# Russia War Good

### Notes

For questions email [Parks.asbury23@montgomerybell.edu](mailto:Parks.asbury23@montgomerybell.edu) or [Alex.barnard23@montgomerybell.edu](mailto:Alex.barnard23@montgomerybell.edu)

# NEG

## 1NCs

### 1NC---AI

#### Russia first strikes the west with hypersonic *HEMPs* if war happens now---This doesn’t kill anyone and guarantees war doesn’t escalate---Russian doctrine AND generals admit it

**Pry 21**, Dr. Peter Vincent Pry, Executive Director EMP Task Force on National and Homeland Security also legit most qualified person ever on this issue, January 2021 The Russian Federation’s Military Doctrine, Plans, and Capabilities for Electromagnetic Pulse (EMP) Attack" https://apps.dtic.mil/sti/pdfs/AD1124730.pdf

Any nuclear weapon detonated in outer space, 30 kilometers or higher, will generate a high-altitude electromagnetic pulse (HEMP). No blast, thermal, fallout or effects other than HEMP are experienced in the atmosphere and on the ground. A nuclear detonation at 30 kilometers altitude will generate a HEMP field with a radius on the ground of 600 kilometers, damaging all kinds of electronics, blacking-out electric grids and collapsing other life-sustaining critical infrastructures. Detonated at 400 kilometers altitude, the radius of the HEMP field will be about 2,200 kilometers, large enough to cover most of North America.

Russia has what they term “Super-EMP” weapons, nuclear warheads specialized for HEMP attack. Super-EMP warheads have very low explosive yield (10 kilotons or less) but very high gamma yield, which is what generates HEMP. According to Russian military and technical sources, Super-EMP weapons can generate HEMP fields of 100,000 volts/meter or higher, greatly exceeding the U.S. military hardening standard for HEMP (50,000 volts/meter).

Russian military doctrine, because HEMP attacks electronics, categorizes nuclear HEMP attack as a dimension of Information Warfare, Electronic Warfare and Cyber Warfare, which are modes of warfare operating within the electromagnetic spectrum.

Commonplace cyber-theft, e-mail disruptions, and hacking, widely regarded as annoyances by most Americans, could foreshadow catastrophic nuclear HEMP attacks on the grid that would threaten the existence of society. In Nazi Germany's blitzkrieg strategy, probing by their motorcycle corps and scout planes, looking for weakness, preceded the massed onslaught of heavy armored divisions. The same principle may be at work in cyber-space with probing attacks from Russia, China, North Korea and Iran. From the perspective of adversary military doctrine on Electronic Warfare and Cyber Warfare, cyber-thefts and intrusions look less like isolated cases of theft and hacking and more like probing U.S. defenses and gauging Washington’s reactions—perhaps in preparation for an all-out cyber offensive that would include physical sabotage, radio frequency weapons, and ultimately nuclear HEMP attack. Russian HEMP Tests The Soviet Union discovered the high-altitude electromagnetic pulse (HEMP) phenomenon probably years before the United States. High-altitude nuclear testing at its Novaya Zemlya site would have exposed the Russian cities of Archangel and Murmansk and electric grids on the Kola Peninsula to HEMP effects. Moreover, Russia being located at a higher northern latitude than most of the U.S., on the same latitude as Canada and Alaska, meant greater exposure to geomagnetic storms and their EMP/GMD effects on communications and power grids, an awareness reflected in their military writings. On October 22, 1962, the Soviet Union conducted a high-altitude EMP test—Nuclear Test 184— over part of its own territory, deliberately exposing Kazakhstan's electric grid to HEMP as an experiment. "These EMP producing tests were done over a large populated land mass in Kazakhstan," writes Jerry Emanuelson in his study of Test 184, "Even though the economic state of Kazakhstan in 1962 was quite primitive by today's standards, it was heavily industrialized and electrified." The HEMP field generated by Nuclear Test 184 covered all of Kazakhstan. Emanuelson: “Test 184 was detonated at 290 kilometers above a point that was 180 miles due west of Zhezgazghan....At an altitude of 290 kilometers above the detonation point in central Kazakhstan, the distance to the horizon would have been more than 1900 kilometers, which would have caused an electromagnetic pulse over all of Kazakhstan.” Data from Nuclear Test 184, the results of which were kept secret for over thirty years, were partially shared with the West in a briefing by Russian General Vladimir M. Loberev in 1994. Nuclear Test 184 confirmed definitively for the Soviets in 1962 what the United States concluded independently by extrapolation from the U.S. STARFISH PRIME and other nuclear test results (conducted over the Pacific Ocean), and from experiments conducted over 50 years using EMP simulators and by computer modeling. Nuclear Test 184 destroyed transformers, generators, communications, switches and all manner of electronics within an enormous footprint extending hundreds of kilometers—thereby proving the advantages and dangers of HEMP attack empirically. Monstrous and unethical as may have been the USSR's decision to conduct an HEMP test against their own people, Nuclear Test 184 and other tests armed the Soviet Union with the best HEMP data in the world in 1962. Nuclear Test 184 was part of a series of seven Soviet nuclear HEMP tests conducted over the USSR's own territory, mostly over Kazakhstan, commencing on September 6, 1961, and ending on November 1, 1962. Whereas the U.S. was surprised by its discovery of HEMP during its 1962 nuclear test STARFISH PRIME, the Soviets were already aware of HEMP during their nuclear test series and were very well prepared with a large array of scientific instruments all over Kazakhstan to test and investigate HEMP effects from actual high-altitude nuclear detonations in a way that has never been approximated by the United States or any other nation. The first two Soviet HEMP nuclear tests, on September 6, 1961, and October 6, 1961, were codenamed "Thunderstorm" and "Thunder" perhaps reflecting the HEMP mission. All of the tests were very realistic, using military ballistic missiles, mostly the SS-4 medium-range missile, to deliver and detonate the warheads at high-altitude. The HEMP tests used a wide variety of warheads, with yields ranging from merely 1.2 kilotons to 300 kilotons, detonated at greatly varying altitudes, ranging from 22.7 kilometers to 300 kilometers height-of-burst. There is no question that as a result of its HEMP nuclear test series, the Soviet Union, and today Russia, probably knows a lot more about HEMP effects than the United States. "In 1962, the then Soviet Union conducted several high-altitude nuclear tests in Kazakhstan in the course of which were obtained vast facts on the damage levels from HEMP illuminating both military and civil systems," writes Russian scientist Vasiliy Greetsai today. "Most of those 'vast facts' are apparently still kept secretly at the Russian Federation Ministry of Defense at the Central Institute of Physics in Sergiev Posad, Russia," warns Emanuelson in his study of Test 184, "Only a tiny amount of those facts have been publicly released, but those facts have been extremely informative." Russia Shares Some HEMP Data Why did Russia share any HEMP nuclear test data with the West, and why just Nuclear Test 184 in particular? It is generally assumed that Russian General Loberev's 1994 briefing on Nuclear Test 184 to an international audience was a benign act, part of the post-Cold War thaw in relations under the pro-Western Russian President Boris Yeltsin. However, a less benign interpretation of the facts is possible. Perhaps the Russian General Staff approved Loberev's 1994 briefing to the West on Nuclear Test 184 because they hope to mislead the United States on the real severity of the threat and preserve U.S. vulnerability to HEMP attack. Emanuelson in his study of Test 184 observes that the nuclear weapon used for this test—as impressive as were the results—was an inefficient design for HEMP, and probably produced weaker HEMP fields than the U.S. STARFISH PRIME nuclear test. Nor have the Russians disclosed, even for Test 184, the strength of the peak HEMP fields that can do the most damage.20 Yet among Western specialists Test 184 has become a sort of "gold standard" that rivals in importance STARFISH PRIME as a basis for designing HEMP protection Moscow jealously guards the secrets of its other HEMP nuclear tests—that includes more than the seven high-altitude detonations for the 1961-62 test series. Most Western analysts assume that Russia is sharing its best data by disclosing Test 184. Even the usually meticulous Emanuelson appears to jump to this conclusion: "The first two of the K Project high altitude nuclear tests (in 1961) over Kazakhstan were only 1.2 kilotons so the EMP...apparently did not have much of an impact on the 1961 infrastructure of Kazakhstan.” But we do not know the impact of these HEMP tests, because Moscow is not telling. Perhaps significantly, at least one of these Soviet HEMP tests was conducted in an Anti-Ballistic Missile (ABM) mode, involving a high-altitude interception of a target. Moreover, all of the tests were conducted over the Saryshagan ABM test range.22 One design of a Soviet ABM warhead is like an Enhanced Radiation Warhead, a warhead having low explosive yield but capable of producing lots of neutrons, x-rays, gamma rays and other radiation to kill incoming warheads. Such a weapon, low-yield but emitting enhanced gamma rays that make high-frequency HEMP, could produce an extraordinarily powerful HEMP field, tantamount to a Super-EMP warhead. Is it possible that Moscow discovered, by accident or design, the secret for making a Super-EMP nuclear weapon in 1961? Did Moscow share data from Nuclear Test 184 in 1994 because they want to disinform the United States and its allies about the real maximum HEMP threat, so that the West will under-prepare, and remain vulnerable to Super-EMP?

Russian HEMP Threats Russia's Super-EMP weapons—that have no counterpart in the U.S. nuclear arsenal—and Russia's superior defensive preparations against HEMP, may have emboldened the Russian Duma in 1999 to threaten an HEMP attack against the United States for NATO's bombing of Russian ally Serbia. As witnessed by the U.S. congressional delegation to Vienna, meeting with their counterparts from the Russian Duma, Vladimir Lukin, Chairman of the Duma International Affairs Committee, and Deputy Chairman Alexander Shabonov, threatened:

LUKIN—"Hypothetically, if Russia really wanted to hurt the United States in retaliation for NATO's bombing of Yugoslavia, Russia could fire a submarine launched ballistic missile and detonate a single nuclear warhead at high-altitude over the United States. The resulting electromagnetic pulse would massively disrupt U.S. communications and computer systems, shutting down everything. No internet. Nothing." SHABANOV—“And if that didn’t work, we’d just launch another missile.” Moscow’s threatened nuclear HEMP attack on the U.S. to the face of an official congressional delegation was a contributing factor to the establishment of the EMP Commission. Indeed, Moscow frequently flourishes its nuclear saber to threaten the United States, as if emboldened by knowledge of some decisive nuclear advantage, like Super-EMP weapons and HEMP attack. For example, Russian General Staff Chief Nikolai Makarov threatened a preemptive strike against NATO anti-missile sites in Poland and the Czech Republic in 2012.24 Increasingly aggressive nuclear threats have been made by Russia in 2013, 2014, 2015, 2016, 2017 and especially after Vladimir Putin’s March 1, 2018 announcement of new nuclear super-weapons, that Putin threatened will compel the U.S. to, “Listen to us now!”25 According to former senior Defense Department official, Dr. Mark Schneider: “Between October 24, 2018 and March 2019, the nuclear missile targeting threat was made at least 11 times at the highest levels—by President Putin, by the Chief of the General Staff of the Army Valery Gerasimov, by the Strategic Missile Force Commander Colonel General Sergei Ryabkov.”26 Yet despite all Russia's nuclear preparations and threats, Moscow still fears a HEMP attack. A Norwegian scientific rocket, launched on January 25, 1995, to explore the aurora borealis, was mistaken by the Russian military as a surprise HEMP attack launched by a U.S. submarine—nearly resulting in a massive Russian preemptive strike. This still little known incident, happening a half decade after the end of the Cold War, is the closest the sides have ever come to nuclear conflict, triggered by the specter of surprise HEMP attack.

Russian Military Doctrine: HEMP Attack Decisive Russian General Vladimir Slipchenko in his military textbook Non-Contact Wars describes the combined use of cyber viruses and hacking, physical attacks, non-nuclear EMP weapons, and ultimately nuclear HEMP attack against electric grids and critical infrastructures as a new way of warfare that is the greatest Revolution in Military Affairs (RMA) in history. Slipchenko sees EMP as such a departure from traditional ways and means of warfare that he describes EMP weapons and warfare as “based on new physical principles”—a phrase that has become ubiquitous in Russian literature to describe the military revolution that is EMP:

“In practically all preceding generations of wars…weapons were employed that acted against targets primarily by kinetic, chemical and thermal energy. In addition to these arms…new ones will also appear…in wars of the future…Weapons based on new physical principles having an electromagnetic effect will see considerable development. They will represent a form of casualty and damage producing effect on targets through the energy of electromagnetic emissions of various wavelengths and levels of power generated by radio frequency and laser weapons and by means of electronic countermeasures using a conventional or high-altitude nuclear burst…Depending on the power of emission, such weapons will be capable of…suppressing practically all classic electronic equipment…causing the melting or evaporation of metal in the printed circuit boards…or causing structural changes of electronic elements…”

Like Nazi Germany’s “Blitzkrieg” (“Lightning War”) strategy that coordinated airpower, armor, and mobile infantry to achieve strategic and technological surprise that nearly defeated the Allies in World War II, the “New Blitzkrieg” is, literally and figuratively, an electronic “Lightning War” so potentially decisive in its effects that an entire civilization could be overthrown in hours. According to General Slipchenko, EMP and the new military revolution renders obsolete modern armies, navies and air forces. For the first time in history, small nations or even non-state actors can humble the most advanced nations on Earth.

An article in Military Thought, the flagship journal of the Russian General Staff, “Weak Points of the U.S. Concept of Network-Centric Warfare” points to nuclear HEMP attack as a means of defeating the United States: “American forces may be vulnerable to electronic warfare attacks, in particular, an electromagnetic pulse that is a brief powerful electromagnetic field capable of overloading or destroying numerous electronic systems and high-tech microcircuits that are very sensitive to the electromagnetic field, even if transmitted from a distance. A single low-yield nuclear weapon exploded for this purpose high above the area of combat operations can generate an electromagnetic pulse covering a large area and destroying electronic equipment without loss of life that is caused by the blast or radiation.” Moreover: “Today, too, a considerable body of administrative information in the U.S. armed forces goes through the civilian Internet. Many civilian commercial communication satellites, particularly satellites in low orbits, can have their functions impaired or they can be disabled by electromagnetic shocks from high altitudes.”

