclear," Reaching Critical Will a project of the Women's International League for Peace and Freedom, 2011, https://www.mapw.org.au/files/downloads/reaching%20critical%20will.pdf

How then is it that the nuclear industry claims that nuclear reactors are safe? Engineers and other techni-cal experts rely primarily on the use of multiple protec-tive systems, all of which would have to fail before a ra-dioactive release could occur. This approach is known as "defense-in-depth," and it is often advertised as an assurance of nuclear safety.2 However, as demonstrated M.V. Ramana is with the Program on Science and Global Security at Princeton University and is on the Coordinating Committee of the Coalition for Nuclear Disarmament and Peace (India).at Fukushima, there are occasions when multiple safety systems do fail at the same time—and these occur far more frequently than technical analysts seem to assume.

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There are multiple theoretical and empirical reasons to doubt the nuclear industry's probabilistic risk assessment (PRA).
M.V. Ramana (Program on Science and Global Security, Princeton University), "No escape from accidents," "Costs, risks, and myths of nuclear," Reaching Critical Will a project of the Women's International League for Peace and Freedom, 2011, https://www.mapw.org.au/files/downloads/reaching%20critical%20will.pdf

There are both empirical and theoretical reasons to doubt these numbers. A 2003 study on the future of nuclear power carried out by the Massachusetts In-stitute of Technology points out that "uncertainties in PRA methods and data bases make it prudent to keep actual historical risk experience in mind when making judgments about safety."7 What does history tell us? Globally, there have been close to 15,000 reactor-years of experience, with well-known severe accidents at five commercial power reactors—three of them in Fuku-shima. However, depending on how core damage is de-fined, there are other accidents that should be included and the actuarial frequency of severe accidents may be as high as 1 in 1,400 reactor-years.8 At that rate, we can Costs, risks, and myths of nuclear power27expect an accident involving core damage every 1.4 years if nuclear power expands from today's 440 commercial power reactors to the 1,000-reactor scenario laid out in the MIT study. In either case, though, our experience is too limited to make any reliable predictions. heoretically, the probabilistic risk assessment method suffers from a number of problems. Nancy Leveson of MIT and her collaborators have argued that the chain-of-event conception of accidents typi-cally used for such risk assessments cannot account for the indirect, non-linear, and feedback relationships that characterize many accidents in complex systems.9These risk assessments do a poor job of modeling hu-man actions and their impact on known, let alone unknown, failure modes. Also, as a 1978 Risk Assess-ment Review Group Report to the NRC pointed out, it is "conceptually impossible to be complete in a math-ematical sense in the construction of event-trees and fault-trees....This inherent limitation means that any calculation using this methodology is always subject to revision and to doubt as to its completeness."10Probabilistic risk assessment models do not account for unexpected failure modes during many accidents. At Japan's Kashiwazaki Kariwa reactors, for example, after the 2007 Chuetsu earthquake some radioactive materials escaped into the sea when ground subsidence pulled underground electric cables downward and cre-ated an opening in the reactor's basement wall. As a Tokyo Electric Power Co. official remarked then, "It was beyond our imagination that a space could be made in the hole on the outer wall for the electric cables."11Yet when it comes to future safe-ty, nuclear designers and operators always seem to assume that they know what is likely to happen. This is what allows them to assert that they have planned for all possible contingencies. Or, as the chairman of the Indian Atomic Energy Com-mission asserted in the aftermath of Fukushima, nuclear reactors [in In-dia] are "one hundred percent" safe.12

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Redundancy built into nuclear power plants can actually make things worse.
M.V. Ramana (Program on Science and Global Security, Princeton University), "No escape from accidents," "Costs, risks, and myths of nuclear," Reaching Critical Will a project of the Women's International League for Peace and Freedom, 2011, https://www.mapw.org.au/files/downloads/reaching%20critical%20will.pdf

Fukushima also demonstrated one of the perverse impacts of using multiple systems to ensure greater lev-els of safety: redundancy can sometimes make things worse. At Fukushima, as with most reactors around the world, zirconium cladding surrounded and protected the fuel, preventing the escape of radioactive materi-als up till very high temperatures. But when the cool-ing systems stopped working, the zirconium cladding overheated. Hot zirconium interacted with water or steam, producing hydrogen gas. When this hydrogen came into contact with air in the containment build-ing, it caused an explosion that reportedly damaged the suppression pool beneath the reactor, another protec-tive system.16 In other words, in complex systems such as nuclear reactors, redundancy may have unexpected and negative consequences for safety, as scholars in-cluding Charles Perrow and especially Scott Sagan have pointed out in the past.17

Safety is secondary to profit when building nuclear plants.
M.V. Ramana (Program on Science and Global Security, Princeton University), "No escape from accidents," "Costs, risks, and myths of nuclear," Reaching Critical Will a project of the Women's International League for Peace and Freedom, 2011, https://www.mapw.org.au/files/downloads/reaching%20critical%20will.pdf

There is another error of understanding involved in producing these lists of recommendations—the idea that organizations that operate nuclear facilities or other high-hazard technologies would want to imple-ment these in the first place. The problem is that for most organizations, "the mission is something other than safety, such as producing and selling products.... In addition, it is often the case that the non-safety goals are best achieved in ways that are not consistent with designing or operating for lowest risk."21 In the case of nuclear designers and operators, it could be to produce the most amount of nuclear electricity at the least pos-sible cost, or to build many reactors rapidly so as to cap-ture a large fraction of the electricity sector and achieve concomitant political power. This is yet another seri-ous challenge to achieving accident-free operations at nuclear facilities.

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The nuclear industry successfully lobbies governments to ease safety restrictions.
M.V. Ramana (Program on Science and Global Security, Princeton University), "No escape from accidents," "Costs, risks, and myths of nuclear," Reaching Critical Will a project of the Women's International League for Peace and Freedom, 2011, https://www.mapw.org.au/files/downloads/reaching%20critical%20will.pdf

In just about every country that has a significant nu-clear sector, those organizations that build or operate nuclear reactors and other facilities wield significant political power. This power manifests itself in a variety of ways including weaker regulation, often made weak-er through regulatory capture, and mechanisms allow-ing the externalization and socialization of costs while privatizing profits (for example, liability laws that cap the extent to which nuclear organizations have to pay for accident-related damage). Neither of these fea-tures is conducive to the improvement of safety. More broadly, one of the themes coming out in the wake of Fukushima is the history of TEPCO's many ways of un-dermining safety at its plants and covering these up. TEPCO is unlikely to be unique in this respect; any nu-clear utility that is subject to such careful investigation will likely demonstrate similar, though not identical, patterns of behavior.

Peaceful nuclear power programs could easily become nuclear weapons programs.
Ray Acheson (Reaching Critical Will of WILPF), "Nuclear weapons and nuclear power," "Costs, risks, and myths of nuclear," Reaching Critical Will a project of the Women's International League for Peace and Freedom, 2011, https://www.mapw.org.au/files/downloads/reaching%20critical%20will.pdf

Former-nuclear weapons designer Theodore B. Tay-lor has pointed out that a government that seeks to acquire technology and equipment for nuclear power "may have no intention to acquire nuclear weapons; but that government may be replaced by one that does, or may change its collective mind." At that point, he says, "A country that is actively pursuing nuclear power for peaceful purposes may also secretly develop nuclear explosives to the point where the last stages of assem-bly and military deployment could be carried out very quickly."6 Physicists Zia Mian and Alexander Glaser of Princ-eton University have explained that the difference in scale between civilian and military nuclear programmes means that a civilian nuclear reactor can often produce more highly enriched uranium or plutonium for weap-ons than a dedicated military reactor can:A 40 MW(th) reactor like CIRUS in India produces enough plutonium for about two nuclear weapons a year, while one of India's small, roughly 700MW(th) power reactors (which produces ca. 200 MW elec-tric power) can yield about ten times that much plutonium a year. A similar case holds for uranium enrichment; about 150 tSWU (or 150,000 separative work units) are required to produce the annual low-enriched uranium fuel for a 1,000 MW(e) nuclear power reactor, while ten percent of this enrichment capacity could produce 100 kg of highly enriched uranium, enough for several nuclear weapons.7

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Nuclear power proliferations undermines efforts and nuclear weapon non-proliferation.
Ray Acheson (Reaching Critical Will of WILPF), "Nuclear weapons and nuclear power," "Costs, risks, and myths of nuclear," Reaching Critical Will a project of the Women's International League for Peace and Freedom, 2011, https://www.mapw.org.au/files/downloads/reaching%20critical%20will.pdf

In the first place, there has not been any progress by the nuclear weapon states to eliminate their nuclear weapons as required by article VI of the nuclear Non-Proliferation Treaty (NPT). At the same time, under the NPT, non-nuclear weapon states are given the "right" to develop nuclear capabilities for "peaceful" purposes. Non-nuclear weapon states that are party to the NPT do not want to accept stricter regulation of their devel-opment of nuclear energy while the nuclear weapons states are not compiling with their obligations on nu-clear disarmament. Furthermore, some states parties to the NPT have also violated their obligations not to engage in nuclear trade with non-states parties, name-ly India. In 2008, the Nuclear Suppliers Group granted India an exemption under its no-trade rules, meaning that other countries have since been able to sell India nuclear fuel for its reactors even though this means it is able to use its own indigenously-produced fuel for its weapons. While stricter controls over nuclear fuel chain tech-nology and materials are necessary to mitigate the risks posed by their proliferation, it is difficult to negoti-ate such controls in a two-tiered system, where some states are allowed to have nuclear weapons and others are not, and where the rules are broken for some states but are applied beyond the letter of the law for others.

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Fukushima is not unique in its vulnerability to a changing environment.
Dave Sweeney (Australian Conservation Foundation) and Dimity Hawkins (ndependent activist, researcher, writer), "Poisoned pathways: the impacts of the nuclear fuel cycle on human health, culture, and the environment," "Costs, risks, and myths of nuclear," Reaching Critical Will a project of the Women's International League for Peace and Freedom, 2011, https://www.mapw.org.au/files/downloads/reaching%20critical%20will.pdf

Emissions, risks of accident and mishap, and the in-tractable problem of radioactive waste are some of the problems with 'routine' operations within the nuclear industry. Fukushima again highlights that even in fa-cilities that enjoy regulatory approval and supervision in countries that have a high level of technological so-phistication, economic capacity, and resources such as Japan, things can and do go wrong. Accidents, errors, natural disasters, and the potential of terrorism tar-geted at nuclear facilities are ever present and very real scenarios on any nuclear journey.The events in Fukushima have shown the unpredict-ability, severity, and longevity of consequences when things in the nuclear industry do not go as expected. Such situations are increasingly likely in a world fac-ing the unpredictable but very real consequences of a changing climate. The Fukushima situation arose ini-tially from massive and unforeseen natural disasters, ex-acerbated by inadequate scenario modeling and human error in the crucial first days and weeks. However Fuku-shima is not alone in suffering from the capricious im-pacts of a changing environment. Already 2011 has seen a number of severe climate related events which have affected other nuclear facilities, including reactors be-ing threatened or shut down in France because drought had reduced cooling water capacity4 and an emergency shut down of two nuclear plants in Nebraska caused by extensive flooding of the Missouri River system.5 Ex-perts are raising concerns over the impact of increased storm and wave surges or activity along coastal areas, given many nuclear reactors are located in these zones.

Nuclear plants pose risks to communities and workers.
Dave Sweeney (Australian Conservation Foundation) and Dimity Hawkins (ndependent activist, researcher, writer), "Poisoned pathways: the impacts of the nuclear fuel cycle on human health, culture, and the environment," "Costs, risks, and myths of nuclear," Reaching Critical Will a project of the Women's International League for Peace and Freedom, 2011, https://www.mapw.org.au/files/downloads/reaching%20critical%20will.pdf

There is an increasing body of scientific and medi-cal evidence highlighting the health risks to communi-ties and workers from exposure to ionizing radiation, with many medical and scientific experts agreeing that there is no safe level of exposure to ionizing radiation. Radioactive contamination does not respect national boundaries and the carriage through air, water, and the food chain can have profound and adverse effects on human health. Exposure increases the risk of dam-age to tissues, cells, DNA, and other vital molecules. This can result in programmed cell death (apoptosis), genetic mutations, cancers, leukaemias, birth defects, and reproductive, immune, cardiovascular, and endo-crine system disorders. Several significant epidemiological studies have been made about the impacts to children's health in proximity to nuclear reactors in European countries. Two such studies concluded in 2007 and 2008 showed startling evidence of childhood leukemias in children within 5km of German nuclear reactors over 20 years.6 However, there remains a lack of comprehensive public information about these health risks.

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Managing nuclear waste becomes increasingly complex as time goes by.
Dave Sweeney (Australian Conservation Foundation) and Dimity Hawkins (ndependent activist, researcher, writer), "Poisoned pathways: the impacts of the nuclear fuel cycle on human health, culture, and the environment," "Costs, risks, and myths of nuclear," Reaching Critical Will a project of the Women's International League for Peace and Freedom, 2011, https://www.mapw.org.au/files/downloads/reaching%20critical%20will.pdf

At the conclusion of all stages of the nuclear chain, we are left with both the intractable human and en-vironmental menace and the profound management challenge that is radioactive waste. Radioactive waste is a long-lived and serious environmental hazard and its production should be minimised or halted. As a society we need to move from an unrealistic concept of 'dispos-al' towards a sense of stewardship and long-term isola-tion and management of existing radioactive waste. Just as the nuclear fuel chain becomes increasingly complex the further down the road it travels, the wastes generated also get more complex. They become more concentrated, dangerous, and difficult to manage and isolate. A fundamental principle in dealing with dan-gerous industrial wastes is reduction at source. Instead of seeking to catch what comes out of the polluted pipe, it makes far more sense to turn off the toxic tap. Open and inclusive processes to develop an effective approach to radioactive waste management are urgent-ly required. Such an approach would be based on the adoption of best international standards and practices, non-imposition of transport or storage of radioactive waste, and active waste minimisation.