According to another Russian article: “Nuclear war strategy has already planned nuclear explosions at an altitude of 50-100 km to destroy enemy satellites’ electronic instruments with electromagnetic pulse”:

“There are now about 683 space craft in near-earth orbit. Of these about 150 are Russian and about 400 American. In the estimation of specialists, for every 100 of our ‘purely’ military espionage artificial earth satellites there are 300 civilian satellites. Clearly, this discrepancy will increase both quantitatively and qualitatively (considering the state of the Russian military industrial complex)…Nuclear war strategy has already planned nuclear explosions at an altitude of 50-100 km to destroy enemy satellites’ electronic instruments with an electromagnetic pulse.”

A 2015 article from Russia’s A.A. Maksimov Scientific Research Institute for Space Systems, alludes to low-yield nuclear enhanced-EMP as the most effective cyber weapon: “Even more effective are remote-controlled cyber weapons in the nuclear variant, but in this case a warhead is required with a capacity many times smaller by comparison with the charges of the typical strategic missiles.”

“Super-EMP is a…first-strike weapon,” according to Aleksey Vaschenko, who describes Russian nuclear weapons specially designed to make extraordinarily powerful EMP fields as Russia’s means for defeating the United States in “A Nuclear Response To America Is Possible”:

“The further direction of the work on the development of Super-EMP was associated with the increase of its kill effect by focusing Y-radiation, which should have resulted in an increase of the pulse’s amplitude. These properties of Super-EMP make it a first strike weapon, which is designed to disable the state and military command and control system, the economy, ICBMs, especially mobile based ICBMs, missiles on the flight trajectory, radar sites, spacecraft, energy supply systems, and so forth. So, Super-EMP is obviously offensive in nature and is a destabilizing firststrike weapon…The Russian nuclear component relies on the Super-EMP factor, which is the Russian response to U.S. nuclear blackmail.”

Hypersonic Warheads: New HEMP Threat Russian development of hypersonic missile warheads is a dangerous new dimension of the nuclear and HEMP threat. Great speed (Mach 20, twenty times the speed of sound) and flying a flat trajectory, skimming along the top of the upper atmosphere, significantly reduces visibility to U.S. early-warning satellites and radars, while also reducing arrival time. Maneuvering makes hypersonic warheads more difficult to track and intercept, virtually impossible to intercept with existing U.S. National Missile Defenses. Former senior Defense Department official Dr. Mark Schneider writes, “The main reason for Russian hypersonic missiles is a nuclear surprise attack and America has no defense against it.”3 Four-star General John Hyten, then chief of the U.S. Strategic Command that controls the nuclear Triad (now Vice Chairman Joint Chief of Staff), agrees with Schneider: “Hypersonic capabilities are a significant challenge. We are going to need a different set of sensors to see hypersonic threats. Our enemies know that.”

Russia deployed its first regiment of SS-19 ICBMs armed with hypersonic Avangard nuclear warheads at the end of December 2019.

Hypersonic vehicles fly over most of their trajectory at 50-100 kilometers altitude: the optimum height-of-burst for Super-EMP warheads

Hypersonic weapons are potentially a new avenue for surprise nuclear HEMP attack that could defeat deterrence. We cannot see the attack coming and may not know against whom to retaliate, especially if HEMP attack blinds satellites and radars needed for early-warning and threat assessment.

Hypersonically delivered HEMP attack could win World War III with a single electronic blow.

HEMP Satellites? During the Cold War, the USSR developed a secret weapon called the Fractional Orbital Bombardment System (FOBS). The FOBS would disguise a nuclear attack as a peaceful satellite launch, orbiting a nuclear-armed satellite over the South Pole to attack the U.S. from the south— from which direction the U.S. is blind and defenseless as there are no BMEWS radars or antimissile defenses facing south. The FOBS satellite could deliver a HEMP attack paralyzing U.S. retaliatory forces and C3I in the first shot of a nuclear war. Miroslav Gyurosi in The Soviet Fractional Orbital Bombardment System describes Moscow's development of the FOBS as part of "a long running campaign of strategic deception against the West through the whole Cold War period, and the protracted development of the Soviet FOBS nuclear weapon system presents an excellent case study of such." Gyurosi: “The Fractional Orbital Bombardment System (FOBS) as it was known in the West, was a Soviet innovation intended to exploit the limitations of U.S. BMEW radar coverage. The idea behind FOBS was that a large thermonuclear warhead would be inserted into a steeply inclined low altitude polar orbit, such that it would approach the CONUS from any direction, but primarily from the southern hemisphere, and following a programmed braking maneuver, re-enter from a direction which was not covered by U.S. BMEW radars.”

"The first warning the U.S. would have of such a strike in progress would be the EMP...," writes Gyurosi.

Russia has the technical capability to clandestinely orbit a nuclear-armed satellite or satellites to be maintained in orbit for years until needed to make a surprise HEMP attack against the U.S., NATO Europe, or some other target. If Russia is orbiting nuclear-armed satellites for HEMP surprise attack, this would be one of their deepest and best protected military secrets. In addition to obvious strategic considerations, the Outer Space Treaty bans orbiting nuclear weapons in space. Moreover, Russia has pursued a long propaganda offensive criticizing the U.S. for “militarizing space” intended to deter the U.S. from orbiting space-based missile defenses and from improving U.S. military capabilities in space. HEMP attacks by satellite or missiles or in combination could be the key to Russian victory in a nuclear war, as U.S. strategic bombers, missiles, and C3I are not hardened to survive attack by Super-EMP weapons, as noted in testimony before the House Armed Services Committee by Dr. William Graham, Chairman of the EMP Commission: MR. BARTLETT: “It is my understanding that, in interviewing some Russian generals, that they told you that the Soviets had developed a ‘Super-EMP’ enhanced weapon that could produce 200 kilovolts per meter at the center?...This is about, what, four times higher than anything we ever built or tested to, in terms of EMP hardening?” DR. GRAHAM: “Yes.” MR. BARTLETT: “Which means that, even if you were some hundreds of miles away from that, that it would be somewhere in the range of 50 to 100 kilovolts per meter at the margins of our country, for instance?” DR. GRAHAM: “Yes. Over much of the margin.” MR. BARTLETT: “So, we aren’t sure that much of our military would still be operable after that robust laydown. Is that correct?...I also understand that we aren’t certain that we could launch, through a series of robust EMP laydowns, that we could launch our intercontinental ballistic missiles?” DR. GRAHAM: “We designed both the missiles and their bases and the strategic communications systems during the Cold War to be able to survive and operate through EMP fields on the order of 50 kilovolts per meter, which was our concern at the time, before we realized that weapons could be designed that had larger EMP fields.” Russian President Vladimir Putin, in a world televised speech on March 1, 2018, announced a new heavy-ICBM, the most powerful ever made, called “Sarmat” (“Satan II” by NATO) that is “invincible” because it can strike anywhere on Earth, and even attack the U.S. by flying over the South Pole, like the FOBs. Putin declared: “Not even future missile defense systems will offer any trouble to the Russian rocket complex, Sarmat,” HEMP Threat To U.S. Submarines? HEMP attack could achieve for Russia a key objective the USSR could not achieve during the Cold War—neutralizing U.S. ballistic missile submarines at sea. Russian Super-EMP weapons could destroy or degrade U.S. bombers, ICBMs, SSBNs in port and their strategic C3I—including land-based VLF communications systems, TACAMO aircraft, and other redundant means of strategic command and control used to convey Emergency Action Messages (EAMs) to submarines hiding at sea. Severing their communications links to the National Command Authority would neutralize U.S. submarines, rendering them useless. HEMP could also be used to attack submarines on patrol at sea directly. A high-yield warhead (1 megaton or more) detonated for HEMP over the ocean would cover an area 2,200 kilometers in radius, a zone nearly as large as North America, with powerful E3 HEMP that would penetrate the ocean depths and possibly damage or destroy the electronics of submarines on patrol. Submarines would be especially vulnerable when deploying their very long antennae—which they need to do precisely when trying to receive EAMS.43 VOSTOK-18 On September 11-17, 2018, Russia’s VOSTOK-18 was perhaps the largest military exercise in history, happening two months after U.S. Department of Homeland Security revelations that Russia penetrated hundreds of U.S. electric utilities with cyber-weapons. A few significant highlights: VOSTOK-18 mobilized 300,000 troops, 36,000 tanks and other vehicles, 1,000 aircraft, and 80 ships. Russian Defense Minister Sergei Shoigu described it as the largest exercise since ZAPAD81, the largest Cold War exercise that, 40 years ago, simulated invading NATO. VOSTOK-18 apparently utilized other forces not advertised, including Russia’s Mediterranean fleet fighting a real war in Syria and the Strategic Rocket Forces Missile Armies, simulating a global nuclear World War III. VOSTOK-18 was a joint Russia-China exercise, signifying de facto alliance against the United States. Russia and China conduct many joint military exercises. Their nuclear collaboration began February 2001 in a combined nuclear war scenario against the U.S. over Taiwan.46 The SinoRussian Friendship Treaty (July 2001) promises their military cooperation “will further strategic stability and security around the world.” VOSTOK-18, though conducted in Siberia, may well be full-dress rehearsal for conquering NATO, practicing new nuclear warfighting techniques. Siberian operations are harder for the U.S. to monitor, so new strategies and tactics can be exercised secretly.

Russia’s new nuclear doctrine (similar to Khrushchev-era thinking, like a more aggressive version of Marshal Sokolovsky’s 1962 Military Strategy) relies on nuclear firepower and relatively small armies, but highly mobile and survivable, to knife through Europe in a week or two.49 Russia’s new generation nuclear weapons for strategic HEMP attack and tactical battlefield use make this possible.

Theoretically, Russian invasion of NATO by 300,000 troops, 36,000 tanks and other vehicles, and 1,000 aircraft could overrun NATO paralyzed by EMP attack and outgunned by tactical nuclear weapons 10-to-1. A single nuclear weapon detonated 60 kilometers above NATO HQ in Brussels would generate a paralyzing HEMP field from Poland to Scotland, like a magic carpet to the English Channel.5 VOSTOK-18 practiced civil defense and recovery operations unrivaled in the West. “Eastern Military District engineer formation mopped-up in aftermath of a simulated technogenic emergency during VOSTOK-18 maneuvers,” according to the Russian Defense Ministry, “The military engineers launched bridges and ferry crossings, restored demolished roads, prepared passage through rubble…evacuated the population, and cleared terrain of simulated explosive objects and radioactive and chemical waste.” These same operations could support an invasion of NATO. But the most important part of VOSTOK-18 was invisible

Russian and Chinese military doctrine also advocates a revolutionary new way of warfare rendering obsolete traditional military power by relying on cyber-attacks, sabotage, and EMP to collapse adversary electric grids and life-sustaining critical infrastructures, thereby achieving victory.

#### That stops AI research.

**Baum & Barrett 18,** Seth Baum & Anthony Barrett 18. Global Catastrophic Risk Institute. 2018. “A Model for the Impacts of Nuclear War.” SSRN Electronic Journal. Crossref, doi:10.2139/ssrn.3155983.

Another link between nuclear war and other major catastrophes comes from the potential for general malfunction of society shifting work on risky technologies such as artificial intelligence, molecular nanotechnology, and biotechnology. The simplest effect would be for the general malfunction of society to halt work on these technologies. In most cases, this would reduce the risk of harm caused by those technologies. It is also conceivable that in the absence of a functional society, safety measures would decay, resulting in the release of harmful technologies (or substances developed via the technologies). For example, stores of dangerous pathogens could escape their laboratories. However, this is a speculative possibility and may be unlikely or impossible, depending on the details of how the technologies/substances are stored.

#### Otherwise were doomed---outweighs nukes

**Turchin & Denkenberger 18**, Alexey Turchin & David Denkenberger. Turchin is a researcher at the Science for Life Extension Foundation; Denkenberger is with the Global Catastrophic Risk Institute (GCRI) @ Tennessee State University, Alliance to Feed the Earth in Disasters (ALLFED). 05/03/2018. “Classification of Global Catastrophic Risks Connected with Artificial Intelligence.” AI & SOCIETY, pp. 1–17.

According to Yampolskiy and Spellchecker (2016), the probability and seriousness of AI failures will increase with time. We estimate that they will reach their peak between the appearance of the first self-improving AI and the moment that an AI or group of AIs reach global power, and will later diminish, as late-stage AI halting seems to be a low-probability event. AI is an extremely powerful and completely unpredictable technology, millions of times more powerful than nuclear weapons. Its existence could create multiple individual global risks, most of which we can not currently imagine. We present several dozen separate global risk scenarios connected with AI in this article, but it is likely that some of the most serious are not included. The sheer number of possible failure modes suggests that there are more to come.

### 1NC---Nano

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**Pry 21**, Dr. Peter Vincent Pry, Executive Director EMP Task Force on National and Homeland Security also legit most qualified person ever on this issue, January 2021 The Russian Federation’s Military Doctrine, Plans, and Capabilities for Electromagnetic Pulse (EMP) Attack" https://apps.dtic.mil/sti/pdfs/AD1124730.pdf

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Russian military doctrine, because HEMP attacks electronics, categorizes nuclear HEMP attack as a dimension of Information Warfare, Electronic Warfare and Cyber Warfare, which are modes of warfare operating within the electromagnetic spectrum.