The benefits of nuclear power do not outweigh the costs.
Dave Sweeney (Australian Conservation Foundation) and Dimity Hawkins (ndependent activist, researcher, writer), "Poisoned pathways: the impacts of the nuclear fuel cycle on human health, culture, and the environment," "Costs, risks, and myths of nuclear," Reaching Critical Will a project of the Women's International League for Peace and Freedom, 2011, https://www.mapw.org.au/files/downloads/reaching%20critical%20will.pdf

Seven decades into the nuclear experiment, it is in-creasingly clear that while the benefits promoted by the industry have not materialized, the extensive hazards created by the industry have. From uranium explora-tion to the permanent problem of radioactive waste management, the path promoted and pushed by the nuclear industry burdens, threatens, and degrades our shared human and natural environment. The lived Indigenous experience of this reality is summed up powerfully by Yvonne Margarula's obser-vation that the "promises never last, but the problems always do." Fukushima is a global reminder of the ur-gent need to move beyond the nuclear age and it is now time for the nuclear industry to stop producing prob-lems and stop breaking promises.

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Nuclear power cannot replace fossil fuels.
Jürgen Scheffran (nternational Network of Engineers and Scientists Against Proliferation), "Nuclear energy and climate change: limits and risks," "Costs, risks, and myths of nuclear," Reaching Critical Will a project of the Women's International League for Peace and Freedom, 2011, https://www.mapw.org.au/files/downloads/reaching%20critical%20will.pdf

Because of the long planning cycles and its inad-equacy for use in combustion and as transportation fuel, nuclear energy cannot replace in a reasonable timeframe the large amounts of fossil fuel currently consumed. Since uranium resources are limited, a sus-tainable energy supply based on nuclear energy cannot be realized with a once¬-through cycle that avoids plu-tonium reprocessing. Even a drastic increase in nuclear energy could not compensate for the current growth in energy consumption; it would come too late for pre-venting climate change and lead to an enormous in-crease in plutonium stocks.

Uranium resources will be consumed in a few decades.
Jürgen Scheffran (nternational Network of Engineers and Scientists Against Proliferation), "Nuclear energy and climate change: limits and risks," "Costs, risks, and myths of nuclear," Reaching Critical Will a project of the Women's International League for Peace and Freedom, 2011, https://www.mapw.org.au/files/downloads/reaching%20critical%20will.pdf

Due to the expected shut-downs of aging power plants, it will already be challenging to replace these plants, not to mention multiplying their capacity. In its low-use reference scenario for the nuclear power outlook, the International Atomic Energy Agency pre-dicts that the installed capacity of nuclear power will remain nearly constant by the year 2030. In its high-use scenario, almost a doubling of nuclear power capacity is projected. In either case, the share of nuclear power in total energy generation and the CO2 reduction will remain only a few percent. This net effect would easily be negated by the energy growth in the global South. What is actually required is a reduction of CO2 emis-sions by at least 50 percent by 2050. Even without a massive expansion of nuclear energy, uranium resourc-es will be consumed within the next five decades.

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The global public support renewable energy over nuclear power.
Antony Froggatt (Independent energy consultant) and Mycle Schneider (Independent energy and nuclear policy consultant), "Nuclear power vs. renewable energy," "Costs, risks, and myths of nuclear," Reaching Critical Will a project of the Women's International League for Peace and Freedom, 2011, https://www.mapw.org.au/files/downloads/reaching%20critical%20will.pdf

Costs, risks, and myths of nuclear power44role for other sectors, in particular for transport and heat and cooling, has yet to be fully recognized and ex-ploited.Nuclear or Renewables?Post-Fukushima public support for nuclear power fell significantly, with a global opinion poll undertaken by Ipsos-Mori showing a 16 point fall to just 38% of the population supporting the technology. While this fall is not that surprising, the survey did find some quite remarkable views. Firstly, that 95% of the people sur-veyed, across 24 countries, had seen, read, or heard of the damage to the Fukushima reactors. Secondly, that 69% of those citizens agree that "what happened at the nuclear plant in Japan demonstrates that all nuclear fa-cilities are vulnerable to unforeseen events that could have a deadly im-pact on those who live in and around them. As a result we should stop all plans to build nuclear plants any-where." Finally, that when asked to rate their support or op-position to various technologies, 97% supported solar power, 93% wind power, and hydro 91%.9 These levels of support are im-portant for govern-ments, as they can help determine or guide the level and types of financial and regulatory support that they pro-vide to different technologies.

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A nuclear power plant in New York could be the next Fukushima.
Andrew Lapin (film critic and journalist who has written for NPR, Vulture, the Washington Post, the Atlantic, and many other publications), "Fukushima in New York? This Nuclear Plant Has Regulators Nervous," National Geographic, July 29. 2016, http://news.nationalgeographic.com/2016/07/indian-point-nuclear-power-new-york-documentary/

Could what happened in Fukushima happen 35 miles (56 kilometers) north of New York City? That's what many activists and former nuclear regulators fear for the Indian Point Energy Center, a nuclear power plant that has operated in Westchester County for more than four decades. The plant provides a good chunk of the energy needs for the surrounding area, but it has come under fire in recent years for safety and environmental concerns, including its warming of the Hudson River and a recent case of bolts missing in one of its reactors. The plant's two working reactor units are currently operating on expired licenses, with the state of New York having denied parent company Entergy's water permits due to suspected violations of the federal Clean Water Act. Following the 2011 earthquake and tsunami that caused catastrophic damage to Japan's Fukushima Daiichi nuclear plant and surrounding area, the safety of nuclear energy as a whole has come under even greater scrutiny. In the new documentary Indian Point, currently in select theaters, filmmaker Ivy Meeropol uses the plant to get into both sides of the nuclear debate. Meeropol, who is also a director on the upcoming second season of the National Geographic Channel series Years of Living Dangerously, tours both Indian Point and Fukushima. She profiles plant workers and executives (Entergy cooperated with the film) along with antinuclear activists, environmental nonprofits, and former chairman of the U.S. Nuclear Regulatory Commission (NRC) Gregory Jaczko. Though she says seeing the inner workings of the plant was "reassuring," Meeropol still found many disturbing details. "All these people who work in a nuclear power plant, basically their main job is to make sure nothing goes terribly wrong," she says. (See photos from Fukushima's eerie ghost towns.) Meeropol spoke to National Geographic about her journey into the central reactor of the nuclear debate, why nuclear power puts aquatic wildlife in danger, and just how scared New Yorkers should be about Indian Point.

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Negative Extensions

Nuclear energy is the best solution to the problems of coal.
Michael H. Fox (Emeritus Professor in the Department of Environmental and Radiological Health Sciences at Colorado State University) , "The environmental case for nuclear power," Oxford University Press Blog, August 13, 2014, http://blog.oup.com/2014/08/environmental-case-nuclear-power/

Coal is the big problem for electricity generation, and carbon capture and storage technology is not going to solve the problem. Coal needs to be essentially eliminated as a power source because of its multitude of health and environmental consequences. Coal provides about 43% of our electricity, and the actual amount of coal used is expected to increase through 2040, even though the percentage of electricity generated by coal would be slightly decreased by then. That is untenable if we want to reduce CO2 emissions. Coal usage generates about two billion tons of CO2 annually in the United States. Natural gas generates about half the CO2 as coal, but fugitive emissions of methane reduce or eliminate its usefulness, and fracking is controversial. Renewable energy can help. But energy from the sun and wind have major difficulties associated with intermittency, location relative to population centers, footprint, and cost that limit their contributions to about 20% or less of electricity production. Even worse, they do not effectively contribute to the baseload electricity that coal provides. Baseload is the minimum electrical demand over a 24-hour day that must be provided by a constant source of electricity. Solar and wind power contribute principally to the intermediate demand that fluctuates during the day, but they still require backup — usually with natural gas power plants — for when they are not available. An increase from the current 4% to 20% of electricity would be an enormous help. But it does not solve the coal problem. Nuclear power is the only alternative to coal for stable baseload power that can truly cut the emissions of CO2 to nearly zero. It currently provides 20% of electricity in the United States. It would take about 175 Generation III nuclear reactors to replace all of the coal-fired power plants in the United States. This would take a major national effort, but it would also require a major national effort to get 20% of electricity from wind and solar and that would not reduce coal usage. Neither of these goals will be achieved unless there is a cost associated with CO2 production through some kind of carbon tax. And that will only happen if there is a strong public demand that we get serious about reducing CO2 emissions and halting global warming.

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Nuclear power is far safer than coal.
Michael H. Fox (Emeritus Professor in the Department of Environmental and Radiological Health Sciences at Colorado State University) , "The environmental case for nuclear power," Oxford University Press Blog, August 13, 2014, http://blog.oup.com/2014/08/environmental-case-nuclear-power/

What about the risks of nuclear power? The reality is that nuclear power has a much better safety record than coal. Since the 1979 Three Mile Island nuclear accident (that killed no one), US coal mining caused 1,969 direct deaths. Deaths from black lung (pneumoconiosis) were over 2,500 in 1979 alone and continue to be hundreds per year. Deaths in the general public from lung disease are estimated to be in the thousands per year. No one in the United States has ever died from a nuclear power reactor accident in over 3,500 reactor-years of experience. It is vastly worse in China where several thousand miners die yearly, and several hundred thousand people die from respiratory diseases related to coal burning. The 1986 Chernobyl nuclear accident caused 31 immediate deaths, 19 delayed deaths in emergency workers and 15 children who died from thyroid cancer. The best scientific estimates are that 4,000 more people may ultimately die from cancer. The tsunami that caused the nuclear accident in Fukushima in 2011 killed nearly 19,000 people and destroyed or damaged over a million buildings. No one has died from the nuclear accident, and it is likely that very few ever will. Even with these accidents, nuclear power has a far safer record than coal.

US nuclear power plants have been operating safely for decades.
Christine Todd Whitman (co-chairs the nuclear industry funded Clean and Safe Energy Coalition (CASEnergy)), "The Case for Nuclear Power Is as Strong as Ever," The Huffington Post, August 2, 2010, http://www.huffingtonpost.com/christine-todd-whitman/the-case-for-nuclear-powe_b_667193.html

The concern for safety is critical, but the good news is that preventive safety work is already being done every day at our nation's reactors. In fact, the United States nuclear energy industry has accumulated an outstanding safety record since the days of the Three Mile Island accident in 1979. Worker safety in nuclear plants stands above any other American industrial sector, as measured by lost-time accidents. The nuclear power industry has devoted significant resources to continuously improving the safety and reliability of our nuclear power facilities against all manner of potential risks and threats with the result that, for more than 30 years, nuclear plants have delivered about 20 percent of America's electrical power safely and securely, without major incident.

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US nuclear power plants are designed to withstand all potential releases.
Christine Todd Whitman (co-chairs the nuclear industry funded Clean and Safe Energy Coalition (CASEnergy)), "The Case for Nuclear Power Is as Strong as Ever," The Huffington Post, August 2, 2010, http://www.huffingtonpost.com/christine-todd-whitman/the-case-for-nuclear-powe_b_667193.html

Every nuclear power plant is designed, constructed and managed to prevent radioactive releases, even in the event of natural disasters, operational accidents or terrorist attacks. Since September 2001, the nuclear industry has spent in excess of $2 billion on enhancements to prevent physical or cyber breaches. In fact, analyses conducted by the independent Electric Power Research Institute (EPRI) concluded that the structures that surround U.S. nuclear power plants would protect against a release of radiation if struck by a Boeing 767 jetliner. Steel-reinforced concrete containment structures protect reactors and redundant safety and reactor shutdown systems have been designed to withstand the impact of earthquakes, hurricanes, tornadoes and floods.

US nuclear power plants are well regulated and safe.
Christine Todd Whitman (co-chairs the nuclear industry funded Clean and Safe Energy Coalition (CASEnergy)), "The Case for Nuclear Power Is as Strong as Ever," The Huffington Post, August 2, 2010, http://www.huffingtonpost.com/christine-todd-whitman/the-case-for-nuclear-powe_b_667193.html

Apart from its own self-initiated safety efforts through the Institute of Nuclear Power Operations, the industry operates under the watchful eye of a strong regulatory authority, and with significant input from state and local officials. The Nuclear Regulatory Commission holds nuclear reactor operators to the highest safety and security standards of any American industry. Fuel, once used, will continue to be safely stored at reactor sites -- as has been the case for decades -- until a long-term repository is identified. Furthermore, federal law requires that energy companies develop and exercise sophisticated emergency response plans to protect public health and safety. A comparison of safety protocols governing the nuclear energy industry and other industries provides a stark comparison: Nuclear energy meets a higher standard for safety than any other American industry.

Expanding nuclear power has broad based support.
Christine Todd Whitman (co-chairs the nuclear industry funded Clean and Safe Energy Coalition (CASEnergy)), "The Case for Nuclear Power Is as Strong as Ever," The Huffington Post, August 2, 2010, http://www.huffingtonpost.com/christine-todd-whitman/the-case-for-nuclear-powe_b_667193.html

Americans understand this, which is why nuclear energy has garnered such a broad-based consensus of support. The latest Gallup poll found that 62 percent of Americans -- an all-time high -- favor the use of nuclear energy to produce electricity. President Barack Obama and Energy Secretary Steven Chu have made expanding nuclear energy a linchpin of their strategy to build a clean energy economy and to create jobs. The editorial pages of both The Washington Post and The New York Times have supported the industry's expansion, most recently in February when both papers lauded the Obama administration's decision to restart the nuclear power industry with its first industry loan guarantee to build two new reactors in Georgia.

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Nuclear power has unique environmental and economic advantages.
Christine Todd Whitman (co-chairs the nuclear industry funded Clean and Safe Energy Coalition (CASEnergy)), "The Case for Nuclear Power Is as Strong as Ever," The Huffington Post, August 2, 2010, http://www.huffingtonpost.com/christine-todd-whitman/the-case-for-nuclear-powe_b_667193.html

This broad-based coalition of supporters has been drawn to nuclear energy because no other full-time electricity source offers the same kind of impact in addressing America's environmental and economic challenges. Nuclear plants produce virtually no carbon dioxide or other harmful emissions; U.S. reactors generated more than 70 percent of the country's emissions-free electricity last year. If the nation's goal is to curb its emissions in the future, then nuclear energy, the only clean base-load power, is uniquely positioned to contribute. At a time when the country's jobless rate is hovering around a 27-year high, nuclear plant construction projections can put thousands of people back to work. In Waynesboro, Georgia, 700 workers have already been tasked with preparing the site for the two new reactors. This, the state's largest construction project, will ultimately employ up to 3,500 people. Over the past three years, in a period of economic constriction, the nuclear industry has created more than 15,000 new jobs nationally in anticipation of the industry's expansion.

Nuclear power is supported by prominent environmentalists.
Patrick Moore, chairman and chief scientist of Greenspirit Strate-gies Ltd, "20Greenpeace founder makes the case for nuclear," Nuclear News, June 2005, http://nature.berkeley.edu/er100/readings/Moore_2005.pdf

Prominent environmental figures like Stewart Brand, founder of the Whole Earth Catalog, Gaia theorist James Lovelock, and Hugh Montefiore, former Friends of the Earth leader, have now all stated their strong support for nuclear energy as a practical means of reducing greenhouse gas emissions while meeting the world's increasing energy demands. I too place myself squarely in that category. U.K. environmentalist James Lovelock, who posited the Gaia theory that the Earth operates as a giant, self-regulating super-or-ganism, now sees nuclear energy as key to our planet's future health. "Civilization is in imminent danger," he warns, "and has to use nuclear—the one safe, available energy source—or suffer the pain soon to be inflicted by our outraged planet." While I may not be quite so strident as my friend James Love-lock, it is clear that whatever risk there is from increased CO2lev-els in the atmosphere—and there may be considerable risk—canbe offset by an emphasis on nuclear energy. In a recent edition of the Massachusetts Institute of Technol-ogy's Technology Review, Stewart Brand writes that nuclear en-ergy's problems can be overcome, and that: The industry is mature, with a half-century of experience and ever improved engineering behind it. Problematic early reactors like the ones at Three Mile Island and Chernobyl can be sup-planted by new, smaller-scale meltdown-proof reactors like the ones that use the pebble-bed design. Nuclear power plants are very high yield, with low-cost fuel. Finally, they offer the best avenue to a "hydrogen economy," combining high energy and high heat in one place for optimal hydrogen generation.

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Revitalizing nuclear power would significantly reduce emissions from fossil fuels.
Patrick Moore, chairman and chief scientist of Greenspirit Strate-gies Ltd, "20Greenpeace founder makes the case for nuclear," Nuclear News, June 2005, http://nature.berkeley.edu/er100/readings/Moore_2005.pdf

Nuclear energy has already made a sizeable contribution to the reduction of GHG emissions in the U.S. But more must be done and nuclear energy is pointing the way. A revitalized American nuclear energy industry, producing an additional 10 000 MW from power plant upgrades, plant restarts, and productivity gains, could assist the electric sector to avoid the emission of 22 millon metric tons of carbon per year by 2012 ac-cording to the Nuclear Energy Institute—that's 21 percent of the President's GHG intensity reduction goal. A doubling of nuclear energy production would make it possi-ble to significantly reduce total GHG emissions nationwide. While current investment in America's nuclear energy indus-try languishes, development of commercial plants in other parts of the world is gathering momentum. In order to create a better environmental and energy-secure future, the U.S. must once again renew its leadership in this area.

Anti-nuclear power fear mongering is not grounded in reality.
Patrick Moore, chairman and chief scientist of Greenspirit Strate-gies Ltd, "Greenpeace founder makes the case for nuclear," Nuclear News, June 2005, http://nature.berkeley.edu/er100/readings/Moore_2005.pdf

As Stewart Brand and other forward-thinking environmental-ists and scientists have made clear, technology has now progressed to the point where the activist fear-mongering about the safety of nuclear energy bears no resemblance to reality. The Chernobyl and Three Mile Island reactors, often raised as examples of nuclear catastrophe by activists, were very differ-ent from today's rigorously safe nuclear energy technology. Chernobyl was actually an accident waiting to happen—bad de-sign, shoddy construction, poor maintenance, and unprofessional operation all combined to cause the only terrible accident in re-actor history. In my view, the Chernobyl accident was the ex-ception that proves the rule that nuclear reactors are generally safe. Three Mile Island was actually a success story in that the radiation from the partially melted core was contained by the over 400 worldwide that are producing electricity every day with-out serious incident.

There is simply no reason nuclear waste cannot be stored safely and securely.
Patrick Moore, chairman and chief scientist of Greenspirit Strate-gies Ltd, "20Greenpeace founder makes the case for nuclear," Nuclear News, June 2005, http://nature.berkeley.edu/er100/readings/Moore_2005.pdf

The fact that reactors produce nuclear waste is often used to support opposition to them. First, there is no technical obstacle to keeping nuclear waste from entering the environment at harmful levels. Second, this is already being accomplished at hundreds of nuclear power sites around the world. It is simply an issue of se-cure containment and maintenance. Most important, the spent fuel from reactors still has over 95 percent of its potential energy con-tained within it. Therefore, spent fuel should not be disposed of,it should be stored securely so that in the future we can use this en-ergy productively.

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The fact that nuclear power could be used to make nuclear weapons fails as a justification to ban nuclear power.
Patrick Moore, chairman and chief scientist of Greenspirit Strate-gies Ltd, "20Greenpeace founder makes the case for nuclear," Nuclear News, June 2005, http://nature.berkeley.edu/er100/readings/Moore_2005.pdf

Nuclear reactors produce plutonium that can be extracted and manufactured into nuclear weapons. This is unfortunate but is not in itself justification for eliminating nuclear energy. It appears that the main technologies that have resulted in combat deaths in re-cent years are machetes, rifles, and car bombs. No one would se-riously suggest banning machetes, guns, cars, or the fertilizer and diesel that explosives are made from. Nuclear proliferation must be addressed as a separate policy issue from the production of nu-clear energy.

There are multiple benefits to nuclear power.
Patrick Moore, chairman and chief scientist of Greenspirit Strate-gies Ltd, "20Greenpeace founder makes the case for nuclear," Nuclear News, June 2005, http://nature.berkeley.edu/er100/readings/Moore_2005.pdf

Besides reductions in GHG emissions and the shift away from our reliance on fossil fuels, nuclear energy offers two important additional and environmentally friendly benefits. First, nuclear power offers an important and practical pathway to the proposed "hydrogen economy." Unfortunately, there are no hydrogen mines where we can source this element directly. It must be manufactured, from fossil fuels, biomass, or by splitting water into hydrogen and oxygen. Splitting water is the only nongreen-house gas–emitting approach to manufacturing hydrogen. Hydrogen, as a fuel, offers the promise of clean, green energy for our automobiles and transportation fleets. Automobile manufacturers continue to improve hydrogen fuel cells, and the technology may, in the not-too-distant future, be-come feasible for mass application. By using electricity, or by using heat directly from nuclear re-actors to produce hydrogen, it may be possible to move from fos-sil fuels for transport energy to using clean hydrogen, thus virtu-ally eliminating smog caused by autos, trucks, and trains. A hydrogen fuel cell–powered transport fleet would not only virtually eliminate CO2emissions, but would eliminate the energy security problem posed by reliance on oil from overseas. Second, around the world, nuclear energy could be used to solve another growing crisis: the increasing shortage of fresh water available for human consumption and crop irrigation. By using nuclear energy, seawater could be desalinized to sat-isfy the ever-growing demand for fresh water without the CO2emissions caused by fossil fuel–powered plants.

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Nuclear power will help meet US energy goals.
Mike Rencheck (president and CEO of AREVA Inc), "Nuclear power meets the challenges of climate change and better health," The Hill, January 27, 2014, http://thehill.com/blogs/congress-blog/energy-environment/196361-nuclear-power-meets-the-challenges-of-climate-change

With society's need for energy growing, we need a reliable, diverse energy mix that prioritizes low- carbon energy sources to reduce emissions and improve public health. We must consider all low-carbon and low-emissions sources of energy, which means both renewable and nuclear energy, as well as other technologies that reduce consumption. As the only round-the-clock, baseload source for reliably generating significant amounts of affordable low-carbon energy, nuclear energy must play an expanding role in U.S. energy policy. Accounting for 20 percent of the U.S. energy supply and 64 percent of U.S. low-carbon energy, nuclear energy can also contribute to meeting the goals that President Obama laid out in his directive: it reduces pollution, promotes U.S. energy independence and is a domestic energy source that provides thousands of jobs. In fact, the nuclear energy industry expects to hire as many as 20,000 highly skilled workers by 2018 to fill jobs vacated by workers who are expected to retire, according to NEI.

Tiny quantities of uranium can provide significant amounts of power.
Peter Huber (senior fellow at the Manhattan Institute) & Mark P. Mills (adjunct fellow of the Manhattan Institute, and founder and CEO of the Digital Power Group), "Why the U.S. Needs More Nuclear Power," City Journal, Winter, 2005, http://www.city-journal.org/html/15_1_nuclear_power.html

That's the stunning thing about nuclear power: tiny quantities of raw material can do so much. A bundle of enriched-uranium fuel-rods that could fit into a two-bedroom apartment in Hell's Kitchen would power the city for a year: furnaces, espresso machines, subways, streetlights, stock tickers, Times Square, everything—even our cars and taxis, if we could conveniently plug them into the grid. True, you don't want to stack fuel rods in midtown Manhattan; you don't in fact want to stack them casually on top of one another anywhere. But in suitable reactors, situated, say, 50 miles from the city on a few hundred acres of suitably fortified and well-guarded real estate, two rooms' worth of fuel could electrify it all. Think of our solitary New Yorker on the Upper West Side as a 1,400-watt bulb that never sleeps—that's the national per-capita average demand for electric power from homes, factories, businesses, the lot. Our average citizen burns about twice as bright at 4 PM in August, and a lot dimmer at 4 AM in December; grown-ups burn more than kids, the rich more than the poor; but it all averages out: 14 floor lamps per person, lit round the clock. Convert this same number back into a utility's supply-side jargon, and a million people need roughly 1.4 "gigs" of power—1.4 gigawatts (GW). Running at peak power, Entergy's two nuclear units at Indian Point generate just under 2 GW. So just four Indian Points could take care of New York City's 7-GW round-the-clock average. Six could handle its peak load of about 11.5 GW. And if we had all-electric engines, machines, and heaters out at the receiving end, another ten or so could power all the cars, ovens, furnaces—everything else in the city that oil or gas currently fuels.

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Alternative renewable energy sources cannot meet the needed energy supply.
Peter Huber (senior fellow at the Manhattan Institute) & Mark P. Mills (adjunct fellow of the Manhattan Institute, and founder and CEO of the Digital Power Group), "Why the U.S. Needs More Nuclear Power," City Journal, Winter, 2005, http://www.city-journal.org/html/15_1_nuclear_power.html

We've been meeting half of that new demand by burning an extra 400 million tons of coal a year, with coal continuing to supply half of our wired power. Natural gas, the fossil fuel grudgingly favored by most environmentalists, has helped meet the new demand, too: it's back at 16 percent of electricity generated, where it was two decades ago, after dropping sharply for a time. Astonishingly, over this same period, uranium's share of U.S. electricity has also risen—from 11 percent to its current 20 percent. Part of the explanation is more nuclear power plants. Even though Three Mile Island put an end to the commissioning of new facilities, some already under construction at the time later opened, with the plant count peaking at 112 in 1990. Three Mile Island also impelled plant operators to develop systematic procedures for sharing information and expertise, and plants that used to run seven months per year now run almost eleven. Uranium has thus displaced about eight percentage points of oil, and five points of hydroelectric, in the expanding electricity market. Renewable fuels, by contrast, made no visible dent in energy supplies, despite the hopes of Greens and the benefits of government-funded research, subsidies, and tax breaks. About a half billion kWh of electricity came from solar power in 2002—roughly 0.013 percent of the U.S. total. Wind power contributed another 0.27 percent. Fossil and nuclear fuels still completely dominate the U.S. energy supply, as in all industrialized economies.