Commonplace cyber-theft, e-mail disruptions, and hacking, widely regarded as annoyances by most Americans, could foreshadow catastrophic nuclear HEMP attacks on the grid that would threaten the existence of society. In Nazi Germany's blitzkrieg strategy, probing by their motorcycle corps and scout planes, looking for weakness, preceded the massed onslaught of heavy armored divisions. The same principle may be at work in cyber-space with probing attacks from Russia, China, North Korea and Iran. From the perspective of adversary military doctrine on Electronic Warfare and Cyber Warfare, cyber-thefts and intrusions look less like isolated cases of theft and hacking and more like probing U.S. defenses and gauging Washington’s reactions—perhaps in preparation for an all-out cyber offensive that would include physical sabotage, radio frequency weapons, and ultimately nuclear HEMP attack. 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Nuclear Test 184 confirmed definitively for the Soviets in 1962 what the United States concluded independently by extrapolation from the U.S. STARFISH PRIME and other nuclear test results (conducted over the Pacific Ocean), and from experiments conducted over 50 years using EMP simulators and by computer modeling. Nuclear Test 184 destroyed transformers, generators, communications, switches and all manner of electronics within an enormous footprint extending hundreds of kilometers—thereby proving the advantages and dangers of HEMP attack empirically. Monstrous and unethical as may have been the USSR's decision to conduct an HEMP test against their own people, Nuclear Test 184 and other tests armed the Soviet Union with the best HEMP data in the world in 1962. Nuclear Test 184 was part of a series of seven Soviet nuclear HEMP tests conducted over the USSR's own territory, mostly over Kazakhstan, commencing on September 6, 1961, and ending on November 1, 1962. Whereas the U.S. was surprised by its discovery of HEMP during its 1962 nuclear test STARFISH PRIME, the Soviets were already aware of HEMP during their nuclear test series and were very well prepared with a large array of scientific instruments all over Kazakhstan to test and investigate HEMP effects from actual high-altitude nuclear detonations in a way that has never been approximated by the United States or any other nation. The first two Soviet HEMP nuclear tests, on September 6, 1961, and October 6, 1961, were codenamed "Thunderstorm" and "Thunder" perhaps reflecting the HEMP mission. All of the tests were very realistic, using military ballistic missiles, mostly the SS-4 medium-range missile, to deliver and detonate the warheads at high-altitude. The HEMP tests used a wide variety of warheads, with yields ranging from merely 1.2 kilotons to 300 kilotons, detonated at greatly varying altitudes, ranging from 22.7 kilometers to 300 kilometers height-of-burst. There is no question that as a result of its HEMP nuclear test series, the Soviet Union, and today Russia, probably knows a lot more about HEMP effects than the United States. "In 1962, the then Soviet Union conducted several high-altitude nuclear tests in Kazakhstan in the course of which were obtained vast facts on the damage levels from HEMP illuminating both military and civil systems," writes Russian scientist Vasiliy Greetsai today. "Most of those 'vast facts' are apparently still kept secretly at the Russian Federation Ministry of Defense at the Central Institute of Physics in Sergiev Posad, Russia," warns Emanuelson in his study of Test 184, "Only a tiny amount of those facts have been publicly released, but those facts have been extremely informative." Russia Shares Some HEMP Data Why did Russia share any HEMP nuclear test data with the West, and why just Nuclear Test 184 in particular? It is generally assumed that Russian General Loberev's 1994 briefing on Nuclear Test 184 to an international audience was a benign act, part of the post-Cold War thaw in relations under the pro-Western Russian President Boris Yeltsin. However, a less benign interpretation of the facts is possible. Perhaps the Russian General Staff approved Loberev's 1994 briefing to the West on Nuclear Test 184 because they hope to mislead the United States on the real severity of the threat and preserve U.S. vulnerability to HEMP attack. Emanuelson in his study of Test 184 observes that the nuclear weapon used for this test—as impressive as were the results—was an inefficient design for HEMP, and probably produced weaker HEMP fields than the U.S. STARFISH PRIME nuclear test. Nor have the Russians disclosed, even for Test 184, the strength of the peak HEMP fields that can do the most damage.20 Yet among Western specialists Test 184 has become a sort of "gold standard" that rivals in importance STARFISH PRIME as a basis for designing HEMP protection Moscow jealously guards the secrets of its other HEMP nuclear tests—that includes more than the seven high-altitude detonations for the 1961-62 test series. Most Western analysts assume that Russia is sharing its best data by disclosing Test 184. Even the usually meticulous Emanuelson appears to jump to this conclusion: "The first two of the K Project high altitude nuclear tests (in 1961) over Kazakhstan were only 1.2 kilotons so the EMP...apparently did not have much of an impact on the 1961 infrastructure of Kazakhstan.” But we do not know the impact of these HEMP tests, because Moscow is not telling. Perhaps significantly, at least one of these Soviet HEMP tests was conducted in an Anti-Ballistic Missile (ABM) mode, involving a high-altitude interception of a target. Moreover, all of the tests were conducted over the Saryshagan ABM test range.22 One design of a Soviet ABM warhead is like an Enhanced Radiation Warhead, a warhead having low explosive yield but capable of producing lots of neutrons, x-rays, gamma rays and other radiation to kill incoming warheads. Such a weapon, low-yield but emitting enhanced gamma rays that make high-frequency HEMP, could produce an extraordinarily powerful HEMP field, tantamount to a Super-EMP warhead. Is it possible that Moscow discovered, by accident or design, the secret for making a Super-EMP nuclear weapon in 1961? Did Moscow share data from Nuclear Test 184 in 1994 because they want to disinform the United States and its allies about the real maximum HEMP threat, so that the West will under-prepare, and remain vulnerable to Super-EMP?

Russian HEMP Threats Russia's Super-EMP weapons—that have no counterpart in the U.S. nuclear arsenal—and Russia's superior defensive preparations against HEMP, may have emboldened the Russian Duma in 1999 to threaten an HEMP attack against the United States for NATO's bombing of Russian ally Serbia. As witnessed by the U.S. congressional delegation to Vienna, meeting with their counterparts from the Russian Duma, Vladimir Lukin, Chairman of the Duma International Affairs Committee, and Deputy Chairman Alexander Shabonov, threatened:

LUKIN—"Hypothetically, if Russia really wanted to hurt the United States in retaliation for NATO's bombing of Yugoslavia, Russia could fire a submarine launched ballistic missile and detonate a single nuclear warhead at high-altitude over the United States. The resulting electromagnetic pulse would massively disrupt U.S. communications and computer systems, shutting down everything. No internet. Nothing." SHABANOV—“And if that didn’t work, we’d just launch another missile.” Moscow’s threatened nuclear HEMP attack on the U.S. to the face of an official congressional delegation was a contributing factor to the establishment of the EMP Commission. Indeed, Moscow frequently flourishes its nuclear saber to threaten the United States, as if emboldened by knowledge of some decisive nuclear advantage, like Super-EMP weapons and HEMP attack. For example, Russian General Staff Chief Nikolai Makarov threatened a preemptive strike against NATO anti-missile sites in Poland and the Czech Republic in 2012.24 Increasingly aggressive nuclear threats have been made by Russia in 2013, 2014, 2015, 2016, 2017 and especially after Vladimir Putin’s March 1, 2018 announcement of new nuclear super-weapons, that Putin threatened will compel the U.S. to, “Listen to us now!”25 According to former senior Defense Department official, Dr. Mark Schneider: “Between October 24, 2018 and March 2019, the nuclear missile targeting threat was made at least 11 times at the highest levels—by President Putin, by the Chief of the General Staff of the Army Valery Gerasimov, by the Strategic Missile Force Commander Colonel General Sergei Ryabkov.”26 Yet despite all Russia's nuclear preparations and threats, Moscow still fears a HEMP attack. A Norwegian scientific rocket, launched on January 25, 1995, to explore the aurora borealis, was mistaken by the Russian military as a surprise HEMP attack launched by a U.S. submarine—nearly resulting in a massive Russian preemptive strike. This still little known incident, happening a half decade after the end of the Cold War, is the closest the sides have ever come to nuclear conflict, triggered by the specter of surprise HEMP attack.

Russian Military Doctrine: HEMP Attack Decisive Russian General Vladimir Slipchenko in his military textbook Non-Contact Wars describes the combined use of cyber viruses and hacking, physical attacks, non-nuclear EMP weapons, and ultimately nuclear HEMP attack against electric grids and critical infrastructures as a new way of warfare that is the greatest Revolution in Military Affairs (RMA) in history. Slipchenko sees EMP as such a departure from traditional ways and means of warfare that he describes EMP weapons and warfare as “based on new physical principles”—a phrase that has become ubiquitous in Russian literature to describe the military revolution that is EMP:

“In practically all preceding generations of wars…weapons were employed that acted against targets primarily by kinetic, chemical and thermal energy. In addition to these arms…new ones will also appear…in wars of the future…Weapons based on new physical principles having an electromagnetic effect will see considerable development. They will represent a form of casualty and damage producing effect on targets through the energy of electromagnetic emissions of various wavelengths and levels of power generated by radio frequency and laser weapons and by means of electronic countermeasures using a conventional or high-altitude nuclear burst…Depending on the power of emission, such weapons will be capable of…suppressing practically all classic electronic equipment…causing the melting or evaporation of metal in the printed circuit boards…or causing structural changes of electronic elements…”

Like Nazi Germany’s “Blitzkrieg” (“Lightning War”) strategy that coordinated airpower, armor, and mobile infantry to achieve strategic and technological surprise that nearly defeated the Allies in World War II, the “New Blitzkrieg” is, literally and figuratively, an electronic “Lightning War” so potentially decisive in its effects that an entire civilization could be overthrown in hours. According to General Slipchenko, EMP and the new military revolution renders obsolete modern armies, navies and air forces. For the first time in history, small nations or even non-state actors can humble the most advanced nations on Earth.

An article in Military Thought, the flagship journal of the Russian General Staff, “Weak Points of the U.S. Concept of Network-Centric Warfare” points to nuclear HEMP attack as a means of defeating the United States: “American forces may be vulnerable to electronic warfare attacks, in particular, an electromagnetic pulse that is a brief powerful electromagnetic field capable of overloading or destroying numerous electronic systems and high-tech microcircuits that are very sensitive to the electromagnetic field, even if transmitted from a distance. A single low-yield nuclear weapon exploded for this purpose high above the area of combat operations can generate an electromagnetic pulse covering a large area and destroying electronic equipment without loss of life that is caused by the blast or radiation.” Moreover: “Today, too, a considerable body of administrative information in the U.S. armed forces goes through the civilian Internet. Many civilian commercial communication satellites, particularly satellites in low orbits, can have their functions impaired or they can be disabled by electromagnetic shocks from high altitudes.”

According to another Russian article: “Nuclear war strategy has already planned nuclear explosions at an altitude of 50-100 km to destroy enemy satellites’ electronic instruments with electromagnetic pulse”:

“There are now about 683 space craft in near-earth orbit. Of these about 150 are Russian and about 400 American. In the estimation of specialists, for every 100 of our ‘purely’ military espionage artificial earth satellites there are 300 civilian satellites. Clearly, this discrepancy will increase both quantitatively and qualitatively (considering the state of the Russian military industrial complex)…Nuclear war strategy has already planned nuclear explosions at an altitude of 50-100 km to destroy enemy satellites’ electronic instruments with an electromagnetic pulse.”

A 2015 article from Russia’s A.A. Maksimov Scientific Research Institute for Space Systems, alludes to low-yield nuclear enhanced-EMP as the most effective cyber weapon: “Even more effective are remote-controlled cyber weapons in the nuclear variant, but in this case a warhead is required with a capacity many times smaller by comparison with the charges of the typical strategic missiles.”

“Super-EMP is a…first-strike weapon,” according to Aleksey Vaschenko, who describes Russian nuclear weapons specially designed to make extraordinarily powerful EMP fields as Russia’s means for defeating the United States in “A Nuclear Response To America Is Possible”:

“The further direction of the work on the development of Super-EMP was associated with the increase of its kill effect by focusing Y-radiation, which should have resulted in an increase of the pulse’s amplitude. These properties of Super-EMP make it a first strike weapon, which is designed to disable the state and military command and control system, the economy, ICBMs, especially mobile based ICBMs, missiles on the flight trajectory, radar sites, spacecraft, energy supply systems, and so forth. So, Super-EMP is obviously offensive in nature and is a destabilizing firststrike weapon…The Russian nuclear component relies on the Super-EMP factor, which is the Russian response to U.S. nuclear blackmail.”

Hypersonic Warheads: New HEMP Threat Russian development of hypersonic missile warheads is a dangerous new dimension of the nuclear and HEMP threat. Great speed (Mach 20, twenty times the speed of sound) and flying a flat trajectory, skimming along the top of the upper atmosphere, significantly reduces visibility to U.S. early-warning satellites and radars, while also reducing arrival time. Maneuvering makes hypersonic warheads more difficult to track and intercept, virtually impossible to intercept with existing U.S. National Missile Defenses. Former senior Defense Department official Dr. Mark Schneider writes, “The main reason for Russian hypersonic missiles is a nuclear surprise attack and America has no defense against it.”3 Four-star General John Hyten, then chief of the U.S. Strategic Command that controls the nuclear Triad (now Vice Chairman Joint Chief of Staff), agrees with Schneider: “Hypersonic capabilities are a significant challenge. We are going to need a different set of sensors to see hypersonic threats. Our enemies know that.”

Russia deployed its first regiment of SS-19 ICBMs armed with hypersonic Avangard nuclear warheads at the end of December 2019.

Hypersonic vehicles fly over most of their trajectory at 50-100 kilometers altitude: the optimum height-of-burst for Super-EMP warheads

Hypersonic weapons are potentially a new avenue for surprise nuclear HEMP attack that could defeat deterrence. We cannot see the attack coming and may not know against whom to retaliate, especially if HEMP attack blinds satellites and radars needed for early-warning and threat assessment.

Hypersonically delivered HEMP attack could win World War III with a single electronic blow.

HEMP Satellites? During the Cold War, the USSR developed a secret weapon called the Fractional Orbital Bombardment System (FOBS). The FOBS would disguise a nuclear attack as a peaceful satellite launch, orbiting a nuclear-armed satellite over the South Pole to attack the U.S. from the south— from which direction the U.S. is blind and defenseless as there are no BMEWS radars or antimissile defenses facing south. The FOBS satellite could deliver a HEMP attack paralyzing U.S. retaliatory forces and C3I in the first shot of a nuclear war. Miroslav Gyurosi in The Soviet Fractional Orbital Bombardment System describes Moscow's development of the FOBS as part of "a long running campaign of strategic deception against the West through the whole Cold War period, and the protracted development of the Soviet FOBS nuclear weapon system presents an excellent case study of such." Gyurosi: “The Fractional Orbital Bombardment System (FOBS) as it was known in the West, was a Soviet innovation intended to exploit the limitations of U.S. BMEW radar coverage. The idea behind FOBS was that a large thermonuclear warhead would be inserted into a steeply inclined low altitude polar orbit, such that it would approach the CONUS from any direction, but primarily from the southern hemisphere, and following a programmed braking maneuver, re-enter from a direction which was not covered by U.S. BMEW radars.”