Energy efficiency cannot solve needed energy demands.
Peter Huber (senior fellow at the Manhattan Institute) & Mark P. Mills (adjunct fellow of the Manhattan Institute, and founder and CEO of the Digital Power Group), "Why the U.S. Needs More Nuclear Power," City Journal, Winter, 2005, http://www.city-journal.org/html/15_1_nuclear_power.html

The other great hope of environmentalists, efficiency, did improve over the last couple of decades—very considerably, in fact. Air conditioners, car engines, industrial machines, lightbulbs, refrigerator motors—without exception, all do much more, with much less, than they used to. Yet in aggregate, they burn more fuel, too. Boosting efficiency actually raises consumption, as counterintuitive as that sounds. The more efficient a car, the cheaper the miles; the more efficient a refrigerator, the cheaper the ice; and at the end of the day, we use more efficient technology so much more that total energy consumption goes up, not down.

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Nuclear power is far more effective than renewable energy alternatives.
Peter Huber (senior fellow at the Manhattan Institute) & Mark P. Mills (adjunct fellow of the Manhattan Institute, and founder and CEO of the Digital Power Group), "Why the U.S. Needs More Nuclear Power," City Journal, Winter, 2005, http://www.city-journal.org/html/15_1_nuclear_power.html

We're burning our 40 quads of raw fuel to generate about 3.5 trillion kilowatt-hours of electricity per year; if the automotive plug-and-play future does unfold on schedule, we'll need as much as 7 trillion kWh per year by 2025. How should we generate the extra trillions of kilowatt-hours? With hydrogen, the most optimistic Green visionaries reply—produced by solar cells or windmills. But it's not possible to take such proposals seriously. New York City consumes so much energy that you'd need, at a minimum, to cover two cities with solar cells to power a single city (see "How Cities Green the Planet," Winter 2000). No conceivable mix of solar and wind could come close to supplying the trillions of additional kilowatt-hours of power we'll soon need. Nuclear power could do it—easily. In all key technical respects, it is the antithesis of solar power. A quad's worth of solar-powered wood is a huge forest—beautiful to behold, but bulky and heavy. Pound for pound, coal stores about twice as much heat. Oil beats coal by about twice as much again. And an ounce of enriched-uranium fuel equals about 4 tons of coal, or 15 barrels of oil. That's why minuscule quantities contained in relatively tiny reactors can power a metropolis.

There are plenty of uranium deposits to mine.
Peter Huber (senior fellow at the Manhattan Institute) & Mark P. Mills (adjunct fellow of the Manhattan Institute, and founder and CEO of the Digital Power Group), "Why the U.S. Needs More Nuclear Power," City Journal, Winter, 2005, http://www.city-journal.org/html/15_1_nuclear_power.html

What's more, North America has vast deposits of uranium ore, and scooping it up is no real challenge. Enrichment accounts for about half of the fuel's cost, and enrichment technologies keep improving. Proponents of solar and wind power maintain—correctly—that the underlying technologies for these energy sources keep getting cheaper, but so do those that squeeze power out of conventional fuels. The lasers coming out of the same semiconductor fabs that build solar cells could enrich uranium a thousand times more efficiently than the gaseous-diffusion processes currently used.

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Nuclear power plants are incredibly safe.
Peter Huber (senior fellow at the Manhattan Institute) & Mark P. Mills (adjunct fellow of the Manhattan Institute, and founder and CEO of the Digital Power Group), "Why the U.S. Needs More Nuclear Power," City Journal, Winter, 2005, http://www.city-journal.org/html/15_1_nuclear_power.html

How worried should we really be in 2005 that accidents or attacks might release and disperse a nuclear power plant's radioactive fuel? Not very. Our civilian nuclear industry has dramatically improved its procedures and safety-related hardware since 1979. Several thousand reactor-years of statistics since Three Mile Island clearly show that these power plants are extraordinarily reliable in normal operation. And uranium's combination of power and super-density makes the fuel less of a terror risk, not more, at least from an engineering standpoint. It's easy to "overbuild" the protective walls and containment systems of nuclear facilities, since—like the pyramids—the payload they're built to shield is so small. Protecting skyscrapers is hard; no builder can afford to erect a hundred times more wall than usable space. Guaranteeing the integrity of a jumbo jet's fuel tanks is impossible; the tanks have to fly. Shielding a nuclear plant's tiny payload is easy—just erect more steel, pour more concrete, and build tougher perimeters. In fact, it's a safety challenge that we have already met. Today's plants split atoms behind super-thick layers of steel and concrete; future plants would boast thicker protection still. All the numbers, and the strong consensus in the technical community, reinforce the projections made two decades ago: it is extremely unlikely that there will ever be a serious release of nuclear materials from a U.S. reactor.

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Nuclear power is great for the economy, especially for the US.
Peter Huber (senior fellow at the Manhattan Institute) & Mark P. Mills (adjunct fellow of the Manhattan Institute, and founder and CEO of the Digital Power Group), "Why the U.S. Needs More Nuclear Power," City Journal, Winter, 2005, http://www.city-journal.org/html/15_1_nuclear_power.html

What about the economic cost of nuclear power? Wind and sun are free, of course. But if the cost of fuel were all that mattered, the day of too-cheap-to-meter nuclear power would now be here—nearer, certainly, than too-cheap-to-meter solar power. Raw fuel accounts for over half the delivered cost of electricity generated in gas-fired turbines, about one-third of coal-fired power, and just a tenth of nuclear electricity. Factor in the cost of capital equipment, and the cheapest electrons come from uranium and coal, not sun and wind. What we pay for at our electric meter is increasingly like what we pay for at fancy restaurants: not the raw calories, but the fine linen, the service, and the chef's ineffable artistry. In our overall energy accounts, the sophisticated power-conversion hardware matters more every year, and the cost of raw fuel matters less. This in itself is great news for America. We're good at large-scale hardware; we build it ourselves and keep building it cheaper. The average price of U.S. electricity fell throughout the twentieth century, and it has kept falling since, except in egregiously mismanaged markets such as California's. The cheap, plentiful power does terrific things for labor productivity and overall employment. As Lewis E. Lehrman notes, rising employment strongly correlates with rising supplies of low-cost energy. It takes energy to get the increasingly mobile worker to the increasingly distant workplace, and energy to process materials and power the increasingly advanced machines that shape and assemble those materials. Most of the world, Europe aside, now recognizes this point. Workers in Asia and India are swiftly gaining access to the powered machines that steadily boosted the productivity of the American factory worker throughout the twentieth century. And the electricity driving those machines comes from power plants designed—and often built—by U.S. vendors. The power is a lot less expensive than ours, though, since it is generated the old-fashioned forget-the-environment way. There is little bother about protecting the river or scrubbing the smoke. China's answer to the 2-gigawatt Hoover Dam on the Colorado River is the Three Gorges project, an 18-gigawatt dam on the Yangtze River. Combine cheaper supplies of energy with ready access to heavy industrial machines, and it's hard to see how foreign laborers cannot close the productivity gap that has historically enabled American workers to remain competitive at considerably higher wages. Unless, that is, the United States keeps on pushing the productivity of its own workforce out ahead of its competitors. That—inevitably—means expanding our power supply and keeping it affordable, and deploying even more advanced technologies of powered production. Nuclear power would help keep the twenty-first-century U.S. economy globally competitive.

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Nuclear power is best for the environment.
Peter Huber (senior fellow at the Manhattan Institute) & Mark P. Mills (adjunct fellow of the Manhattan Institute, and founder and CEO of the Digital Power Group), "Why the U.S. Needs More Nuclear Power," City Journal, Winter, 2005, http://www.city-journal.org/html/15_1_nuclear_power.html

Greens don't want to hear it, but nuclear power makes the most environmental sense, too. Nuclear wastes pose no serious engineering problems. Uranium is such an energy-rich fuel that the actual volume of waste is tiny compared with that of other fuels, and is easily converted from its already-stable ceramic form as a fuel into an even more stable glass-like compound, and just as easily deposited in deep geological formations, themselves stable for tens of millions of years. And what has Green antinuclear activism achieved since the seventies? Not the reduction in demand for energy that it had hoped for but a massive increase in the use of coal, which burns less clean than uranium.

Increasing nuclear power could help reduce dependence on fossil fuels.
Peter Huber (senior fellow at the Manhattan Institute) & Mark P. Mills (adjunct fellow of the Manhattan Institute, and founder and CEO of the Digital Power Group), "Why the U.S. Needs More Nuclear Power," City Journal, Winter, 2005, http://www.city-journal.org/html/15_1_nuclear_power.html

But serious Greens must face reality. Short of some convulsion that drastically shrinks the economy, demand for electricity will go on rising. Total U.S. electricity consumption will increase another 20 to 30 percent, at least, over the next ten years. Neither Democrats nor Republicans, moreover, will let the grid go cold—not even if that means burning yet another 400 million more tons of coal. Not even if that means melting the ice caps and putting much of Bangladesh under water. No governor or president wants to be the next Gray Davis, recalled from office when the lights go out. The power has to come from somewhere. Sun and wind will never come close to supplying it. Earnest though they are, the people who argue otherwise are the folks who brought us 400 million extra tons of coal a year. The one practical technology that could decisively shift U.S. carbon emissions in the near term would displace coal with uranium, since uranium burns emission-free. It's time even for Greens to embrace the atom.

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Nuclear power could help end dependence on Middle Eastern oil.
Peter Huber (senior fellow at the Manhattan Institute) & Mark P. Mills (adjunct fellow of the Manhattan Institute, and founder and CEO of the Digital Power Group), "Why the U.S. Needs More Nuclear Power," City Journal, Winter, 2005, http://www.city-journal.org/html/15_1_nuclear_power.html

It must surely be clear by now, too, that the political costs of depending so heavily on oil from the Middle East are just too great. We need to find a way to stop funneling $25 billion a year (or so) of our energy dollars into churning cauldrons of hate and violence. By sharply curtailing our dependence on Middle Eastern oil, we would greatly expand the range of feasible political and military options in dealing with the countries that breed the terrorists. The best thing we can do to decrease the Middle East's hold on us is to turn off the spigot ourselves. For economic, ecological, and geopolitical reasons, U.S. policymakers ought to promote electrification on the demand side, and nuclear fuel on the supply side, wherever they reasonably can.

Had the US not halted nuclear plant production, it would now be Kyoto compliant.
Alexander Armlovich (Research Associate at Manhattan Institute for Policy Research) & Lawrence J. Mone (former President of the Manhattan Institute), "A Climate March With A Big Blind Spot," The Daily News, September 18, 2014, http://www.nydailynews.com/opinion/lawrence-mone-alex-armlovich-climate-march-big-blind-spot-article-1.1943427

The U.S. today relies on 100 nuclear power plants for roughly 20% of its electricity. Were it not for a wave of plant cancellations starting in the mid-1970s — prompted, in part, by the financing costs of the era, but exacerbated by the overreaction to the Three Mile Island accident — U.S. nuclear capacity could have significantly increased; in fact, U.S. nuclear capacity might plausibly be double what it now is. Had that nuclear capacity replaced coal, kilowatt-for-kilowatt, the country's emissions would have fallen below the current Kyoto Protocol target for the U.S.

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Nuclear power is safer than other options for energy.
Alexander Armlovich (Research Associate at Manhattan Institute for Policy Research) & Lawrence J. Mone (former President of the Manhattan Institute), "A Climate March With A Big Blind Spot," The Daily News, September 18, 2014, http://www.nydailynews.com/opinion/lawrence-mone-alex-armlovich-climate-march-big-blind-spot-article-1.1943427

And despite what we often hear from alarmists, this could have happened with relatively little risk. While the events at Japan's Fukushima plant were tragic, nuclear energy's health and safety profile is sterling compared with other energy-centered fixtures of modern life. Automobile accidents directly kill more than 30,000 Americans a year; America's civilian nuclear reactor program, meanwhile, has seen zero fatalities in its history. Even wind turbines have killed more people. While we need to acknowledge and address the health and safety risks of potential worst-case nuclear disasters, such risks are surprisingly low. Fukushima, despite the double whammy of an earthquake and a tsunami, suffered zero radiation deaths — and not a single case of radiation sickness. What's more, new, ever-safer designs for nuclear plants are being developed, such as an MIT design for floating reactors moored offshore to protect them from seismic events.

The risks of nuclear waste are highly exaggerated.
Alexander Armlovich (Research Associate at Manhattan Institute for Policy Research) & Lawrence J. Mone (former President of the Manhattan Institute), "A Climate March With A Big Blind Spot," The Daily News, September 18, 2014, http://www.nydailynews.com/opinion/lawrence-mone-alex-armlovich-climate-march-big-blind-spot-article-1.1943427

Environmentalists have long opposed nuclear power because of the complexity of disposing nuclear waste. This fear, too, is overblown. France has reprocessed its nuclear fuel for decades, a method of recycling that reduces the half-life of nuclear waste to hundreds, rather than thousands, of years. Even better, Bill Gates and Peter Thiel are each putting their money behind innovative nuclear startups with reactor designs capable of directly burning traditional waste as fuel, leaving behind only short-lived waste.