"The first warning the U.S. would have of such a strike in progress would be the EMP...," writes Gyurosi.

Russia has the technical capability to clandestinely orbit a nuclear-armed satellite or satellites to be maintained in orbit for years until needed to make a surprise HEMP attack against the U.S., NATO Europe, or some other target. If Russia is orbiting nuclear-armed satellites for HEMP surprise attack, this would be one of their deepest and best protected military secrets. In addition to obvious strategic considerations, the Outer Space Treaty bans orbiting nuclear weapons in space. Moreover, Russia has pursued a long propaganda offensive criticizing the U.S. for “militarizing space” intended to deter the U.S. from orbiting space-based missile defenses and from improving U.S. military capabilities in space. HEMP attacks by satellite or missiles or in combination could be the key to Russian victory in a nuclear war, as U.S. strategic bombers, missiles, and C3I are not hardened to survive attack by Super-EMP weapons, as noted in testimony before the House Armed Services Committee by Dr. William Graham, Chairman of the EMP Commission: MR. BARTLETT: “It is my understanding that, in interviewing some Russian generals, that they told you that the Soviets had developed a ‘Super-EMP’ enhanced weapon that could produce 200 kilovolts per meter at the center?...This is about, what, four times higher than anything we ever built or tested to, in terms of EMP hardening?” DR. GRAHAM: “Yes.” MR. BARTLETT: “Which means that, even if you were some hundreds of miles away from that, that it would be somewhere in the range of 50 to 100 kilovolts per meter at the margins of our country, for instance?” DR. GRAHAM: “Yes. Over much of the margin.” MR. BARTLETT: “So, we aren’t sure that much of our military would still be operable after that robust laydown. Is that correct?...I also understand that we aren’t certain that we could launch, through a series of robust EMP laydowns, that we could launch our intercontinental ballistic missiles?” DR. GRAHAM: “We designed both the missiles and their bases and the strategic communications systems during the Cold War to be able to survive and operate through EMP fields on the order of 50 kilovolts per meter, which was our concern at the time, before we realized that weapons could be designed that had larger EMP fields.” Russian President Vladimir Putin, in a world televised speech on March 1, 2018, announced a new heavy-ICBM, the most powerful ever made, called “Sarmat” (“Satan II” by NATO) that is “invincible” because it can strike anywhere on Earth, and even attack the U.S. by flying over the South Pole, like the FOBs. Putin declared: “Not even future missile defense systems will offer any trouble to the Russian rocket complex, Sarmat,” HEMP Threat To U.S. Submarines? HEMP attack could achieve for Russia a key objective the USSR could not achieve during the Cold War—neutralizing U.S. ballistic missile submarines at sea. Russian Super-EMP weapons could destroy or degrade U.S. bombers, ICBMs, SSBNs in port and their strategic C3I—including land-based VLF communications systems, TACAMO aircraft, and other redundant means of strategic command and control used to convey Emergency Action Messages (EAMs) to submarines hiding at sea. Severing their communications links to the National Command Authority would neutralize U.S. submarines, rendering them useless. HEMP could also be used to attack submarines on patrol at sea directly. A high-yield warhead (1 megaton or more) detonated for HEMP over the ocean would cover an area 2,200 kilometers in radius, a zone nearly as large as North America, with powerful E3 HEMP that would penetrate the ocean depths and possibly damage or destroy the electronics of submarines on patrol. Submarines would be especially vulnerable when deploying their very long antennae—which they need to do precisely when trying to receive EAMS.43 VOSTOK-18 On September 11-17, 2018, Russia’s VOSTOK-18 was perhaps the largest military exercise in history, happening two months after U.S. Department of Homeland Security revelations that Russia penetrated hundreds of U.S. electric utilities with cyber-weapons. A few significant highlights: VOSTOK-18 mobilized 300,000 troops, 36,000 tanks and other vehicles, 1,000 aircraft, and 80 ships. Russian Defense Minister Sergei Shoigu described it as the largest exercise since ZAPAD81, the largest Cold War exercise that, 40 years ago, simulated invading NATO. VOSTOK-18 apparently utilized other forces not advertised, including Russia’s Mediterranean fleet fighting a real war in Syria and the Strategic Rocket Forces Missile Armies, simulating a global nuclear World War III. VOSTOK-18 was a joint Russia-China exercise, signifying de facto alliance against the United States. Russia and China conduct many joint military exercises. Their nuclear collaboration began February 2001 in a combined nuclear war scenario against the U.S. over Taiwan.46 The SinoRussian Friendship Treaty (July 2001) promises their military cooperation “will further strategic stability and security around the world.” VOSTOK-18, though conducted in Siberia, may well be full-dress rehearsal for conquering NATO, practicing new nuclear warfighting techniques. Siberian operations are harder for the U.S. to monitor, so new strategies and tactics can be exercised secretly.

Russia’s new nuclear doctrine (similar to Khrushchev-era thinking, like a more aggressive version of Marshal Sokolovsky’s 1962 Military Strategy) relies on nuclear firepower and relatively small armies, but highly mobile and survivable, to knife through Europe in a week or two.49 Russia’s new generation nuclear weapons for strategic HEMP attack and tactical battlefield use make this possible.

Theoretically, Russian invasion of NATO by 300,000 troops, 36,000 tanks and other vehicles, and 1,000 aircraft could overrun NATO paralyzed by EMP attack and outgunned by tactical nuclear weapons 10-to-1. A single nuclear weapon detonated 60 kilometers above NATO HQ in Brussels would generate a paralyzing HEMP field from Poland to Scotland, like a magic carpet to the English Channel.5 VOSTOK-18 practiced civil defense and recovery operations unrivaled in the West. “Eastern Military District engineer formation mopped-up in aftermath of a simulated technogenic emergency during VOSTOK-18 maneuvers,” according to the Russian Defense Ministry, “The military engineers launched bridges and ferry crossings, restored demolished roads, prepared passage through rubble…evacuated the population, and cleared terrain of simulated explosive objects and radioactive and chemical waste.” These same operations could support an invasion of NATO. But the most important part of VOSTOK-18 was invisible

Russian and Chinese military doctrine also advocates a revolutionary new way of warfare rendering obsolete traditional military power by relying on cyber-attacks, sabotage, and EMP to collapse adversary electric grids and life-sustaining critical infrastructures, thereby achieving victory.

#### That war stops nanotech research.

**Baum & Barrett 18,** Seth Baum & Anthony Barrett 18. Global Catastrophic Risk Institute. 2018. “A Model for the Impacts of Nuclear War.” SSRN Electronic Journal. Crossref, doi:10.2139/ssrn.3155983.

Another link between nuclear war and other major catastrophes comes from the potential for general malfunction of society shifting work on risky technologies such as artificial intelligence, molecular nanotechnology, and biotechnology. The simplest effect would be for the general malfunction of society to halt work on these technologies. In most cases, this would reduce the risk of harm caused by those technologies. It is also conceivable that in the absence of a functional society, safety measures would decay, resulting in the release of harmful technologies (or substances developed via the technologies). For example, stores of dangerous pathogens could escape their laboratories. However, this is a speculative possibility and may be unlikely or impossible, depending on the details of how the technologies/substances are stored.

#### **Otherwise, nanotech becomes self-replicating and destroys the Universe**

Hu 18 – Jiaqi Hu, Humanities Scholar and President and Chief Scientist of the Beijing Jianlei International Decoration Engineering Company and 16Lao Group, Graduate of Dongbei University, Elected as the Chinese People’s Consultative Conference Member for Beijing Mentougou District, Saving Humanity: Truly Understanding and Ranking Our World's Greatest Threats, p. 208-210

As a unit of measurement, a nanometer is 10^9 meters (or one billionth of a meter); it is roughly one 50,000th of a strand of hair and is commonly used in the measuring of atoms and molecules. In 1959, Nobel Prize winner and famous physicist Richard Feynman first proposed in a lecture entitled "There's Plenty of Room at the Bottom" that humans might be able to create molecule-sized micro-machines in the future and that it would be another technological revolution. At the time, Feynman's ideas were ridiculed, but subsequent developments in science soon proved him to be a true visionary. In 1981, scientists developed the scanning tunneling microscope and finally reached nano-level cognition. In 1990, IBM scientists wrote the three letters "IBM" on a nickel substrate by moving thirty-five xenon atoms one by one, demonstrating that nanotechnology had become capable of transporting single atoms. Most of the matter around us exists in molecule forms, which are composed of atoms. The ability to move atoms signaled an ability to perform marvelous feats. For example, we could move carbon atoms to form diamonds, or pick out all the gold atoms in low-grade gold mines. However, nanotechnology would not achieve any goals of real significance if solely reliant on manpower. There are hundreds of millions of atoms in a needle-tip-sized area—even if a person committed their life to moving these atoms, no real value could be achieved. Real breakthroughs in nanotechnology could only be produced by nanobots. Scientists imagined building molecule-sized robots to move atoms and achieve goals; these were nanobots. On the basis of this hypothesis, scientists further postulated the future of nanotechnology; for example, nanobots might be able to enter the bloodstream and dispose of cholesterol deposited in the veins; nanobots could track cancer cells in the body and kill them at their weakest moment; nanobots could instantly turn newly-cut grass into bread; nanobots could transform recycled steel into a brand new-car in seconds. In short, the future of nanotechnology seemed incredibly bright. This was not the extent of nanotechnology's power. Scientists also discovered that nanotechnology could change the properties of materials. In 1991, when studying C60, scientists discovered carbon nanotubes (CNTs) that were only a few nanos in diameter. The carbon nanotube became known as the king of nano materials due to its superb properties; scientists believed that it would produce great results when applied to nanobots. Later, scientists also developed a type of synthetic molecular motor that derived energy from the high-energy adenosine triphosphate (ATP) that powered intracellular chemical reactions. The success of molecular motor research solved the core component problem of nano machines; any molecular motor grafted with other components could turn into a nano machine, and nanobots could use them for motivation. In May **20**04, American chemists developed the world’s first nanobot: a bipedal molecular robot that looked like a compass with ten-nanometer-long legs. This nanobot was composed of DNA fragments, including thirty-six base pairs, and it could "stroll" on plates in the laboratory. In April 2005, Chinese scientists developed nano-scale robotic prototypes as well. In June of 2013, the Tohoku University used peptide protein micro-tablets to successfully create nanobots that could enter cells and move on the cell membrane. In July **20**17, researchers at the University of Rome and the Roman Institute of Nanotechnology announced the development of a new synthetic molecular motor that was bacteria-driven and light-controlled. The next step would be to get nanobots to move atoms or molecules. Compared to the value produced by a nanobot, they are extremely expensive to create. The small size of nanobots means that although they can accomplish meaningful tasks, they are often very inefficient. Even if a nanobot toiled day and night, its achievements would only be calculated in terms of atoms, making its practical total attainment relatively small. Scientists came up with a solution for this problem. They decided to prepare two sets of instructions when programming nanobots. The first set of instructions would set out tasks for the nanobot, while the second set would order the nanobot to self-replicate. Since nanobots are capable of moving atoms and are themselves composed of atoms, self-replication would be fairly easy. One nanobot could replicate into ten, then a hundred, and then a thousand . . . **billions could be replicated in a** short period **of time**. This army of nanobots would greatly increase their efficiency. One troublesome question that arises from this scenario is: how would nanobots know when to stop self-replicating? Human bodies and all of Earth are composed of atoms; the unceasing replication of nanobots could easily swallow humanity and the entire planet. If these nanobots were accidentally transported to other planets by cosmic dust, the same fate would befall those planets. This is a truly terrifying prospect. Some scientists are confident that they can control the situation. They believe that it is possible to design nanobots that are programmed to self-destruct after several generations of replication, or even nanobots that only self-replicate in specific conditions. For example, a nanobot that dealt with garbage refurbishing could be programmed to only self-replicate around trash using trash. Although these ideas are worthy, they are too idealistic. Some more rational scientists have posed these questions: What would happen if nanobots malfunctioned and did not terminate their self-replication? What would happen if scientists accidentally forgot to add self-replication controls during programming? What if immoral scientists purposefully designed nanobots that would not stop self-replicating? Any one of the above scenarios would be enough to destroy both humanity and Earth. Chief scientist of Sun Microsystems, Bill Joy, is a leading, world-renowned scientist in the computer technology field. In April of 1999, he pointed out that if misused, nanotechnology could be more devastating than nuclear weapons. If nanobots self-replicated uncontrollably, they could become the cancer that engulfs the universe. If we are not careful, nanotechnology might become the Pandoras box that destroys the entire universe and all of humanity with it. We all understand that one locust is insignificant, but hundreds of millions of locusts can destroy all in their path. If self-replicating nanobots are really achieved in the future, it might signify the end of humanity. If that day came, nothing could stop unethical scientists from designing nanobots that suited their immoral purposes. Humans are not far from mastering nanotechnology. The extremely tempting prospects of nanotechnology have propelled research of nanobots and nanotechnology. The major science and technology nations have devoted particular efforts to this field.

### 1NC---Warming

#### Studies prove 12 degrees warming is coming now---only a radical shift can solve

EcoWatch 19, 02-26-2019, "'A World Without Clouds': New Study Details Possibility of Devastating Climate Feedback Loop," EcoWatch, <https://www.ecowatch.com/a-world-without-clouds-2630055994.html> //barn \* edited for clarity

As people across the globe mobilize to demand bold action to combat the climate crisis and scientific findings about looming “environmental breakdown” pile up, a startling new study published Monday in the journal Nature Geoscience warns that human-caused global warming could cause stratocumulus clouds to totally disappear in as little as a century, triggering up to 8°C (14°F) of additional warming.

Stratocumulus clouds cover about two-thirds of the Earth and help keep \*~~it~~ [Earth] cool by reflecting solar radiation back to space. Recent research has suggested that planetary warming correlates with greater cloud loss, stoking fears about a feedback loop that could spell disaster.

For this study, researchers at the California Institute of Technology used a supercomputer simulation to explore what could lead these low-lying, lumpy clouds to vanish completely. As science journalist Natalie Wolchover laid out in a lengthy piece for Quanta Magazine titled A World Without Clouds:

The simulation revealed a tipping point: a level of warming at which stratocumulus clouds break up altogether. The disappearance occurs when the concentration of CO2 in the simulated atmosphere reaches 1,200 parts per million [ppm]—a level that fossil fuel burning could push us past in about a century, under “business-as-usual” emissions scenarios. In the simulation, when the tipping point is breached, Earth’s temperature soars 8 degrees Celsius, in addition to the 4 degrees of warming or more caused by the CO2 directly…

To imagine 12 degrees of warming, think of crocodiles swimming in the Arctic and of the scorched, mostly lifeless equatorial regions during the [Paleocene-Eocene Thermal Maximum or PETM]. If carbon emissions aren’t curbed quickly enough and the tipping point is breached, “that would be truly devastating climate change,” said Caltech’s Tapio Schneider, who performed the new simulation with Colleen Kaul and Kyle Pressel.

The study elicited alarm from climate campaigners along with calls for the “radical, disruptive changes” to society’s energy and economic systems that scientists and experts have repeatedly said are necessary to prevent climate catastrophe:

#### Russia first strikes the west with hypersonic *HEMPs* if war happens now---This doesn’t kill anyone and guarantees war doesn’t escalate---Russian doctrine AND generals admit it

**Pry 21**, Dr. Peter Vincent Pry, Executive Director EMP Task Force on National and Homeland Security also legit most qualified person ever on this issue, January 2021 The Russian Federation’s Military Doctrine, Plans, and Capabilities for Electromagnetic Pulse (EMP) Attack" https://apps.dtic.mil/sti/pdfs/AD1124730.pdf

Any nuclear weapon detonated in outer space, 30 kilometers or higher, will generate a high-altitude electromagnetic pulse (HEMP). No blast, thermal, fallout or effects other than HEMP are experienced in the atmosphere and on the ground. A nuclear detonation at 30 kilometers altitude will generate a HEMP field with a radius on the ground of 600 kilometers, damaging all kinds of electronics, blacking-out electric grids and collapsing other life-sustaining critical infrastructures. Detonated at 400 kilometers altitude, the radius of the HEMP field will be about 2,200 kilometers, large enough to cover most of North America.

Russia has what they term “Super-EMP” weapons, nuclear warheads specialized for HEMP attack. Super-EMP warheads have very low explosive yield (10 kilotons or less) but very high gamma yield, which is what generates HEMP. According to Russian military and technical sources, Super-EMP weapons can generate HEMP fields of 100,000 volts/meter or higher, greatly exceeding the U.S. military hardening standard for HEMP (50,000 volts/meter).

Russian military doctrine, because HEMP attacks electronics, categorizes nuclear HEMP attack as a dimension of Information Warfare, Electronic Warfare and Cyber Warfare, which are modes of warfare operating within the electromagnetic spectrum.

Commonplace cyber-theft, e-mail disruptions, and hacking, widely regarded as annoyances by most Americans, could foreshadow catastrophic nuclear HEMP attacks on the grid that would threaten the existence of society. In Nazi Germany's blitzkrieg strategy, probing by their motorcycle corps and scout planes, looking for weakness, preceded the massed onslaught of heavy armored divisions. The same principle may be at work in cyber-space with probing attacks from Russia, China, North Korea and Iran. From the perspective of adversary military doctrine on Electronic Warfare and Cyber Warfare, cyber-thefts and intrusions look less like isolated cases of theft and hacking and more like probing U.S. defenses and gauging Washington’s reactions—perhaps in preparation for an all-out cyber offensive that would include physical sabotage, radio frequency weapons, and ultimately nuclear HEMP attack. Russian HEMP Tests The Soviet Union discovered the high-altitude electromagnetic pulse (HEMP) phenomenon probably years before the United States. High-altitude nuclear testing at its Novaya Zemlya site would have exposed the Russian cities of Archangel and Murmansk and electric grids on the Kola Peninsula to HEMP effects. Moreover, Russia being located at a higher northern latitude than most of the U.S., on the same latitude as Canada and Alaska, meant greater exposure to geomagnetic storms and their EMP/GMD effects on communications and power grids, an awareness reflected in their military writings. On October 22, 1962, the Soviet Union conducted a high-altitude EMP test—Nuclear Test 184— over part of its own territory, deliberately exposing Kazakhstan's electric grid to HEMP as an experiment. "These EMP producing tests were done over a large populated land mass in Kazakhstan," writes Jerry Emanuelson in his study of Test 184, "Even though the economic state of Kazakhstan in 1962 was quite primitive by today's standards, it was heavily industrialized and electrified." The HEMP field generated by Nuclear Test 184 covered all of Kazakhstan. Emanuelson: “Test 184 was detonated at 290 kilometers above a point that was 180 miles due west of Zhezgazghan....At an altitude of 290 kilometers above the detonation point in central Kazakhstan, the distance to the horizon would have been more than 1900 kilometers, which would have caused an electromagnetic pulse over all of Kazakhstan.” Data from Nuclear Test 184, the results of which were kept secret for over thirty years, were partially shared with the West in a briefing by Russian General Vladimir M. Loberev in 1994. Nuclear Test 184 confirmed definitively for the Soviets in 1962 what the United States concluded independently by extrapolation from the U.S. STARFISH PRIME and other nuclear test results (conducted over the Pacific Ocean), and from experiments conducted over 50 years using EMP simulators and by computer modeling. Nuclear Test 184 destroyed transformers, generators, communications, switches and all manner of electronics within an enormous footprint extending hundreds of kilometers—thereby proving the advantages and dangers of HEMP attack empirically. Monstrous and unethical as may have been the USSR's decision to conduct an HEMP test against their own people, Nuclear Test 184 and other tests armed the Soviet Union with the best HEMP data in the world in 1962. Nuclear Test 184 was part of a series of seven Soviet nuclear HEMP tests conducted over the USSR's own territory, mostly over Kazakhstan, commencing on September 6, 1961, and ending on November 1, 1962. Whereas the U.S. was surprised by its discovery of HEMP during its 1962 nuclear test STARFISH PRIME, the Soviets were already aware of HEMP during their nuclear test series and were very well prepared with a large array of scientific instruments all over Kazakhstan to test and investigate HEMP effects from actual high-altitude nuclear detonations in a way that has never been approximated by the United States or any other nation. The first two Soviet HEMP nuclear tests, on September 6, 1961, and October 6, 1961, were codenamed "Thunderstorm" and "Thunder" perhaps reflecting the HEMP mission. All of the tests were very realistic, using military ballistic missiles, mostly the SS-4 medium-range missile, to deliver and detonate the warheads at high-altitude. The HEMP tests used a wide variety of warheads, with yields ranging from merely 1.2 kilotons to 300 kilotons, detonated at greatly varying altitudes, ranging from 22.7 kilometers to 300 kilometers height-of-burst. There is no question that as a result of its HEMP nuclear test series, the Soviet Union, and today Russia, probably knows a lot more about HEMP effects than the United States. "In 1962, the then Soviet Union conducted several high-altitude nuclear tests in Kazakhstan in the course of which were obtained vast facts on the damage levels from HEMP illuminating both military and civil systems," writes Russian scientist Vasiliy Greetsai today. "Most of those 'vast facts' are apparently still kept secretly at the Russian Federation Ministry of Defense at the Central Institute of Physics in Sergiev Posad, Russia," warns Emanuelson in his study of Test 184, "Only a tiny amount of those facts have been publicly released, but those facts have been extremely informative." Russia Shares Some HEMP Data Why did Russia share any HEMP nuclear test data with the West, and why just Nuclear Test 184 in particular? It is generally assumed that Russian General Loberev's 1994 briefing on Nuclear Test 184 to an international audience was a benign act, part of the post-Cold War thaw in relations under the pro-Western Russian President Boris Yeltsin. However, a less benign interpretation of the facts is possible. Perhaps the Russian General Staff approved Loberev's 1994 briefing to the West on Nuclear Test 184 because they hope to mislead the United States on the real severity of the threat and preserve U.S. vulnerability to HEMP attack. Emanuelson in his study of Test 184 observes that the nuclear weapon used for this test—as impressive as were the results—was an inefficient design for HEMP, and probably produced weaker HEMP fields than the U.S. STARFISH PRIME nuclear test. Nor have the Russians disclosed, even for Test 184, the strength of the peak HEMP fields that can do the most damage.20 Yet among Western specialists Test 184 has become a sort of "gold standard" that rivals in importance STARFISH PRIME as a basis for designing HEMP protection Moscow jealously guards the secrets of its other HEMP nuclear tests—that includes more than the seven high-altitude detonations for the 1961-62 test series. Most Western analysts assume that Russia is sharing its best data by disclosing Test 184. Even the usually meticulous Emanuelson appears to jump to this conclusion: "The first two of the K Project high altitude nuclear tests (in 1961) over Kazakhstan were only 1.2 kilotons so the EMP...apparently did not have much of an impact on the 1961 infrastructure of Kazakhstan.” But we do not know the impact of these HEMP tests, because Moscow is not telling. Perhaps significantly, at least one of these Soviet HEMP tests was conducted in an Anti-Ballistic Missile (ABM) mode, involving a high-altitude interception of a target. Moreover, all of the tests were conducted over the Saryshagan ABM test range.22 One design of a Soviet ABM warhead is like an Enhanced Radiation Warhead, a warhead having low explosive yield but capable of producing lots of neutrons, x-rays, gamma rays and other radiation to kill incoming warheads. Such a weapon, low-yield but emitting enhanced gamma rays that make high-frequency HEMP, could produce an extraordinarily powerful HEMP field, tantamount to a Super-EMP warhead. Is it possible that Moscow discovered, by accident or design, the secret for making a Super-EMP nuclear weapon in 1961? Did Moscow share data from Nuclear Test 184 in 1994 because they want to disinform the United States and its allies about the real maximum HEMP threat, so that the West will under-prepare, and remain vulnerable to Super-EMP?

Russian HEMP Threats Russia's Super-EMP weapons—that have no counterpart in the U.S. nuclear arsenal—and Russia's superior defensive preparations against HEMP, may have emboldened the Russian Duma in 1999 to threaten an HEMP attack against the United States for NATO's bombing of Russian ally Serbia. As witnessed by the U.S. congressional delegation to Vienna, meeting with their counterparts from the Russian Duma, Vladimir Lukin, Chairman of the Duma International Affairs Committee, and Deputy Chairman Alexander Shabonov, threatened:

LUKIN—"Hypothetically, if Russia really wanted to hurt the United States in retaliation for NATO's bombing of Yugoslavia, Russia could fire a submarine launched ballistic missile and detonate a single nuclear warhead at high-altitude over the United States. The resulting electromagnetic pulse would massively disrupt U.S. communications and computer systems, shutting down everything. No internet. Nothing." SHABANOV—“And if that didn’t work, we’d just launch another missile.” Moscow’s threatened nuclear HEMP attack on the U.S. to the face of an official congressional delegation was a contributing factor to the establishment of the EMP Commission. Indeed, Moscow frequently flourishes its nuclear saber to threaten the United States, as if emboldened by knowledge of some decisive nuclear advantage, like Super-EMP weapons and HEMP attack. For example, Russian General Staff Chief Nikolai Makarov threatened a preemptive strike against NATO anti-missile sites in Poland and the Czech Republic in 2012.24 Increasingly aggressive nuclear threats have been made by Russia in 2013, 2014, 2015, 2016, 2017 and especially after Vladimir Putin’s March 1, 2018 announcement of new nuclear super-weapons, that Putin threatened will compel the U.S. to, “Listen to us now!”25 According to former senior Defense Department official, Dr. Mark Schneider: “Between October 24, 2018 and March 2019, the nuclear missile targeting threat was made at least 11 times at the highest levels—by President Putin, by the Chief of the General Staff of the Army Valery Gerasimov, by the Strategic Missile Force Commander Colonel General Sergei Ryabkov.”26 Yet despite all Russia's nuclear preparations and threats, Moscow still fears a HEMP attack. A Norwegian scientific rocket, launched on January 25, 1995, to explore the aurora borealis, was mistaken by the Russian military as a surprise HEMP attack launched by a U.S. submarine—nearly resulting in a massive Russian preemptive strike. This still little known incident, happening a half decade after the end of the Cold War, is the closest the sides have ever come to nuclear conflict, triggered by the specter of surprise HEMP attack.

Russian Military Doctrine: HEMP Attack Decisive Russian General Vladimir Slipchenko in his military textbook Non-Contact Wars describes the combined use of cyber viruses and hacking, physical attacks, non-nuclear EMP weapons, and ultimately nuclear HEMP attack against electric grids and critical infrastructures as a new way of warfare that is the greatest Revolution in Military Affairs (RMA) in history. Slipchenko sees EMP as such a departure from traditional ways and means of warfare that he describes EMP weapons and warfare as “based on new physical principles”—a phrase that has become ubiquitous in Russian literature to describe the military revolution that is EMP:

“In practically all preceding generations of wars…weapons were employed that acted against targets primarily by kinetic, chemical and thermal energy. In addition to these arms…new ones will also appear…in wars of the future…Weapons based on new physical principles having an electromagnetic effect will see considerable development. They will represent a form of casualty and damage producing effect on targets through the energy of electromagnetic emissions of various wavelengths and levels of power generated by radio frequency and laser weapons and by means of electronic countermeasures using a conventional or high-altitude nuclear burst…Depending on the power of emission, such weapons will be capable of…suppressing practically all classic electronic equipment…causing the melting or evaporation of metal in the printed circuit boards…or causing structural changes of electronic elements…”

Like Nazi Germany’s “Blitzkrieg” (“Lightning War”) strategy that coordinated airpower, armor, and mobile infantry to achieve strategic and technological surprise that nearly defeated the Allies in World War II, the “New Blitzkrieg” is, literally and figuratively, an electronic “Lightning War” so potentially decisive in its effects that an entire civilization could be overthrown in hours. According to General Slipchenko, EMP and the new military revolution renders obsolete modern armies, navies and air forces. For the first time in history, small nations or even non-state actors can humble the most advanced nations on Earth.