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Nuclear power is economically affordable and cheaper than alternatives.
Alexander Armlovich (Research Associate at Manhattan Institute for Policy Research) & Lawrence J. Mone (former President of the Manhattan Institute), "A Climate March With A Big Blind Spot," The Daily News, September 18, 2014, http://www.nydailynews.com/opinion/lawrence-mone-alex-armlovich-climate-march-big-blind-spot-article-1.1943427

So nuclear power is quite safe and getting safer — but is it economically practical? France has long produced nearly 80% of its electricity from nuclear plants, reaping both lower prices and lower emissions than Germany, which has moved to phase out nuclear power in favor of solar (and has had to turn to coal to ensure reliability). Household electricity costs the French just 21 cents a kilowatt-hour — cheaper than what Con Ed charges in New York. France also emitted 87% less carbon dioxide per unit of electrical energy than Germany, according to the most recent data. McKibben recently claimed nuclear power is "like burning $20 bills for energy." Yet according to the federal Energy Information Administration, utility-scale solar power — even with a lavish government subsidy — remains nearly 40% more expensive than nuclear. Onshore wind at a small scale is slightly cheaper, but requires nearly 850 square miles (or most of Rhode Island) of turbine-covered land to equal the output of a typical two-unit nuclear plant. The quest for low-cost, carbon-free energy is a cause everyone should be able to agree upon. But it is difficult to take seriously McKibben's march, or his positions, unless he and his followers are willing to commit themselves to a diverse energy mix that can both reduce carbon emissions and affordably support the economic growth and modern economy we need.

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The facts of what occurred at Fukushima refute the case against nuclear energy.
Robert Bryce (American author and journalist in Austin, Texas), "A Nuclear Option For Energy," Bloomberg View, May 9, 2014, http://www.bloombergview.com/articles/2014-05-09/a-nuclear-option-for-energy

Some opponents still claim nuclear energy is also too dangerous. Debunking that argument requires only a quick look at the facts about Fukushima. From a nuclear safety standpoint, it's difficult to imagine a scarier scenario than what happened on March 11, 2011. An earthquake measuring 9.0 on the Richter scale -- powerful enough to shift the position of Earth's axis by about 6.5 inches -- hit 80 miles off the Japanese coast. Within minutes, a series of seven tsunamis, some as high as 50 feet, slammed into the Fukushima Daiichi nuclear plant. Backup diesel generators, designed to keep the reactors' cooling water pumps operating, quickly failed. A day later, a hydrogen explosion blew the roof off the Unit 1 reactor building. Over the next few days, similar explosions hit Units 2 and 3. Three reactors melted down. It was the worst nuclear accident since the Chernobyl accident in 1986. But here's the reality: It led directly to exactly two deaths -- two workers who drowned at the plant. It was feared that radioactive materials from the plant would contaminate large areas of Japan and even reach the U.S. That didn't happen. In early 2013, the World Health Organization reported that radiation exposure due to Fukushima was low and concluded: "Outside the geographical areas most affected by radiation, even in locations within Fukushima prefecture, the predicted risks remain low and no observable increases in cancer above natural variation in baseline rates are anticipated." I am not minimizing the seriousness of what happened at Fukushima. The reactors used at the site were of an older design that lacked passive cooling systems. Nor am I forgetting about the staggering costs of decommissioning and cleaning up the Fukushima site and compensating all the people who were displaced. Nevertheless, this wasn't Chernobyl. About 10 days after the disaster struck, George Monbiot, a British journalist and environmentalist who had long described himself as "nuclear-neutral," announced he had changed his mind. "Atomic energy has just been subjected to one of the harshest of possible tests, and the impact on people and the planet has been small." He continued, "The crisis at Fukushima has converted me to the cause of nuclear power."

Small modular reactor would make nuclear power even safer.
Robert Bryce (American author and journalist in Austin, Texas), "A Nuclear Option For Energy," Bloomberg View, May 9, 2014, http://www.bloombergview.com/articles/2014-05-09/a-nuclear-option-for-energy

Small modular reactors. Generally defined as having a capacity of 300 megawatts or less, small modular reactors cost a fraction of what larger reactors cost. In addition to their lower up-front costs, they can be deployed as single or multiple units, and they're designed to be buried in the ground, which makes them more resistant to natural disasters, terrorism and mishaps. The hope is that if enough are ordered, the reactor assemblies can be fabricated in a central location, which should mean lower costs and a faster learning curve.

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Affirmative Blocks
Affirmative Answers To (A/T) common negative arguments

A/T It is impossible to ban nuclear power.

States could ban nuclear power by refusing to subsidize it in the future.

Kevin Carson (senior fellow of the Center for a Stateless Society), "How to "Ban" Nuclear Power," Center for a Stateless Society, March 17, 2011, https://c4ss.org/content/6462

So given the high stakes of a nuclear meltdown, and the manifest inability of planners to anticipate what might go wrong, it would make sense to ban nuclear power, right? Well, the actual problem is that governments worldwide have been actively intervening for decades to prevent the market from banning nuclear power. Precisely because the stakes are so high and there's so much room for unforeseen things to go wrong, nuclear power is uninsurable on the private market. So, under the terms of the Price-Anderson Nuclear Industries Indemnity Act, the US nuclear industry bears the cost of insuring itself against liability only up to a small fraction of the damages that could result from a disaster like that currently underway in Japan. Above that amount the taxpayers are required to assume liability up to a higher level — which is still far less than the harm which could result from a full-scale meltdown. So if a reactor melts down, blanketing a thousand square miles around a major city with fallout and causing hundreds of billions in damages, the victims are pretty much S.O.L. (simply out of luck). Legislative caps on liability far, far below the actual damages that would likely result … sound familiar? Here's a hint: It starts with B, and ends with P. In fact the liability issue is only one facet of a much larger theme: Nuclear power is a virtual creature of the government. The nuclear industry grew directly out of the US "Defense" Department's nuclear weapons programs, and the first reactors were built as an offshoot of military production. A major portion of the cost of just about every single step in the nuclear power production chain, from the federal government providing preferential access to government land and building access roads at taxpayer expense for uranium mines, to the above-mentioned assumption and capping of liability, to taxpayer-funded storage of nuclear waste, shows up on your tax bill rather than on your electric bill. As a Westinghouse executive testified before Congress in 1953: "If you were to inquire whether Westinghouse might consider putting up its own money … we would have to say 'No.' The cost of the plant would be a question mark until after we built it and, by that sole means, found out the answer. We would not be sure of successful plant operation until after we had done all the work and operated successfully …" Hmmm. Nuclear power was a no-go if 1) private industry had to put up its own money, or 2) it wasn't guaranteed a profit. This writer's regular readers might note this seems to be a pretty common business model in the corporate economy. So the question is not whether government should ban nuclear power. The question is whether it should stop propping it up.

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A/T Nuclear power is needed to stop climate change.

1. **Nuclear power is not the solution to climate change.**
Friends of the Earth Scotland, "Climate Change Briefing 'Nuclear power is no solution to climate change: exposing the myths,'" Nuclear Information and Resource Service, 1998, http://www.nirs.org/factsheets/kyotonuc.htm

Under no circumstances can nuclear power be considered to be a solution to climate change:

It is one of the most expensive ways to reduce carbon dioxide emissions.
The nuclear industry does contribute to carbon dioxide emissions. No proven strategies exist for the permanent safe storage of nuclear waste.
Nuclear power poses a very real health risk.
Nuclear power is uneconomic, unsustainable and unsafe.

Climate change is a serious problem which needs to be tackled in a way which safeguards the future for generations to come. Tackling climate change through the development of nuclear power is both expensive and just swaps one serious problem for another. Nuclear power cannot be considered to be a "clean source of electricity" [7]. The nuclear industry is hoping to use the Climate Change negotiations to save itself, because the economics of nuclear power has meant a rapid decline in the industry's fortunes. This is a desperate attempt to generate business from the misfortune of the problems we all now face.

2. **Nuclear plants cannot be built fast enough to make a difference on climate change.**
Katherine Ling, "Nuclear Power Cannot Solve Climate Change," Scientific American, March 27, 2009, http://www.scientificamerican.com/article/nuclear-cannot-solve-climate-change/

Nuclear power plants cannot be built quickly enough and in a safe and secure manner to be a major global solution for climate change, according to a report released yesterday from the Carnegie Endowment for International Peace. The report says the nuclear industry, under current policies and financing, won't be able to build enough new reactors to make a difference in climate in the next 20 years. "Without major changes in government policies and aggressive financial support, nuclear power is actually likely to account for a declining percentage of global electricity generation," the report says. The International Energy Agency's World Energy Outlook 2008 projects that without policy changes, nuclear power's share of worldwide electricity generation will drop from 15 percent in 2006 to 10 percent in 2030.

3. **Nuclear power diverts money away from renewable energy sources and ignores the real solution to climate change.**
Nuclear information & Resources Service & World Information Services on Energy, "Nuclear Power: No Solution to climate change," Nuclear Monitor, February, 2005

Switching the entire world's electricity production to nuclear would still not solve the problem. Moreover, by diverting the world's resources from sustainable energy production to nuclear power, it would only exacerbate the problem by diverting scare resources away from those technologies which offer real hope for addressing climate change. This is partly because the production of electricity is only one of many human activities that release greenhouse gases. Others include transport and heating, agriculture, the production of cement and deforestation. The CO2released worldwide through electricity production accounts for only 9% of total annu-al human greenhouse gas emissions. Numerous studies have shown that the single most effective way to reduce emissions is to reduce energy demand. Studies of future energy scenarios show no evident correlation between CO2 emissions and nuclear power. In fact the scenario with the lowest emissions was not the one with the greatest use of nuclear power, but the one in which the growth in demand was minimized.

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A/T Nuclear waste can be stored safely.

1. **Despite billions spent over decades, there is no safe storage solution to nuclear waste.**

Greenpeace, "The Deadly Legacy of radioactive waste," Greenpeace.org, July, 2010, http://www.greenpeace.org/france/PageFiles/266521/dechets-nucleaires-un-herita.pdf

Billions of euros have been spent over the past half-century on finding a solution to the nuclear waste problem. The attempts have all been unsuccessful. For years, low level radioactive waste was dumped at sea, 'out of sight and out of mind'. Disintegrating barrels brought the waste back into the environment and dangerous substances accumulated in the bodies of animals. After 15 years of campaigning by Greenpeace, an international treaty was signed in 1993 banning all dumping of radioactive waste at sea. In Asse, Germany, an experimental radioactive waste dump was set up in the 1960s in salt formations deep underground. A few years ago it was discovered that it had started leaking water in 1988 and is currently flooding with 12,000 litres of water each day. As a result, all 126,000 barrels of waste already placed in the dump now need to be cleared out. Asse was envisaged as a pilot project for a final storage solution in the salt layers under Gorleben, but there is now serious doubt in Germany about the viability of salt layers as storage for nuclear waste. One of the largest nuclear dumps in the world, the Centre de Stockage de La Manche (CSM) in northern France was opened in 1969 to store low-level waste. It was closed in 1994. It currently stores 520,000 m3 of radioactive materials from waste reprocessing and French nuclear reactors. A 1996 commission set up by the French government concluded that the site also contained long-living waste and high-level waste, and that the true inventory was effectively unknown. In 2006 it was found that contaminated water from the site had already been leaking into an underground aquifer, threatening the surrounding agricultural land. In 1987, Yucca Mountain - about 80 miles north of Las Vegas - was designated as the site for long-term disposal of radioactive wastes in the United States. However, the US Geological Survey has found a seismic fault line under the site and there are serious doubts about the long-term movements of underground water that can transport deadly contamination into the environment. As a result of these problems and billions of dollars in cost overruns, the US government stopped funding the project in early 2010.

2. **Proposed solutions to storing nuclear waste safely are flawed.**

Greenpeace, "The Deadly Legacy of radioactive waste," Greenpeace.org, July, 2010, http://www.greenpeace.org/france/PageFiles/266521/dechets-nucleaires-un-herita.pdf

Sweden plans to pack waste in cast iron inserts in copper canisters and place them in holes bored in tunnel floors, deep underground (400-500 metres), surrounded by bentonite clay. Water is expected to make the bentonite clay expand so that it fills the cavities in the surrounding granite rock which would reduce groundwater movement. Finland adopted the same system and Switzerland and the UK are considering this option. But there are already major concerns. The copper canisters were expected to survive corrosion for at least 100,000 years but recent research shows that they can fail in just 1,000 years or less3. There are also concerns about the build-up of hydrogen produced as a result of corrosion. High temperatures from the canisters could also affect the clay buffer, while groundwater flows could bring contaminants from any compromised containers into the biosphere. Furthermore, Nordic countries will face at least one Ice Age in the coming 100,000 years4, entailing extremely violent earthquakes, penetration of permafrost to the disposal depth and below, potential intrusion of water and unpredictable changes in groundwater flows. Unlike Sweden and Finland, which rely on man-made barriers to prevent leakage, France and Belgium are exploring clay as a natural barrier. The waste is to be contained in simple stainless steel canisters, which can corrode much faster than the Swedish copper ones. Hence the French/Belgium concept relies on the natural clay formation to contain radioactivity. The crucial question is whether it can be guaranteed – for hundreds of thousands of years – that no cracks or channels will form in the clay layers, which would cause water to leak in and out again, poisoning nearby aquifers.

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A/T New and innovative nuclear power plants will solve for the affirmative criticism.