An article in Military Thought, the flagship journal of the Russian General Staff, “Weak Points of the U.S. Concept of Network-Centric Warfare” points to nuclear HEMP attack as a means of defeating the United States: “American forces may be vulnerable to electronic warfare attacks, in particular, an electromagnetic pulse that is a brief powerful electromagnetic field capable of overloading or destroying numerous electronic systems and high-tech microcircuits that are very sensitive to the electromagnetic field, even if transmitted from a distance. A single low-yield nuclear weapon exploded for this purpose high above the area of combat operations can generate an electromagnetic pulse covering a large area and destroying electronic equipment without loss of life that is caused by the blast or radiation.” Moreover: “Today, too, a considerable body of administrative information in the U.S. armed forces goes through the civilian Internet. Many civilian commercial communication satellites, particularly satellites in low orbits, can have their functions impaired or they can be disabled by electromagnetic shocks from high altitudes.”

According to another Russian article: “Nuclear war strategy has already planned nuclear explosions at an altitude of 50-100 km to destroy enemy satellites’ electronic instruments with electromagnetic pulse”:

“There are now about 683 space craft in near-earth orbit. Of these about 150 are Russian and about 400 American. In the estimation of specialists, for every 100 of our ‘purely’ military espionage artificial earth satellites there are 300 civilian satellites. Clearly, this discrepancy will increase both quantitatively and qualitatively (considering the state of the Russian military industrial complex)…Nuclear war strategy has already planned nuclear explosions at an altitude of 50-100 km to destroy enemy satellites’ electronic instruments with an electromagnetic pulse.”

A 2015 article from Russia’s A.A. Maksimov Scientific Research Institute for Space Systems, alludes to low-yield nuclear enhanced-EMP as the most effective cyber weapon: “Even more effective are remote-controlled cyber weapons in the nuclear variant, but in this case a warhead is required with a capacity many times smaller by comparison with the charges of the typical strategic missiles.”

“Super-EMP is a…first-strike weapon,” according to Aleksey Vaschenko, who describes Russian nuclear weapons specially designed to make extraordinarily powerful EMP fields as Russia’s means for defeating the United States in “A Nuclear Response To America Is Possible”:

“The further direction of the work on the development of Super-EMP was associated with the increase of its kill effect by focusing Y-radiation, which should have resulted in an increase of the pulse’s amplitude. These properties of Super-EMP make it a first strike weapon, which is designed to disable the state and military command and control system, the economy, ICBMs, especially mobile based ICBMs, missiles on the flight trajectory, radar sites, spacecraft, energy supply systems, and so forth. So, Super-EMP is obviously offensive in nature and is a destabilizing firststrike weapon…The Russian nuclear component relies on the Super-EMP factor, which is the Russian response to U.S. nuclear blackmail.”

Hypersonic Warheads: New HEMP Threat Russian development of hypersonic missile warheads is a dangerous new dimension of the nuclear and HEMP threat. Great speed (Mach 20, twenty times the speed of sound) and flying a flat trajectory, skimming along the top of the upper atmosphere, significantly reduces visibility to U.S. early-warning satellites and radars, while also reducing arrival time. Maneuvering makes hypersonic warheads more difficult to track and intercept, virtually impossible to intercept with existing U.S. National Missile Defenses. Former senior Defense Department official Dr. Mark Schneider writes, “The main reason for Russian hypersonic missiles is a nuclear surprise attack and America has no defense against it.”3 Four-star General John Hyten, then chief of the U.S. Strategic Command that controls the nuclear Triad (now Vice Chairman Joint Chief of Staff), agrees with Schneider: “Hypersonic capabilities are a significant challenge. We are going to need a different set of sensors to see hypersonic threats. Our enemies know that.”

Russia deployed its first regiment of SS-19 ICBMs armed with hypersonic Avangard nuclear warheads at the end of December 2019.

Hypersonic vehicles fly over most of their trajectory at 50-100 kilometers altitude: the optimum height-of-burst for Super-EMP warheads

Hypersonic weapons are potentially a new avenue for surprise nuclear HEMP attack that could defeat deterrence. We cannot see the attack coming and may not know against whom to retaliate, especially if HEMP attack blinds satellites and radars needed for early-warning and threat assessment.

Hypersonically delivered HEMP attack could win World War III with a single electronic blow.

HEMP Satellites? During the Cold War, the USSR developed a secret weapon called the Fractional Orbital Bombardment System (FOBS). The FOBS would disguise a nuclear attack as a peaceful satellite launch, orbiting a nuclear-armed satellite over the South Pole to attack the U.S. from the south— from which direction the U.S. is blind and defenseless as there are no BMEWS radars or antimissile defenses facing south. The FOBS satellite could deliver a HEMP attack paralyzing U.S. retaliatory forces and C3I in the first shot of a nuclear war. Miroslav Gyurosi in The Soviet Fractional Orbital Bombardment System describes Moscow's development of the FOBS as part of "a long running campaign of strategic deception against the West through the whole Cold War period, and the protracted development of the Soviet FOBS nuclear weapon system presents an excellent case study of such." Gyurosi: “The Fractional Orbital Bombardment System (FOBS) as it was known in the West, was a Soviet innovation intended to exploit the limitations of U.S. BMEW radar coverage. The idea behind FOBS was that a large thermonuclear warhead would be inserted into a steeply inclined low altitude polar orbit, such that it would approach the CONUS from any direction, but primarily from the southern hemisphere, and following a programmed braking maneuver, re-enter from a direction which was not covered by U.S. BMEW radars.”

"The first warning the U.S. would have of such a strike in progress would be the EMP...," writes Gyurosi.

Russia has the technical capability to clandestinely orbit a nuclear-armed satellite or satellites to be maintained in orbit for years until needed to make a surprise HEMP attack against the U.S., NATO Europe, or some other target. If Russia is orbiting nuclear-armed satellites for HEMP surprise attack, this would be one of their deepest and best protected military secrets. In addition to obvious strategic considerations, the Outer Space Treaty bans orbiting nuclear weapons in space. Moreover, Russia has pursued a long propaganda offensive criticizing the U.S. for “militarizing space” intended to deter the U.S. from orbiting space-based missile defenses and from improving U.S. military capabilities in space. HEMP attacks by satellite or missiles or in combination could be the key to Russian victory in a nuclear war, as U.S. strategic bombers, missiles, and C3I are not hardened to survive attack by Super-EMP weapons, as noted in testimony before the House Armed Services Committee by Dr. William Graham, Chairman of the EMP Commission: MR. BARTLETT: “It is my understanding that, in interviewing some Russian generals, that they told you that the Soviets had developed a ‘Super-EMP’ enhanced weapon that could produce 200 kilovolts per meter at the center?...This is about, what, four times higher than anything we ever built or tested to, in terms of EMP hardening?” DR. GRAHAM: “Yes.” MR. BARTLETT: “Which means that, even if you were some hundreds of miles away from that, that it would be somewhere in the range of 50 to 100 kilovolts per meter at the margins of our country, for instance?” DR. GRAHAM: “Yes. Over much of the margin.” MR. BARTLETT: “So, we aren’t sure that much of our military would still be operable after that robust laydown. Is that correct?...I also understand that we aren’t certain that we could launch, through a series of robust EMP laydowns, that we could launch our intercontinental ballistic missiles?” DR. GRAHAM: “We designed both the missiles and their bases and the strategic communications systems during the Cold War to be able to survive and operate through EMP fields on the order of 50 kilovolts per meter, which was our concern at the time, before we realized that weapons could be designed that had larger EMP fields.” Russian President Vladimir Putin, in a world televised speech on March 1, 2018, announced a new heavy-ICBM, the most powerful ever made, called “Sarmat” (“Satan II” by NATO) that is “invincible” because it can strike anywhere on Earth, and even attack the U.S. by flying over the South Pole, like the FOBs. Putin declared: “Not even future missile defense systems will offer any trouble to the Russian rocket complex, Sarmat,” HEMP Threat To U.S. Submarines? HEMP attack could achieve for Russia a key objective the USSR could not achieve during the Cold War—neutralizing U.S. ballistic missile submarines at sea. Russian Super-EMP weapons could destroy or degrade U.S. bombers, ICBMs, SSBNs in port and their strategic C3I—including land-based VLF communications systems, TACAMO aircraft, and other redundant means of strategic command and control used to convey Emergency Action Messages (EAMs) to submarines hiding at sea. Severing their communications links to the National Command Authority would neutralize U.S. submarines, rendering them useless. HEMP could also be used to attack submarines on patrol at sea directly. A high-yield warhead (1 megaton or more) detonated for HEMP over the ocean would cover an area 2,200 kilometers in radius, a zone nearly as large as North America, with powerful E3 HEMP that would penetrate the ocean depths and possibly damage or destroy the electronics of submarines on patrol. Submarines would be especially vulnerable when deploying their very long antennae—which they need to do precisely when trying to receive EAMS.43 VOSTOK-18 On September 11-17, 2018, Russia’s VOSTOK-18 was perhaps the largest military exercise in history, happening two months after U.S. Department of Homeland Security revelations that Russia penetrated hundreds of U.S. electric utilities with cyber-weapons. A few significant highlights: VOSTOK-18 mobilized 300,000 troops, 36,000 tanks and other vehicles, 1,000 aircraft, and 80 ships. Russian Defense Minister Sergei Shoigu described it as the largest exercise since ZAPAD81, the largest Cold War exercise that, 40 years ago, simulated invading NATO. VOSTOK-18 apparently utilized other forces not advertised, including Russia’s Mediterranean fleet fighting a real war in Syria and the Strategic Rocket Forces Missile Armies, simulating a global nuclear World War III. VOSTOK-18 was a joint Russia-China exercise, signifying de facto alliance against the United States. Russia and China conduct many joint military exercises. Their nuclear collaboration began February 2001 in a combined nuclear war scenario against the U.S. over Taiwan.46 The SinoRussian Friendship Treaty (July 2001) promises their military cooperation “will further strategic stability and security around the world.” VOSTOK-18, though conducted in Siberia, may well be full-dress rehearsal for conquering NATO, practicing new nuclear warfighting techniques. Siberian operations are harder for the U.S. to monitor, so new strategies and tactics can be exercised secretly.

Russia’s new nuclear doctrine (similar to Khrushchev-era thinking, like a more aggressive version of Marshal Sokolovsky’s 1962 Military Strategy) relies on nuclear firepower and relatively small armies, but highly mobile and survivable, to knife through Europe in a week or two.49 Russia’s new generation nuclear weapons for strategic HEMP attack and tactical battlefield use make this possible.

Theoretically, Russian invasion of NATO by 300,000 troops, 36,000 tanks and other vehicles, and 1,000 aircraft could overrun NATO paralyzed by EMP attack and outgunned by tactical nuclear weapons 10-to-1. A single nuclear weapon detonated 60 kilometers above NATO HQ in Brussels would generate a paralyzing HEMP field from Poland to Scotland, like a magic carpet to the English Channel.5 VOSTOK-18 practiced civil defense and recovery operations unrivaled in the West. “Eastern Military District engineer formation mopped-up in aftermath of a simulated technogenic emergency during VOSTOK-18 maneuvers,” according to the Russian Defense Ministry, “The military engineers launched bridges and ferry crossings, restored demolished roads, prepared passage through rubble…evacuated the population, and cleared terrain of simulated explosive objects and radioactive and chemical waste.” These same operations could support an invasion of NATO. But the most important part of VOSTOK-18 was invisible

Russian and Chinese military doctrine also advocates a revolutionary new way of warfare rendering obsolete traditional military power by relying on cyber-attacks, sabotage, and EMP to collapse adversary electric grids and life-sustaining critical infrastructures, thereby achieving victory.

#### Its try-or-die nuke war is the only way to solve warming---no defense

[**Miller-McDonald**](https://www.the-trouble.com/content?author=5b60aea3575d1f4e6b9fa9d2) **19,** 1-4-2019, Samuel Miller McDonald is a writer and geography PhD student at University of Oxford studying the intersection of grassroots movements and energy transition. "Deathly Salvation — THE TROUBLE.," <https://www.the-trouble.com/content/2019/1/4/deathly-salvation---Parks> \*edited for ableist language

The global economy is hurtling humanity toward extinction. Greenhouse gas emissions are on track to warm the planet by six degrees Celsius above preindustrial averages. A six-degree increase risks killing most life on earth, as global warming did during the Late Permian when volcanoes burned a bunch of fossilized carbon (e.g., coal, oil, and gas). Called the [Great Dying](http://nymag.com/daily/intelligencer/2017/07/climate-change-earth-too-hot-for-humans.html), that event was, according to New York Magazine, “The most notorious [extinction event…]; it began when carbon warmed the planet by five degrees, accelerated when that warming triggered the release of methane in the Arctic, and ended with 97 percent of all life on Earth dead.”

Mainstream science [suggests](https://www.theguardian.com/environment/2018/oct/08/global-warming-must-not-exceed-15c-warns-landmark-un-report) that we’re on our way there. During the winter of 2017, the Arctic grew warmer than Europe, sending snow to the Mediterranean and Sahara. The planet may have already passed irreversible thresholds that could accelerate further feedback loops like permafrost melt and loss of polar ice. Patches of permafrost [aren’t freezing](https://www.cnbc.com/2018/08/22/scientists-surprised-arctic-ground-may-not-be-freezingeven-in-winter.html) even during winter, necessitating a rename (may I suggest ‘nevafrost’?). In the summer of 2018, forests north of the Arctic Circle broke 90 degrees Fahrenheit and [burned](https://www.cnn.com/2018/07/19/europe/sweden-forest-fires-wxc-intl/index.html) in vast wildfires. We’re reaching milestones far faster than scientists have even recently predicted. As Guardian columnist George Monbiot [noted](https://twitter.com/GeorgeMonbiot/status/968740684114092032), “The Arctic meltdown […] is the kind of event scientists warned we could face by 2050. Not by 2018.” Mass marine death that rapidly emits uncontrollable greenhouse gasses is another feedback loop that seems ready to strike. The ocean is now [more acidic](https://phys.org/news/2018-07-ocean-acidification-million-years.html) than any time in the last 14 million years, killing everything from snails to whales. It’s growing rapidly more acidic. Meanwhile, from the global South to wealthier industrialized countries, people are already dying and being displaced from the impacts of extreme climate change via extreme droughts, floods, wildfires, storms, and conflicts like the Syrian civil war. Authoritarianism is [on the rise](https://newrepublic.com/article/148861/climate-change-authoritarian-leaders) due directly to these climate emergencies and migrations.