1. **New nuclear plants will produce a form of super waste.**

Greenpeace, "The Deadly Legacy of radioactive waste," Greenpeace.org, July, 2010, http://www.greenpeace.org/france/PageFiles/266521/dechets-nucleaires-un-herita.pdf

Nuclear waste research has so far focused on waste produced by existing reactors. However, the nuclear industry is pushing new, so-called 'Generation III' designs, which are designed to use nuclear fuel more efficiently. The amount of dangerous materials in spent nuclear fuel significantly increases with the time the fuel stays in the reactor. Consequently, the spent fuel becomes more hazardous as more energy is extracted from the fuel. This so-called high burn-up of fuel should increase electricity output for a certain amount of fuel, and hence the economic profit for the operators. Recent studies show that spent nuclear fuel from the European Pressurised Reactor (EPR), a French design currently under construction in Finland, France and China, will be up to seven times more hazardous per unit of electric output, because of drastic increases in the amount of easily released, dangerous and long-living radioactive isotopes such as iodine-1295 than that produced by existing nuclear reactors6. The spent fuel also becomes hotter, more brittle and more likely to lose integrity in accident situations or in storage. This means that not only will waste produced by the EPR be more dangerous to health, but also the technical demands, risks, costs of storage and disposal will be far more challenging, likely increasing the overall cost of nuclear waste disposal.

2. **There is no proposed solution to securing nuclear waste for the duration of its half-life.**

Greenpeace, "The Deadly Legacy of radioactive waste," Greenpeace.org, July, 2010, http://www.greenpeace.org/france/PageFiles/266521/dechets-nucleaires-un-herita.pdf

Once placed into final storage, nuclear waste also needs to be monitored and secured from human interference as well as natural events. Stored civilian and military nuclear waste, such as plutonium or uranium, are sources of radioactive material that can be used for the production of nuclear bombs. A few kilograms of these substances would be sufficient to make bombs similar to the ones used on Japan during World War II. Even a very modest amount of radioactive material from waste storage sites would be sufficient to make a 'dirty bomb', which could contaminate an entire city. To deal with the problem, the nuclear industry proposes, at the very best, to guard storage sites for 300 years. But there is no proposal to ensure security for the other 239,700 years.

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A/T Nuclear power is cost-effective.

1. **Storing nuclear waste is very costly.**
Greenpeace, "The Deadly Legacy of radioactive waste," Greenpeace.org, July, 2010, http://www.greenpeace.org/france/PageFiles/266521/dechets-nucleaires-un-herita.pdf

Because it is as yet unclear how nuclear waste can be safely stored for the amount of time necessary, it is very difficult to make a full projection of costs. In many countries, nuclear energy companies are required to reserve money for waste processing and storage in the future. In several countries, however, these waste funds appear to be far too small and have in the past been used for new risky investments. When the UK privatised nuclear utility British Energy, the State had to spend £5.3 billion (€6.6 billion) of taxpayers' money to fill a hole in the company's reserves for decommissioning and waste. British Energy's fund would only cover a fraction of the total cost for decommissioning and waste for all 45 existing British nuclear reactors, so far estimated to be around £70 billion (€88 billion). It is likely that the cost for dealing with all of this will continue to rise.

2. **New power plants are too expensive to build.**
Union of Concerned Scientists, "Cheap Dreams, expensive realities," ucsusa.org, http://www.ucsusa.org/nuclear-power/cost-nuclear-power#.VeD7zPnJyM8

In the dawn of the nuclear era, cost was expected to be one of the technology's advantages, not one of its drawbacks. The first chairman of the Atomic Energy Commission, Lewis Strauss, predicted in a 1954 speech that nuclear power would someday make electricity "too cheap to meter." A half century later, we have learned that nuclear power is, instead, too expensive to finance. The first generation of nuclear power plants proved so costly to build that half of them were abandoned during construction. Those that were completed saw huge cost overruns, which were passed on to utility customers in the form of rate increases. By 1985, Forbes had labeled U.S. nuclear power "the largest managerial disaster in business history." The industry has failed to prove that things will be different this time around: soaring, uncertain costs continue to plague nuclear power in the 21st century. Between 2002 and 2008, for example, cost estimates for new nuclear plant construction rose from between $2 billion and $4 billion per unit to $9 billion per unit, according to a 2009 UCS report, while experience with new construction in Europe has seen costs continue to soar.

3. **There are more cost effective alternatives to nuclear waste.**
Union of Concerned Scientists, "Cheap Dreams, expensive realities," ucsusa.org, http://www.ucsusa.org/nuclear-power/cost-nuclear-power#.VeD7zPnJyM8

If we want to reduce the climate impact of electric power generation in the United States, there are less costly and risky ways to do it than expanding nuclear power. A 2011 UCS analysis of new nuclear projects in Florida and Georgia shows that the power provided by the new plants would be more expensive per kilowatt than several alternatives, including energy efficiency measures, renewable energy sources such as biomass and wind, and new natural gas plants. Public financing for energy alternatives should be focused on fostering innovation and achieving the largest possible reduction in heat-trapping emissions per dollar invested—not on promoting the growth of an industry that has repeatedly shown itself to be a highly risky investment.

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A/T Nuclear plants are built to be incredibly safe.

1. **Nuclear plants pose risks to communities and workers.**

Dave Sweeney (Australian Conservation Foundation) and Dimity Hawkins (ndependent activist, researcher, writer), "Poisoned pathways: the impacts of the nuclear fuel cycle on human health, culture, and the environment," "Costs, risks, and myths of nuclear," Reaching Critical Will a project of the Women's International League for Peace and Freedom, 2011, https://www.mapw.org.au/files/downloads/reaching%20critical%20will.pdf

There is an increasing body of scientific and medi-cal evidence highlighting the health risks to communi-ties and workers from exposure to ionizing radiation, with many medical and scientific experts agreeing that there is no safe level of exposure to ionizing radiation. Radioactive contamination does not respect national boundaries and the carriage through air, water, and the food chain can have profound and adverse effects on human health. Exposure increases the risk of dam-age to tissues, cells, DNA, and other vital molecules. This can result in programmed cell death (apoptosis), genetic mutations, cancers, leukaemias, birth defects, and reproductive, immune, cardiovascular, and endo-crine system disorders. Several significant epidemiological studies have been made about the impacts to children's health in proximity to nuclear reactors in European countries. Two such studies concluded in 2007 and 2008 showed startling evidence of childhood leukemias in children within 5km of German nuclear reactors over 20 years.6 However, there remains a lack of comprehensive public information about these health risks.

2. **Redundancy built into nuclear power plants can actually make things worse.**

M.V. Ramana (Program on Science and Global Security, Princeton University), "No escape from accidents," "Costs, risks, and myths of nuclear," Reaching Critical Will a project of the Women's International League for Peace and Freedom, 2011, https://www.mapw.org.au/files/downloads/reaching%20critical%20will.pdf

Fukushima also demonstrated one of the perverse impacts of using multiple systems to ensure greater lev-els of safety: redundancy can sometimes make things worse. At Fukushima, as with most reactors around the world, zirconium cladding surrounded and protected the fuel, preventing the escape of radioactive materi-als up till very high temperatures. But when the cool-ing systems stopped working, the zirconium cladding overheated. Hot zirconium interacted with water or steam, producing hydrogen gas. When this hydrogen came into contact with air in the containment build-ing, it caused an explosion that reportedly damaged the suppression pool beneath the reactor, another protec-tive system.16 In other words, in complex systems such as nuclear reactors, redundancy may have unexpected and negative consequences for safety, as scholars in-cluding Charles Perrow and especially Scott Sagan have pointed out in the past.17

3. **Safety is secondary to profit when building nuclear plants.**

M.V. Ramana (Program on Science and Global Security, Princeton University), "No escape from accidents," "Costs, risks, and myths of nuclear," Reaching Critical Will a project of the Women's International League for Peace and Freedom, 2011, https://www.mapw.org.au/files/downloads/reaching%20critical%20will.pdf

There is another error of understanding involved in producing these lists of recommendations—the idea that organizations that operate nuclear facilities or other high-hazard technologies would want to imple-ment these in the first place. The problem is that for most organizations, "the mission is something other than safety, such as producing and selling products.... In addition, it is often the case that the non-safety goals are best achieved in ways that are not consistent with designing or operating for lowest risk."21 In the case of nuclear designers and operators, it could be to produce the most amount of nuclear electricity at the least pos-sible cost, or to build many reactors rapidly so as to cap-ture a large fraction of the electricity sector and achieve concomitant political power. This is yet another seri-ous challenge to achieving accident-free operations at nuclear facilities.

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Negative Blocks
Negative Answers To (A/T) common affirmative arguments.

A/T Nuclear waste cannot be stored safely.

1. **There is simply no reason nuclear waste cannot be stored safely and securely.**

Patrick Moore, chairman and chief scientist of Greenspirit Strate-gies Ltd, "20Greenpeace founder makes the case for nuclear," Nuclear News, June 2005, http://nature.berkeley.edu/er100/readings/Moore_2005.pdf

The fact that reactors produce nuclear waste is often used to support opposition to them. First, there is no technical obstacle to keeping nuclear waste from entering the environment at harmful levels. Second, this is already being accomplished at hundreds of nuclear power sites around the world. It is simply an issue of se-cure containment and maintenance. Most important, the spent fuel from reactors still has over 95 percent of its potential energy con-tained within it. Therefore, spent fuel should not be disposed of,it should be stored securely so that in the future we can use this en-ergy productively.

2. **The risks of nuclear waste are highly exaggerated.**

Alexander Armlovich (Research Associate at Manhattan Institute for Policy Research) & Lawrence J. Mone (former President of the Manhattan Institute), "A Climate March With A Big Blind Spot," The Daily News, September 18, 2014, http://www.nydailynews.com/opinion/lawrence-mone-alex-armlovich-climate-march-big-blind-spot-article-1.1943427

Environmentalists have long opposed nuclear power because of the complexity of disposing nuclear waste. This fear, too, is overblown. France has reprocessed its nuclear fuel for decades, a method of recycling that reduces the half-life of nuclear waste to hundreds, rather than thousands, of years. Even better, Bill Gates and Peter Thiel are each putting their money behind innovative nuclear startups with reactor designs capable of directly burning traditional waste as fuel, leaving behind only short-lived waste.

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A/T Nuclear power is not a solution to climate change.

1. **Revitalizing nuclear power would significantly reduce emissions from fossil fuels.**

Patrick Moore, chairman and chief scientist of Greenspirit Strate-gies Ltd, "20Greenpeace founder makes the case for nuclear," Nuclear News, June 2005, http://nature.berkeley.edu/er100/readings/Moore_2005.pdf

Nuclear energy has already made a sizeable contribution to the reduction of GHG emissions in the U.S. But more must be done and nuclear energy is pointing the way. A revitalized American nuclear energy industry, producing an additional 10 000 MW from power plant upgrades, plant restarts, and productivity gains, could assist the electric sector to avoid the emission of 22 millon metric tons of carbon per year by 2012 ac-cording to the Nuclear Energy Institute—that's 21 percent of the President's GHG intensity reduction goal. A doubling of nuclear energy production would make it possi-ble to significantly reduce total GHG emissions nationwide. While current investment in America's nuclear energy indus-try languishes, development of commercial plants in other parts of the world is gathering momentum. In order to create a better environmental and energy-secure future, the U.S. must once again renew its leadership in this area.

2. **Nuclear power is supported by prominent environmentalists.**

Patrick Moore, chairman and chief scientist of Greenspirit Strate-gies Ltd, "20Greenpeace founder makes the case for nuclear," Nuclear News, June 2005, http://nature.berkeley.edu/er100/readings/Moore_2005.pdf

Prominent environmental figures like Stewart Brand, founder of the Whole Earth Catalog, Gaia theorist James Lovelock, and Hugh Montefiore, former Friends of the Earth leader, have now all stated their strong support for nuclear energy as a practical means of reducing greenhouse gas emissions while meeting the world's increasing energy demands. I too place myself squarely in that category. U.K. environmentalist James Lovelock, who posited the Gaia theory that the Earth operates as a giant, self-regulating super-or-ganism, now sees nuclear energy as key to our planet's future health. "Civilization is in imminent danger," he warns, "and has to use nuclear—the one safe, available energy source—or suffer the pain soon to be inflicted by our outraged planet." While I may not be quite so strident as my friend James Love-lock, it is clear that whatever risk there is from increased CO2lev-els in the atmosphere—and there may be considerable risk—can be offset by an emphasis on nuclear energy. In a recent edition of the Massachusetts Institute of Technol-ogy's Technology Review, Stewart Brand writes that nuclear en-ergy's problems can be overcome, and that: The industry is mature, with a half-century of experience and ever improved engineering behind it. Problematic early reactors like the ones at Three Mile Island and Chernobyl can be sup-planted by new, smaller-scale meltdown-proof reactors like the ones that use the pebble-bed design. Nuclear power plants are very high yield, with low-cost fuel. Finally, they offer the best avenue to a "hydrogen economy," combining high energy and high heat in one place for optimal hydrogen generation.

3. **Increasing nuclear power could help reduce dependence on fossil fuels.**

Peter Huber (senior fellow at the Manhattan Institute) & Mark P. Mills (adjunct fellow of the Manhattan Institute, and founder and CEO of the Digital Power Group), "Why the U.S. Needs More Nuclear Power," City Journal, Winter, 2005, http://www.city-journal.org/html/15_1_nuclear_power.html

But serious Greens must face reality. Short of some convulsion that drastically shrinks the economy, demand for electricity will go on rising. Total U.S. electricity consumption will increase another 20 to 30 percent, at least, over the next ten years. Neither Democrats nor Republicans, moreover, will let the grid go cold—not even if that means burning yet another 400 million more tons of coal. Not even if that means melting the ice caps and putting much of Bangladesh under water. No governor or president wants to be the next Gray Davis, recalled from office when the lights go out. The power has to come from somewhere. Sun and wind will never come close to supplying it. Earnest though they are, the people who argue otherwise are the folks who brought us 400 million extra tons of coal a year. The one practical technology that could decisively shift U.S. carbon emissions in the near term would displace coal with uranium, since uranium burns emission-free. It's time even for Greens to embrace the atom.

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A/T Renewable energy is preferable to nuclear power.

1. **Alternative renewable energy sources cannot meet the needed energy supply.**

Peter Huber (senior fellow at the Manhattan Institute) & Mark P. Mills (adjunct fellow of the Manhattan Institute, and founder and CEO of the Digital Power Group), "Why the U.S. Needs More Nuclear Power," City Journal, Winter, 2005, http://www.city-journal.org/html/15_1_nuclear_power.html

We've been meeting half of that new demand by burning an extra 400 million tons of coal a year, with coal continuing to supply half of our wired power. Natural gas, the fossil fuel grudgingly favored by most environmentalists, has helped meet the new demand, too: it's back at 16 percent of electricity generated, where it was two decades ago, after dropping sharply for a time. Astonishingly, over this same period, uranium's share of U.S. electricity has also risen—from 11 percent to its current 20 percent. Part of the explanation is more nuclear power plants. Even though Three Mile Island put an end to the commissioning of new facilities, some already under construction at the time later opened, with the plant count peaking at 112 in 1990. Three Mile Island also impelled plant operators to develop systematic procedures for sharing information and expertise, and plants that used to run seven months per year now run almost eleven. Uranium has thus displaced about eight percentage points of oil, and five points of hydroelectric, in the expanding electricity market. Renewable fuels, by contrast, made no visible dent in energy supplies, despite the hopes of Greens and the benefits of government-funded research, subsidies, and tax breaks. About a half billion kWh of electricity came from solar power in 2002—roughly 0.013 percent of the U.S. total. Wind power contributed another 0.27 percent. Fossil and nuclear fuels still completely dominate the U.S. energy supply, as in all industrialized economies.

2. **Nuclear power is far more effective than renewable energy alternatives.**

Peter Huber (senior fellow at the Manhattan Institute) & Mark P. Mills (adjunct fellow of the Manhattan Institute, and founder and CEO of the Digital Power Group), "Why the U.S. Needs More Nuclear Power," City Journal, Winter, 2005, http://www.city-journal.org/html/15_1_nuclear_power.html

We're burning our 40 quads of raw fuel to generate about 3.5 trillion kilowatt-hours of electricity per year; if the automotive plug-and-play future does unfold on schedule, we'll need as much as 7 trillion kWh per year by 2025. How should we generate the extra trillions of kilowatt-hours? With hydrogen, the most optimistic Green visionaries reply—produced by solar cells or windmills. But it's not possible to take such proposals seriously. New York City consumes so much energy that you'd need, at a minimum, to cover two cities with solar cells to power a single city (see "How Cities Green the Planet," Winter 2000). No conceivable mix of solar and wind could come close to supplying the trillions of additional kilowatt-hours of power we'll soon need. Nuclear power could do it—easily. In all key technical respects, it is the antithesis of solar power. A quad's worth of solar-powered wood is a huge forest—beautiful to behold, but bulky and heavy. Pound for pound, coal stores about twice as much heat. Oil beats coal by about twice as much again. And an ounce of enriched-uranium fuel equals about 4 tons of coal, or 15 barrels of oil. That's why minuscule quantities contained in relatively tiny reactors can power a metropolis.

3. **Nuclear power is more reliable than its renewable alternatives.**

Josh Freed (Third Way's Clean Energy Vice President) "Back to the Future Advanced Nuclear Energy and the Battle against Climate Change," Brookings, December 12, 2014, http://www.brookings.edu/research/essays/2014/backtothefuture#

So what, after a 30-year drought, is drawing smart young people back to the nuclear industry? The answer is climate change. Nuclear energy currently provides about 20 percent of the electric power in the United States, and it does so without emitting any greenhouse gases. Compare that to the amount of electricity produced by the other main non-emitting sources of power, the so-called "renewables"—hydroelectric (6.8 percent), wind (4.2 percent) and solar (about one quarter of a percent). Not only are nuclear plants the most important of the non-emitting sources, but they provide baseload—"always there"—power, while most renewables can produce electricity only intermittently, when the wind is blowing or the sun is shining.

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A/T Nuclear power plants are inherently dangerous.

1. **US nuclear power plants are well regulated and safe.**

Christine Todd Whitman (co-chairs the nuclear industry funded Clean and Safe Energy Coalition (CASEnergy)), "The Case for Nuclear Power Is as Strong as Ever," The Huffington Post, August 2, 2010, http://www.huffingtonpost.com/christine-todd-whitman/the-case-for-nuclear-powe_b_667193.html

Apart from its own self-initiated safety efforts through the Institute of Nuclear Power Operations, the industry operates under the watchful eye of a strong regulatory authority, and with significant input from state and local officials. The Nuclear Regulatory Commission holds nuclear reactor operators to the highest safety and security standards of any American industry. Fuel, once used, will continue to be safely stored at reactor sites -- as has been the case for decades -- until a long-term repository is identified. Furthermore, federal law requires that energy companies develop and exercise sophisticated emergency response plans to protect public health and safety. A comparison of safety protocols governing the nuclear energy industry and other industries provides a stark comparison: Nuclear energy meets a higher standard for safety than any other American industry.

2. **US nuclear power plants have been operating safely for decades.**

Christine Todd Whitman (co-chairs the nuclear industry funded Clean and Safe Energy Coalition (CASEnergy)), "The Case for Nuclear Power Is as Strong as Ever," The Huffington Post, August 2, 2010, http://www.huffingtonpost.com/christine-todd-whitman/the-case-for-nuclear-powe_b_667193.html

The concern for safety is critical, but the good news is that preventive safety work is already being done every day at our nation's reactors. In fact, the United States nuclear energy industry has accumulated an outstanding safety record since the days of the Three Mile Island accident in 1979. Worker safety in nuclear plants stands above any other American industrial sector, as measured by lost-time accidents. The nuclear power industry has devoted significant resources to continuously improving the safety and reliability of our nuclear power facilities against all manner of potential risks and threats with the result that, for more than 30 years, nuclear plants have delivered about 20 percent of America's electrical power safely and securely, without major incident.

3. **US nuclear power plants are designed to withstand all potential releases.**

Christine Todd Whitman (co-chairs the nuclear industry funded Clean and Safe Energy Coalition (CASEnergy)), "The Case for Nuclear Power Is as Strong as Ever," The Huffington Post, August 2, 2010, http://www.huffingtonpost.com/christine-todd-whitman/the-case-for-nuclear-powe_b_667193.html

Every nuclear power plant is designed, constructed and managed to prevent radioactive releases, even in the event of natural disasters, operational accidents or terrorist attacks. Since September 2001, the nuclear industry has spent in excess of $2 billion on enhancements to prevent physical or cyber breaches. In fact, analyses conducted by the independent Electric Power Research Institute (EPRI) concluded that the structures that surround U.S. nuclear power plants would protect against a release of radiation if struck by a Boeing 767 jetliner. Steel-reinforced concrete containment structures protect reactors and redundant safety and reactor shutdown systems have been designed to withstand the impact of earthquakes, hurricanes, tornadoes and floods.

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A/T Nuclear power can easily be turned into nuclear weapons.

1. **The fact that nuclear power could be used to make nuclear weapons fails as a justification to ban nuclear power.**

Patrick Moore, chairman and chief scientist of Greenspirit Strate-gies Ltd, "20Greenpeace founder makes the case for nuclear," Nuclear News, June 2005, http://nature.berkeley.edu/er100/readings/Moore_2005.pdf

Nuclear reactors produce plutonium that can be extracted and manufactured into nuclear weapons. This is unfortunate but is not in itself justification for eliminating nuclear energy. It appears that the main technologies that have resulted in combat deaths in re-cent years are machetes, rifles, and car bombs. No one would se-riously suggest banning machetes, guns, cars, or the fertilizer and diesel that explosives are made from. Nuclear proliferation must be addressed as a separate policy issue from the production of nu-clear energy.

2. **Nuclear power can reduce the threat of nuclear war by repurposing existing weapons.**

David Biello (associate editor at Scientific American), "How Nuclear Power Can Stop Global Warming," Scientific American, December 12, 2013, http://www.scientificamerican.com/article/how-nuclear-power-can-stop-global-warming/

When the Atlantic Navigator docked in Baltimore harbor earlier this month, the freighter carried the last remnants of some of the nuclear weapons that the Soviet Union had brandished in the cold war. During the past 20 years more than 19,000 Russian warheads have been dismantled and processed to make fuel for U.S. nuclear reactors. In fact, during that period more than half the uranium fuel that powered the more than 100 reactors in the U.S. came from such reprocessed nuclear weapons.

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A/T We will run out of uranium soon anyway.

1. **Tiny quantities of uranium can provide significant amounts of power.**

Peter Huber (senior fellow at the Manhattan Institute) & Mark P. Mills (adjunct fellow of the Manhattan Institute, and founder and CEO of the Digital Power Group), "Why the U.S. Needs More Nuclear Power," City Journal, Winter, 2005, http://www.city-journal.org/html/15_1_nuclear_power.html

That's the stunning thing about nuclear power: tiny quantities of raw material can do so much. A bundle of enriched-uranium fuel-rods that could fit into a two-bedroom apartment in Hell's Kitchen would power the city for a year: furnaces, espresso machines, subways, streetlights, stock tickers, Times Square, everything—even our cars and taxis, if we could conveniently plug them into the grid. True, you don't want to stack fuel rods in midtown Manhattan; you don't in fact want to stack them casually on top of one another anywhere. But in suitable reactors, situated, say, 50 miles from the city on a few hundred acres of suitably fortified and well-guarded real estate, two rooms' worth of fuel could electrify it all. Think of our solitary New Yorker on the Upper West Side as a 1,400-watt bulb that never sleeps—that's the national per-capita average demand for electric power from homes, factories, businesses, the lot. Our average citizen burns about twice as bright at 4 PM in August, and a lot dimmer at 4 AM in December; grown-ups burn more than kids, the rich more than the poor; but it all averages out: 14 floor lamps per person, lit round the clock. Convert this same number back into a utility's supply-side jargon, and a million people need roughly 1.4 "gigs" of power—1.4 gigawatts (GW). Running at peak power, Entergy's two nuclear units at Indian Point generate just under 2 GW. So just four Indian Points could take care of New York City's 7-GW round-the-clock average. Six could handle its peak load of about 11.5 GW. And if we had all-electric engines, machines, and heaters out at the receiving end, another ten or so could power all the cars, ovens, furnaces—everything else in the city that oil or gas currently fuels.

2. **There are plenty of uranium deposits to mine.**

Peter Huber (senior fellow at the Manhattan Institute) & Mark P. Mills (adjunct fellow of the Manhattan Institute, and founder and CEO of the Digital Power Group), "Why the U.S. Needs More Nuclear Power," City Journal, Winter, 2005, http://www.city-journal.org/html/15_1_nuclear_power.html

What's more, North America has vast deposits of uranium ore, and scooping it up is no real challenge. Enrichment accounts for about half of the fuel's cost, and enrichment technologies keep improving. Proponents of solar and wind power maintain—correctly—that the underlying technologies for these energy sources keep getting cheaper, but so do those that squeeze power out of conventional fuels. The lasers coming out of the same semiconductor fabs that build solar cells could enrich uranium a thousand times more efficiently than the gaseous-diffusion processes currently used.

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Rebuttal Overviews

First Affirmative

First Aff

Extend that the value for the round is morality because "the word ought in the resolution is, according to the Random House Dictionary, used to express duty or moral obligation. As such it is the only normative term in the resolution meaning it is the only word in the resolution that could provide guidance as to how to begin to answer the question of the resolution. So, the resolution is asking if countries have a moral duty to ban nuclear power." <My opponent argued _____ but this is wrong because _____.> Thus morality is the correct value for the round and only offense accessing this value is relevant. Extend that the criterion for the round is achieving the greatest good for the greatest number. Extend Ito who warrants this writing, "any object of moral assessment (e.g. action, motive, policy, or institution) should be assessed by and in proportion to the value of its consequences for the general happiness"—and is known as act-utilitarianism: the justification of an action is determined by the value of the consequences of that particular act." <My opponent argued _____ _____ but this is wrong because _____.> This means I am winning the criterion and so only offense that accesses this criterion matters in the round. Now extend my first point where Sweeney proves that uranium mining has lethal effects writing, "Once these materials are mined, radioactive elements become far more bio-available and can readily escape into waterways and the atmosphere. Uranium is also chemically toxic at high concentrations and can cause damage to internal organs. Uranium has been linked with adverse impacts on reproduction, foetal develop-ment, and an increased risk of cancer and leukaemia. Even after mining ceases, uranium tailings retain about 80% of the radioactivity of the original ore body." <My opponent argued _____ but this is wrong because _____.> This means that even at the beginning of the nuclear power process there are great risks to the people and so banning nuclear power would achieve the greatest number and so you can affirm. Now extend my second point where Sweeney proves that uranium processing carries multiple risks writing, "The processes required for uranium conversion, enrichment, and fuel fabrication further contribute to environmental and social risks and contamination loads. These processes generate 'routine' emissions, occupational exposures, and liquid, gaseous, and solid radioactive wastes, the management of which remains contentious and unresolved." <My opponent argued _____ _____ but this is wrong because _____.> This means that nuclear power is dangerous to people even during the processing stage and so banning nuclear power would achieve the greatest good for the greatest number and so you can affirm. Now extend my third point where Sweeney proves that nuclear reactors are responsible for multiple health and environmental risks writing, "Reactor operations at the continuing facilities around the world are responsible for site-specific and regional public health and environmental impacts. These are exacerbated by the fact that many of the ex-isting plants are aging facilities rapidly reaching the end of their approved operating life. Attempts to ex-tend the operations of these facilities have led to in-creased concerns about their vulnerability." <My opponent argued _____ but this is wrong because _____ _____.> This means the very existence of nuclear reactors is very dangerous to people and so banning nuclear power would achieve the greatest good for the greatest number and so you can affirm. Now extend my last point where Acheson proves that continuing to use nuclear power assures the spread of nuclear weapons writing, "This means the very existence of nuclear reactors is very dangerous to people and so banning nuclear power would achieve the greatest good for the greatest number and so you can affirm." <My opponent argued _____ but this is wrong because _____ _____.> This means that the mere existence of nuclear power threatens the world with nuclear war and so banning nuclear power would achieve the greatest good for the greatest number and so you can affirm.