The IPCC has recently alerted the world that we have about a decade to dramatically cut emissions before collapse becomes inevitable. We could prevent human extinction if we act immediately. But the world is unanimously ignoring climate change. Nations will almost certainly fail to avert biosphere collapse. That is because doing so will require a rapid decarbonization of the global economy.

But why does decarbonization--an innocuous enough term--seem so implausible? Well, let’s put it this way: a sufficient transition to non-carbon energy would require all the trains, buses, planes, cars, and ships in the world to almost immediately stop and be replaced with newly manufactured vehicles to run on non-carbon fuel, like hydrogen cells, renewable electricity, or some carbon-neutral biofuel. All this new manufacturing will have to be done with low-carbon techniques, many of which don’t exist yet and may be impossible to achieve at scale. This means all the complex supply chains that move most of the world’s food, water, medicine, basically all consumer goods, construction materials, clothing, and everything else billions of people depend on to survive will have to be fundamentally reformed, in virtually every way, immediately.

It also means that all the electric grids and indoor heating and cooling systems in the world must be rapidly transformed from centralized coal and gas power plants to a mixture of solar, wind, and nuclear—both distributed and centralized—dispersed through newly built micro-grids and smart-grids, and stored in new battery infrastructure. These new solar panels, batteries, and nuclear plants will somehow have to be built using little carbon energy, again something that may be impossible to achieve at a global scale.

The cost of this transition is impossible to know, but surely reaches the tens of trillions of dollars. It needs to happen in just about every industrialized nation on the planet and needs to happen now—not in 2050, as the Paris Agreement dictates, or the 2030s, as reflected in many governments’ decarbonization goals. The engineering and administrative obstacles are immense; disentangling century-old, haphazard electric grid systems, for example, poses an almost unimaginable cascade of institutional and logistical hurdles. Imagine the difficulty of persuading millions of municipalities around the world to do anything simultaneously; now, imagine convincing them all to fundamentally shift the resource infrastructure on which their material existence depends immediately.

Perhaps even more daunting are the political obstacles, with diverse financial interests woven together in a tapestry of inertia and self-interest. Virtually all retirement funds, for instance, are invested in fossil fuel companies. Former and current fossil fuel industry managers sit on all manner of institutional committees in which energy and investment decisions are made: trustee boards of universities, regulatory commissions, city councils, congressional committees, philanthropic boards, federal agencies, the Oval Office couch. Lots of people make lots of money from fossil fuels. Will they sacrifice deeply vested interests to prevent collapse? They certainly have not shown signs of doing so yet, when the stakes are as dire as they’ve ever been; most have instead ruthlessly obstructed meaningful action. Will enough people be willing to do what it takes to forcibly remove them from the most powerful institutions in the world? That also seems unlikely, given meager public involvement in this issue so far.

This is the obstacle of collective action: everyone has to sacrifice, but no one wants to start. Who will assent to giving up their steady returns from fossil fuels if everyone else refuses? When people are living so precariously as it is (43% of American can’t afford basic necessities), how can we ask them to undertake energy transition? The US drags its feet on decarbonizing and justifies it by arguing that China has not made strong enough commitments. Which country will voluntarily give up access to strategic fossil fuel reserves? Much of our geopolitical dynamics and wars have revolved around access to mineral resources like oil. Is the US going to put itself in a disadvantaged position for the climate? Shell withdraws research funding for renewables because ExxonMobil goes full steam ahead on oil, and, hey, they must compete. Fossil fuel funded politicians of both parties certainly will not aid transition.

If untangling the webs of influence, interests, and engineering preventing decarbonization weren’t daunting enough, the world will also have to suck billions of tons of greenhouse gases out of the atmosphere that have already been emitted. Keeping the planet to even a deadly 1.5 degrees Celsius increase of warming depends on it.

This sounds simpler than it is, as if a big vacuum cleaner could siphon particulates from the sky. But no one really knows how to extract and sequester carbon at the scale necessary to prevent catastrophic climate change. Engineers have thrown out a lot of ideas—some [more plausible](https://www.the-trouble.com/content/2018/10/18/avoiding-climate-imperialism-a-leftist-vision-of-geoengineering) than others—but most scientists who have looked at proposals generally agree that it’s wishful thinking. As Huffington Post [quotes](http://www.huffingtonpost.co.uk/adnan-aldaini/global-warming-delusions-_b_3175118.html) Clive Hamilton, “In order to capture just a quarter of the emissions from the world's coal-fired power plants we would need a system of pipelines that would transport a volume of fluid twice the size of the global crude-oil industry.” Of course, manufacturing, shipping, and constructing those pipelines would require immense carbon energy inputs and emissions. And that’s just to capture the emissions from coal!

Like energy transition, carbon capture and sequestration requires governments to act collectively to invest trillions of dollars in risky, experimental, and probably mostly ineffectual sequestration technologies. Again, it’s a collective action problem: nobody wants to be the one to sacrifice while no one else is putting themselves on the line. And the miniscule likelihood that energy transition will occur under a Trump-Digs-Coal presidency—and the Trumpian nationalists [winning elections](https://www.bbc.co.uk/news/world-europe-36130006) across the [world](https://www.theguardian.com/world/2018/nov/01/bolsonaro-environment-agriculture-ministries-amazon)—casts further doubt on the possibility of rapid decarbonization. The administration’s energy department has [projected](https://insideclimatenews.org/news/06022018/eia-trump-greenhouse-gas-emissions-rise-climate-change-natural-gas-wind-solar-energy) that, “The carbon footprint of the United States will barely go down at all for the foreseeable future and will be slightly higher in 2050,” as InsideClimateNews notes. The world, today, is still setting records for carbon emissions and there’s no sign that will change anytime soon.

The only period in US history the nation has undertaken anything near the magnitude of collective action necessary for mitigation was during the Second World War and the rebuilding effort in its aftermath. But even those projects involved a fraction of the capital and coordination that will be necessary for sufficient energy transition and carbon sequestration. More importantly, today’s collective action will have to be politically justified without the motivation of defeating a personified enemy—a Hitler, if you will. Today, with interpersonal alienation running rampant and extremely consolidated wealth and power, industrial economies seem infinitely far from a cultural, political atmosphere in which collective action policies are even close to possible. To the contrary, wealthy countries are all still slashing public goods, passing austerity budgets, and investing heavily in fossil fuel infrastructure. Even most elected Democrats are dragging their feet on passing climate policy. The world is going in the exact opposite direction from one in which humans can live.

We’ve tied ourselves in a perfect Gordian knot.

The global economy is a vast machine, operating beyond the control of even the most powerful individuals, and it has a will of its own to consume and pollute. It’s hard to believe that this massive metal beast will be peacefully undone by the people who survive by it, and we all survive by it in some way, often against our wills; it bribes and entraps us all in ways large and small.

But a wrench could clog the gears, and maybe only a wrench can stop it. One wrench that could slow climate disruption may be a large-scale conflict that halts the global economy, destroys fossil fuel infrastructure, and throws particulates in the air. At this point, with ~~insane~~ people like Trump, Putin, Xi, May, and Macron leading the world’s biggest nuclear powers, large-scale conflagration between them would probably lead to a nuclear exchange. Nobody wants nuclear war. Rather, ~~nobody sane and prosocial wants nuclear war~~. It is an absolute horror that would burn and maim millions of living beings, despoil millions of hectares, and scar the skin of the earth and dome of the sky for centuries, maybe millennia. With proxy conflict brewing between the US and Russia in the Middle East and the [Thucydides trap](http://foreignpolicy.com/2017/06/09/the-thucydides-trap/) ready to ensnare us with an ascendant China, nuclear war looks like a more realistic possibility than it has since the 1980s.

A devastating fact of climate collapse is that there may be a silver lining to the mushroom cloud. First, it should be noted that a nuclear exchange does not inevitably result in apocalyptic loss of life. Nuclear winter—the idea that firestorms would make the earth uninhabitable—is based on shaky science. There’s no reliable model that can determine how many megatons would decimate agriculture or make humans extinct. Nations have already detonated 2,476 nuclear devices.

An exchange that shuts down the global economy but stops short of human extinction may be the only blade realistically likely to cut the carbon knot we’re trapped within. It would decimate existing infrastructures, providing an opportunity to build new energy infrastructure and intervene in the current investments and subsidies keeping fossil fuels alive.

In the near term, emissions would almost certainly rise as militaries are some of the world’s [largest emitters](https://www.nytimes.com/interactive/2017/06/01/climate/us-biggest-carbon-polluter-in-history-will-it-walk-away-from-the-paris-climate-deal.html). Given what we know of human history, though, conflict may be the only way to build the mass social cohesion necessary for undertaking the kind of huge, collective action needed for global sequestration and energy transition. Like the 20th century’s world wars, a nuclear exchange could serve as an economic leveler. It could provide justification for nationalizing energy industries with the interest of shuttering fossil fuel plants and transitioning to renewables and, uh, nuclear energy. It could shock us into reimagining a less suicidal civilization, one that dethrones the death-cult zealots who are currently in power. And it may toss particulates into the atmosphere sufficient to block out some of the solar heat helping to drive global warming. Or it may have the opposite effects. Who knows?

What we do know is that humans can survive and recover from war, probably even a nuclear one. Humans cannot recover from runaway climate change. Nuclear war is not an inevitable extinction event; six degrees of warming is.

Given that mostly violent, psychopathic individuals manage the governments and industries of the world, it may only be possible for anti-social collective action—that is, war—to halt, or at least slow, our inexorable march toward oblivion. A courageous, benevolent ruler might compel vast numbers of people to collective action. But we have too few of those, and the legal, political, and military barriers preventing them from rising are immense. Our current crop of villainous presidents, prime ministers, and CEOs, whether lusting for chaos or pursuing their own petty ends, may inadvertently conspire to break the machine now preventing our future. When so bereft of heroes, we may need to rely on humanity’s antagonists and their petty incompetence to accidentally save the day. It is a stark reflection of how homicidal our economy is—and our collective adherence to its whims—that nuclear war could be a rational course of action.

## 2NC---AT: War Bad

### 2NC---Extinction O/W

#### Even if they somehow win a large portion of the population dies extinction threatens <500 trillion lives---you should vote neg if we win 1/55-thousand risk of our impacts.

Math (if they win almost everyone dies): 500 trillion/9 billion = .000018 = .0018% = 1/55555 < 1/55k

**Baum & Barrett 18**, D. Baum & Anthony M. Barrett 18. Global Catastrophic Risk Institute. 2018. “Global Catastrophes: The Most Extreme Risks.” Risk in Extreme Environments: Preparing, Avoiding, Mitigating, and Managing, edited by Vicki Bier, Routledge, pp. 174–184.

A common theme across all these treatments of GCR is that some catastrophes are vastly more important than others. Carl Sagan was perhaps the first to recognize this, in his commentary on nuclear winter (Sagan 1983). Without nuclear winter, a global nuclear war might kill several hundred million people. This is obviously a major catastrophe, but humanity would presumably carry on. However, with nuclear winter, per Sagan, humanity could go extinct. The loss would be not just an additional four billion or so deaths, but the loss of all future generations. To paraphrase Sagan, the loss would be billions and billions of lives, or even more. Sagan estimated 500 trillion lives, assuming humanity would continue for ten million more years, which he cited as typical for a successful species. Sagan’s 500 trillion number may even be an underestimate. The analysis here takes an adventurous turn, hinging on the evolution of the human species and the long-term fate of the universe. On these long time scales, the descendants of contemporary humans may no longer be recognizably “human”. The issue then is whether the descendants are still worth caring about, whatever they are. If they are, then it begs the question of how many of them there will be. Barring major global catastrophe, Earth will remain habitable for about one billion more years until the Sun gets too warm and large. The rest of the Solar System, Milky Way galaxy, universe, and (if it exists) the multiverse will remain habitable for a lot longer than that (Adams and Laughlin 1997), should our descendants gain the capacity to migrate there. An open question in astronomy is whether it is possible for the descendants of humanity to continue living for an infinite length of time or instead merely an astronomically large but finite length of time (see e.g. Ćirković 2002; Kaku 2005). Either way, the stakes with global catastrophes could be much larger than the loss of 500 trillion lives.

#### We don’t need to win much---100 survivors ensure continued survival and save <500 trillion lives

**Turchin & Denkenberger 18** Alexey Turchin & David Denkenberger 18. Turchin is a researcher at the Science for Life Extension Foundation; Denkenberger is with the Global Catastrophic Risk Institute (GCRI) @ Tennessee State University, Alliance to Feed the Earth in Disasters (ALLFED). 09/2018. “Global Catastrophic and Existential Risks Communication Scale.” Futures, vol. 102, pp. 27–38.

“Civilizational collapse risks” As most human societies are fairly complex, a true civilizational collapse would require a drastic reduction in human population, and the break-down of connections between surviving populations. Survivors would have to rebuild civilization from scratch, likely losing much technological abilities and knowledge in the process. Hanson (2008) estimated that the minimal human population able to survive is around 100 people. Like X risks, there is little agreement on what is required for civilizational collapse. Clearly, different types and levels of the civilizational collapse are possible (Diamond, 2005) (Meadows, Randers, & Meadows, 2004). For instance, one definition of the collapse of civilization involves, collapse of long distance trade, widespread conflict, and loss of government (Coates, 2009). How such collapses relate to existential risk needs more research.