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Second Aff

Extend that the value for the round is morality because "the word ought in the resolution is, according to the Random House Dictionary, used to express duty or moral obligation. As such it is the only normative term in the resolution meaning it is the only word in the resolution that could provide guidance as to how to begin to answer the question of the resolution. So, the resolution is asking if countries have a moral duty to ban nuclear power." <My opponent argued _____ but this is wrong because _____.> Thus morality is the correct value for the round and only offense accessing this value is relevant. Extend that the criterion for the round is combatting climate change. Extend Ki-Moon who writes, "If ever there were an issue that requires unity of purpose, it is climate change. Science tells us we are far off track from reducing global emissions sufficient to keep global temperature rise below 2° C. We are currently on course for a rise of 4-5° C. That would alter life on Earth as we know it. This is morally indefensible." <My opponent argued _____ but this is wrong because _____.> So this is the correct criterion for the round and offense accessing any other criterion is irrelevant. Now extend my first point where Scheffran proves that nuclear power is not carbon free and so not effective at fighting climate change writing, "1 GWe nuclear power reactor plant in Germany causes indirect emissions of 200,000 tonnes of CO2 per year, which is comparable to hydropower, lower than photovoltaic, and higher than for wind or improved efficiency of electricity generation and use.3Thus, nuclear power is not an effective means to miti-gate climate change and there are alternatives that avoid its negative side effects." <My opponent argued _____ but this is wrong because _____ _____.> This means that while nuclear power might be lower in carbon emissions, they cannot solve for climate change because they are not carbon free giving you your first reason to affirm. Now extend my second point where Scheffran proves that solutions to climate change must be nuclear free writing, "Rather than burying or correcting the consequences of nuclear and fossil energies through nuclear waste disposal and climate engineering, it is more appropri-ate to avoid the problems in the first place. To this end, it is essential to establish a nuclear-free, carbon-free, and sustainable energy system.[9] Because of the adverse linkages between nuclear and climate risks, it is time to develop a new thinking that synergizes solutions in both nuclear security and climate policy with an inte-grated framework of sustainable peace." <My opponent argued _____ but this is wrong because _____.> So clearly to solve for climate change we must ban nuclear power and so we must affirm. Now extend my third point where Scheffran explains that renewable energy is better for climate change writing, "In a comprehensive environmental and economic as-sessment, including external costs from waste disposal, uranium mining, fuel processing, and radioactive emis-sions during normal operations, most renewable ener-gy sources look better than nuclear energy." And extend Froggatt who then explains that nuclear power is not compatible with renewable energy writing, "From a systemic point of view there is a conflict be-tween an electricity grid that is designed and operated with nuclear at its core to one that focuses on a com-bination of energy efficiency and renewables. This is becoming increasingly transparent in countries or re-gions where renewable energy is taking a large share of electricity generation, i.e. in Germany and Spain." <My opponent argued _____ but this is wrong because _____ _____.> So this is the clearest reason to affirm because nuclear power which will not solve for climate change actually thwarts renewable energy efforts and so we have to affirm to to stop climate change.

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First Neg

Extend that the value for the round is morality because “the word ought in the resolution is, according to the Random House Dictionary, used to express duty or moral obligation. As such it is the only normative term in the resolution meaning it is the only word in the resolution that could provide guidance as to how to begin to answer the question of the resolution. So, the resolution is asking if countries have a moral duty to ban nuclear power.” <My opponent argued _____ but this is wrong because _____.> Thus morality is the correct value for the round and only offense accessing this value is relevant. Extend that the criterion for the round is maximizing happiness. Extend Mill who writes, “Power is a means to an end. The end is, everything, without exception, which the human being calls pleasure, and the removal of pain. The grand instrument for attaining what a man likes is the actions of other men. Power, in its most appropriate signification, therefore, means, security for the conformity between the will of one man and the acts of other men.” <My opponent argued _____ _____ but this is wrong because _____.> So this is the correct criterion for the round and offense accessing any other criterion is irrelevant. Now extend my first point where Biello proves that nuclear power has saved nearly two million lives writing, “The low-carbon electricity produced by such reactors provides 20 percent of the nation's power and, by the estimates of climate scientist James Hansen of Columbia University, avoided 64 billion metric tons of greenhouse gas pollution. They also avoided spewing soot and other air pollution like coal-fired power plants do and thus have saved some 1.8 million lives.” <My opponent argued _____ but this is wrong because _____.> So nuclear power saves millions of lives and so maximizes happiness and so is moral thus you can negate. Now extend my second point where Rencheck proves that nuclear power could save millions of more lives writing, “global nuclear power has prevented an average of 1.8 million air pollution-related deaths that would otherwise have resulted from the burning of fossil fuels. If nuclear energy technologies replaced fossil fuels on a large scale, that number could grow to 7 million lives saved over the next 40 years.” <My opponent argued _____ but this is wrong because _____.> This means nuclear power has the potential to save millions of more lives and so maximizes happiness and thus is moral and so you can negate.

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Second Neg

Extend that the value for the round is morality because "the word ought in the resolution is, according to the Random House Dictionary, used to express duty or moral obligation. As such it is the only normative term in the resolution meaning it is the only word in the resolution that could provide guidance as to how to begin to answer the question of the resolution. So, the resolution is asking if countries have a moral duty to ban nuclear power." <My opponent argued _____ but this is wrong because _____.> Thus morality is the correct value for the round and only offense accessing this value is relevant. Extend that the criterion for the round is embracing environmental pragmatism. Extend Mintz who writes, "environmental pragmatists are not wedded to any particular theoretical framework from which to evaluate specific problems, but [they] can choose the avenue which best protects the long-term health and stability of the environment, regardless of its theoretical origin." <My opponent argued _____ but this is wrong because _____.> So this is the correct criterion for the round and offense accessing any other criterion is irrelevant. Now extend my first point where Moore proves that nuclear power is a proven alternative to fossil fuel writing, "In 2002, the use of nuclear energy helped the U.S. avoid the re-lease of 189.5 million tons of carbon into the air, if this electric-ity had been produced by coal. In fact, the electric sector's carbon emissions would have been 29 percent higher without nuclear power." <My opponent argued _____ but this is wrong because _____ _____.> This means that nuclear power is the best alternative to fossil fuels as it is more effective than renewable alternatives and so you can negate. Now extend my second point where Fox proves that if we ban nuclear power we grow more dependent on coal writing, "If environmentalists continue to oppose nuclear power, coal will still be providing most of the world's electricity 50 years from now and the earth will be on a path to catastrophic warming. The choice is ours. I believe the best choice is to reduce global warming by replacing most coal power plants with nuclear power." <My opponent argued _____ but this is wrong because _____.> This means that if we affirm we will rely more on fossil fuels and not less. The affirmative cannot solve this by simply also fiating that we reduce fossil fuels or become more energy efficient as either would be ludicrously extra topical and beyond your jurisdiction to vote for, thus nuclear power is the most pragmatic realistic alternative and so you can negate,

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Preflows

V = Morality
the word ought in the resolution is, according to the Random House Dictionary, used to express duty or moral obligation. As such it is the only normative term in the resolution meaning it is the only word in the resolution that could provide guidance as to how to begin to answer the question of the resolution. So, the resolution is asking if countries have a moral duty to ban nuclear power.

Cr = Achieving greatest good for greatest #
x-Ito
"any object of moral assessment (e.g. action, motive, policy, or institution) should be assessed by and in proportion to the value of its consequences for the general happiness" —and is known as act-utilitarianism: the justification of an action is determined by the value of the consequences of that particular act

1 Uranium mining has lasting lethal effects.
x-Sweeney
Once these materials are mined, radioactive elements become far more bio-available and can readily escape into waterways and the atmosphere. Uranium is also chemically toxic at high concentrations and can cause damage to internal organs. Uranium has been linked with adverse impacts on reproduction, foetal develop-ment, and an increased risk of cancer and leukaemia. Even after mining ceases, uranium tailings retain about 80% of the radioactivity of the original ore body.

2 Uranium processing carry multiple risks regardless of the purpose of the processing
x-Sweeney
The processes required for uranium conversion, enrichment, and fuel fabrication further contribute to environmental and social risks and contamination loads. These processes generate 'routine' emissions, occupational exposures, and liquid, gaseous, and solid radioactive wastes, the management of which remains contentious and unresolved

3 Nuclear reactors are responsible for multiple health and environmental risks
x-Sweeney
Reactor operations at the continuing facilities around the world are responsible for site-specific and regional public health and environmental impacts. These are exacerbated by the fact that many of the ex-isting plants are aging facilities rapidly reaching the end of their approved operating life.

4 Continuing to use nuclear power assures the spread of nuclear weapons
x-Acheson
The continued existence of nuclear fuel cycle fa-cilities, technology, and material makes it extremely difficult to envisage reaching a world free of nuclear weapons. Since 1945, many scientists, activists, and government officials have pointed out that nuclear ma-terial, technology, and facilities are dangerous whether they are in weapons form or for "peaceful uses". "Whatever its source, the harm to health of ion-izing radiation is the same. The same chain reaction drives nuclear fission in reactors and bombs

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Cr = combat climate change
x-Ki-Moon
If ever there were an issue that requires unity of purpose, it is climate change. Science tells us we are far off track from reducing global emissions sufficient to keep global temperature rise below 2° C. We are currently on course for a rise of 4-5° C. That would alter life on Earth as we know it. This is morally indefensible.

1 Nuclear power is not carbon free and so not effective at climate change.
x-Scheffran
1 GWe nuclear power reactor plant in Germany causes indirect emissions of 200,000 tonnes of CO2 per year, which is comparable to hydropower, lower than photovoltaic, and higher than for wind or improved efficiency of electricity generation and use

2 Solutions to climate change should be nuclear free
x-Scheffran
it is essential to establish a nuclear-free, carbon-free, and sustainable energy system. 9 Because of the adverse linkages between nuclear and climate risks, it is time to develop a new thinking that synergizes solutions in both nuclear security and climate policy with an inte-grated framework of sustainable peace

3 Renewable energy is better for climate Change
x-Scheffran
In a comprehensive environmental and economic as-sessment, including external costs from waste disposal, uranium mining, fuel processing, and radioactive emis-sions during normal operations, most renewable ener-gy sources look better than nuclear energy

Nuclear power is not compatible with renewable energy.
x-Froggatt
From a systemic point of view there is a conflict be-tween an electricity grid that is designed and operated with nuclear at its core to one that focuses on a com-bination of energy efficiency and renewables. This is becoming increasingly transparent in countries or re-gions where renewable energy is taking a large share of electricity generation, i.e. in Germany and Spain

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Cr = Maximize happiness
x-Mill
Power is a means to an end. The end is, everything, without exception, which the human being calls pleasure, and the removal of pain. The grand instrument for attaining what a man likes is the actions of other men. Power, in its most appropriate signification, therefore, means, security for the conformity between the will of one man and the acts of other men

1 Nuclear power has saved nearly two million lives
x-Biello
by the estimates of climate scientist James Hansen of Columbia University, avoided 64 billion metric tons of greenhouse gas pollution. They also avoided spewing soot and other air pollution like coal-fired power plants do and thus have saved some 1.8 million lives

2 Nuclear power has saved millions of lives and could save millions more.
x-Rencheck
global nuclear power has prevented an average of 1.8 million air pollution-related deaths that would otherwise have resulted from the burning of fossil fuels. If nuclear energy technologies replaced fossil fuels on a large scale, that number could grow to 7 million lives saved over the next 40 years

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Cr = embrace environmental Pragmatism
x-Mintz
environmental pragmatists are not wedded to any particular theoretical framework from which to evaluate specific problems, but [they] can choose the avenue which best protects the long-term health and stability of the environment, regardless of its theoretical origin

1 Nuclear power is a proven alternative to fossil fuel
x-Moore
In 2002, the use of nuclear energy helped the U.S. avoid the re-lease of 189.5 million tons of carbon into the air, if this electric-ity had been produced by coal. In fact, the electric sector's carbon emissions would have been 29 percent higher without nuclear power.

2 If we ban nuclear power we will grow more dependent on coal
x-Fox
If environmentalists continue to oppose nuclear power, coal will still be providing most of the world's electricity 50 years from now and the earth will be on a path to catastrophic warming. The choice is ours. I believe the best choice is to reduce global warming by replacing most coal power plants with nuclear power. I hope we have the wisdom to take that path

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