### 2NC---AT: Escalation

#### HEMPs *ZERO* the risk of escalation---the warheads can’t be fired, plus no one would allow it

Peter Pry 22, Dr. Peter Vincent Pry is Executive Director of the EMP Task Force on National and Homeland Security, served as the Chief of State of the Congressional EMP Commission, Director of the U.S. Nuclear Strategy Forum, and on the staffs of the Congressional Strategic Posture Commission, House Armed Services Committee, and the CIA. He is author of the books Blackout Warfare(2021) and The Power And The Light(2020) ,02-17-2022, "Russia could win World War III in Europe with EMP nuclear attack," Washington Times, <https://www.washingtontimes.com/news/2022/feb/17/russia-could-win-world-war-iii-in-europe-with-nucl/> //agb, edited for ableist language\*

Russia could win World War III in Europe with a single Super-EMP nuclear warhead. Detonated 70 kilometers high over NATO Headquarters in Brussels, the EMP field would blackout electric grids and ~~paralyze~~ \*(make powerless) NATO military forces from Poland to Britain, making a red carpet for a Russian invasion. U.S. troops and 30,000 civilians fleeing Ukraine would become POWs. Russian tanks could reach the English Channel in days. After an EMP attack, the U.S. would discover it has no tactical nuclear weapons. Even if some delivery systems survive the EMP, it is doubtful any host European government would allow a tactical nuclear strike against Russia from its territory, fearing nuclear retaliation.

#### Even if we can we won’t

**CRS 08**, 06-21-08, "High Altitude Electromagnetic Pulse (HEMP) and High Power Microwave (HPM) Devices: Threat Assessments," [https://www.everycrsreport.com/reports/RL32544.html](https://www.everycrsreport.com/reports/RL32544.html---Parks)

Commission members have stated at hearings that, as time passes without a visible effort to show the world that we are protecting our computer systems and critical infrastructures, the perceived inaction may actually invite a possible EMP attack.[15](https://www.everycrsreport.com/reports/RL32544.html" \l "fn15) In the past, the threat of mutually assured destruction provided a lasting deterrent against the exchange of multiple high-yield nuclear warheads. However, a single, low-yield nuclear explosion high above the United States, or over a battlefield, can produce a large-scale, high-altitude EMP \*(HEMP) effect resulting in widespread loss of electronics, but possibly without direct fatalities. Therefore, an EMP attack directed against the United States involving no violent destruction, nor instant death for large numbers of U.S. citizens, may not necessarily evoke massive nuclear retaliation by the U.S. military, where, for example, large numbers of innocent civilians of a nation with a rogue leader might be killed. Such a perceived lower risk of assured destruction by the United States, and widespread knowledge about the vulnerability of U.S. civilian and military computers to the effects of an EMP attack, could actually create a new incentive for other countries or terrorist groups to develop, or perhaps purchase, a nuclear capability.

#### Even if it does somehow escalate there’s no extinction

James Scouras 19. Johns Hopkins University Applied Physics Laboratory. Summer 2019. “Nuclear War as a Global Catastrophic Risk.” Journal of Benefit-Cost Analysis, vol. 10, no. 2, pp. 274–295.

While it is clear that nuclear war is a global catastrophic risk, it is also clear that it is not an existential risk. Yet over the course of the nuclear age, a series of mechanisms have been proposed that, it has been erroneously argued, could lead to human extinction. The first concern3 arose among physicists on the Manhattan Project during a 1942  seminar at Berkeley some three years before the first test of an atomic weapon. Chaired by Robert Oppenheimer, it was attended by Edward Teller, Hans Bethe, Emil Konopinski, and other theoretical physicists.4 They considered the possibility that detonation of an atomic bomb could ignite a self-sustaining nitrogen fusion reaction that might propagate through earth’s atmosphere, thereby extinguishing all air-breathing life on earth. Konopinski, Cloyd Margin, and Teller eventually published the calculations that led to the conclusion that the nitrogen-nitrogen reaction was virtually impossible from atomic bomb explosions—calculations that had previously been used to justify going forward with Trinity, the first atomic bomb test.5 Of course, the Trinity test was conducted, as well as over 2000 (by all nations) subsequent atomic and thermonuclear tests, and we are fortunately still here breathing air After the bomb was used, extinction fear focused on invisible and deadly fallout, unanticipated as a significant consequence of the bombings of Japan that would spread by global air currents to poison the entire planet. Public dread was reinforced by the depressing, but influential, 1957 novel On the Beach by Nevil Shute ([1957](https://www.cambridge.org/core/journals/journal-of-benefit-cost-analysis/article/nuclear-war-as-a-global-catastrophic-risk/EC726528F3A71ED5ED26307677960962/core-reader#ref36)) and the subsequent 1959 movie version (Kramer, 1959). The story describes survivors in Melbourne, Australia, one of a few remaining human outposts in the Southern Hemisphere, as fallout clouds approached to bring the final blow to humanity.In the 1970s, after fallout was better understood to be limited in space, time, and magnitude, depletion of the ozone layer, which would cause increased ultraviolet radiation to fry all humans who dared to venture outside, became the extinction mechanism of concern. Again, one popular book, The Fate of the Earth by Jonathan Schell ([1982](https://www.cambridge.org/core/journals/journal-of-benefit-cost-analysis/article/nuclear-war-as-a-global-catastrophic-risk/EC726528F3A71ED5ED26307677960962/core-reader#ref34)), which described the nuclear destruction of the ozone layer leaving the earth “a republic of insects and grass,” promoted this fear. Schell did at times try to cover all bases, however: “To say that human extinction is a certainty would, of course, be a misrepresentation – just as it would be a misrepresentation to say that extinction can be ruled out” (Schell, [1982](https://www.cambridge.org/core/journals/journal-of-benefit-cost-analysis/article/nuclear-war-as-a-global-catastrophic-risk/EC726528F3A71ED5ED26307677960962/core-reader#ref34)). Finally, the current mechanism of concern for extinction is nuclear winter, the phenomenon by which dust and soot created primarily by the burning of cities would rise to the stratosphere and attenuate sunlight such that surface temperatures would decline dramatically, agriculture would fail, and humans and other animals would perish from famine. The public first learned of the possibility of nuclear winter in a Parade article by Sagan ([1983](https://www.cambridge.org/core/journals/journal-of-benefit-cost-analysis/article/nuclear-war-as-a-global-catastrophic-risk/EC726528F3A71ED5ED26307677960962/core-reader#ref31)), published a month or so before its scientific counterpart by Turco et al. ([1983](https://www.cambridge.org/core/journals/journal-of-benefit-cost-analysis/article/nuclear-war-as-a-global-catastrophic-risk/EC726528F3A71ED5ED26307677960962/core-reader#ref40)). While some nuclear disarmament advocates promote the idea that nuclear winter is an extinction threat, and the general public is probably confused to the extent it is not disinterested, few scientists seem to consider it an extinction threat. It is understandable that some of these extinction fears were created by ignorance or uncertainty and treated seriously by worst-case thinking, as seems appropriate for threats of extinction. But nuclear doom mongering also seems to be at play for some of these episodes. For some reason, portions of the public active in nuclear issues, as well as some scientists, appear to think that arguments for nuclear arms reductions or elimination will be more persuasive if nuclear war is believed to threaten extinction, rather than merely the horrific cataclysm that it would be in reality (Martin, [1982](https://www.cambridge.org/core/journals/journal-of-benefit-cost-analysis/article/nuclear-war-as-a-global-catastrophic-risk/EC726528F3A71ED5ED26307677960962/core-reader#ref22)).[4](https://www.cambridge.org/core/journals/journal-of-benefit-cost-analysis/article/nuclear-war-as-a-global-catastrophic-risk/EC726528F3A71ED5ED26307677960962/core-reader#fn4) To summarize, nuclear war is a global catastrophic risk. Such wars may cause billions of deaths and unfathomable suffering, as well set civilization back centuries. Smaller nuclear wars pose regional catastrophic risks and also national risks in that the continued functioning of, for example, the United States as a constitutional republic is highly dubious after even a relatively limited nuclear attack. But what nuclear war is not is an existential risk to the human race. There is simply no credible scenario in which humans do not survive to repopulate the earth

### 2NC---AT: Grid

#### This is ridiculous not everyone even uses the grid and mutual aid makes extinction *impossible*

**Springer, 17**—University of Victoria (Simon, “The limits to Marx: David Harvey and the condition of postfraternity,” Dialogues in Human Geography 2017, Vol. 7(3) 280–294, dml)

Yet since horizontal organizational tactics in anarchism are usually part of a broader class struggle (Solidarity Federation, 2012), it is absurd to suggest that there would ever be a time where anarchists would enter into assembly—federated or otherwise—during a nuclear meltdown or the complex operation of landing an airplane. Indeed, without a discernable hierarchy to oppose, ‘in what possible circumstance would collective struggle be necessary during such risky periods?’ (fkshultze, 2013). Nonetheless, mutual aid in times of disaster—both natural and manufactured—is a recurrent human theme, where people regularly come together and organize themselves effectively around an ensuing crisis in the complete absence of a centralized authority. We saw this with spectacular effect in the wake of Hurricane Katrina, where the state was more concerned with restoring ‘law and order’ and criminalizing desperate people than it was with relief and rescue efforts. In response to the state’s failure, people instead helped themselves and each other, particularly through the formation of the Common Ground Collective. For Kropotkin (2008 [1902]: 137), the tendency for mutual aid ‘has so remote an origin, and is so deeply interwoven with all the past evolution of the human race, that it has been maintained ... notwithstanding all vicissitudes of history’.

### 2NC---AT: HEMPs

#### HEMPs are harmless---studies are overhyped and *STILL* conclude NEG

**James 22**, Jim James is the author of survival freedom and cites 4 independent studies 2-10-22 , "Can an EMP Harm a Human?," https://survivalfreedom.com/can-an-emp-harm-a-human-what-you-need-to-know/?utm\_source=rss&amp;utm\_medium=rss&amp;utm\_campaign=can-an-emp-harm-a-human-what-you-need-to-know-Parks

There’s little to no evidence to suggest that EMPs pose a physical threat to humans. One of the main reasons low EMPs may not harm humans directly is that we’re mostly made of water, and our body isn’t very conductive. However, the conclusion from most studies is that EMPs at high levels may directly harm humans. Some of the possible effects on humans include: Cellular mutations Internal burns Nervous system damage Brain damage EMPs may also affect pacemakers and other implanted devices. Because they’re electronic devices, they can become damaged if an EMP occurs. The extent of damage will depend on the level of the EMP and the person’s proximity to it. Long Exposure Could Cause DNA Mutations [According to Amir Raz](https://www.scientificamerican.com/article/could-certain-frequencies/), assistant professor of clinical neuroscience at Columbia University, exposure to ionizing radiation, such as the one in EMPs, can cause DNA damage and mutations. He also stated that non-ionizing energy from cell phone towers, power lines, and wireless devices might cause structural and functional damage to the nervous system at radio wave frequencies. Temporary Microvascular Leaking Is Possible In [another study](https://www.ncbi.nlm.nih.gov/pubmed/19725471) on the effects of EMP on the brain microvascular permeability in rats, the researchers found that EMP exposure of 200–400 pulses produced microvascular artery leakage in the brain. This sort of microvascular artery leaking has been linked to mild cognitive and memory issues in humans. Although they were still visible 12 hours after exposure, the effects were relatively transient. EMPs Can Disrupt the Blood-Brain Barrier Besides DNA damage, mutation, and internal burns, EMPs may also disrupt the blood-brain barrier. This barrier is what protects the tissues of your nervous system. When you break down that barrier, you’re destroying another layer of defense for your brain. The effect? Well, according to a [2010 research](https://www.ncbi.nlm.nih.gov/pubmed/20550949), temperature rises of merely 1°C (1.8°F) can have a harmful impact, giving easy access to macromolecules to permeate the blood-brain barrier. High Levels of Emp Could Impact Cognitive Functions Some studies also suggest that high levels of EMP may severely impact the cognitive functions of the left hemisphere of the brain, which is responsible for language and speech. According to [this study](https://www.ncbi.nlm.nih.gov/pubmed/19725471), it can briefly short-circuit the [neural circuit](https://en.wikipedia.org/wiki/Neural_circuit). Most Studies Show That Any Effects Are Limited Based on the studies reviewed so far in this article, the conclusion is that you may experience some adverse effects during the first 12 hours of an EMP. However, it’s important to mention that the bulk of these researches includes relatively high levels of microwave radiation exposure during testing – probably much higher than what you’d get from a nuclear detonation or a solar flare in the event of an EMP.

### 2NC---AT: Disease

#### Turn---HEMPs reduce the risk of pandemics---at worst there’s no correlation

Cook 10, Nigel B. PhD Computer Programming, BA Physics, “How weapons and war effects exaggerations for disarmament forced Britain to collaborate with evil racist thugs at Munich in 1938, in the name of peace” http://glasstone.blogspot.com/2010/03/lifeboat-analogy-to-civil-defence.html 3/1/10

Dr Stonier's chapter 9, "Pestilence and Plague: The Threat of Epidemics" and the remainder of the book is contrived and deceptive, citing in his bibliography - but ignoring in his text - documentary evidence from nuclear test ecological recovery at Eniwetok Atoll near two megaton yield tests which contradicts his case that the insects will inherit the Earth. He entirely ignores the plague of 1348-50 which killed a third of the population in Western Europe as an example of the human recovery potential after a huge disaster (see Jack Hirshleifer, *Disaster and Recovery: The Black Death in Western Europe,* RAND Corporation report RM4700, 1966, online PDF linked here). Like his ability to ignore the lack of firestorms in modern London buildings and the limited firestorm intensity even in the wooden two-storey buildings of Hiroshima, and to misrepresent the Hamburg firestorm in 3-5 storey medieval wooden overcrowded buildings as illustrative of the threat to modern concrete, steel and brick cities, Stonier misrepresents plague risks. He delves back selectively through the history of epidemics to find examples that tend to support his thesis (simply ignoring all evidence to the contrary) such as tularemia (a virulent bacterial infection transmitted by tick bites, skin contact, inhalation and ingestion, which concentrating in the lymph nodes, causing weakness and fever but not usually death) outbreak of 1941 in Rostov-on-Don, Russia, where 37,000 people were infected. This outbreak resulted from the wartime conscription, which left the crops unharvested in the fields, allowing field mice to proliferate, spreading tularemia through their droppings and ticks on the hay and grain stored in barns, which were used by soldiers for sleeping quarters. Stonier then studies the second bubonic plague outbreak that began on 14 August 1907 in San Francisco, infecting 167 people of which 89 died, over a year after the city was devastated by the great earthquake and fire of 18 April 1906. This plague was spread by fleas living on rats breeding in the insanitary conditions of the wrecked city, which still lacked functioning sewage disposal systems. Stonier moves on to the more deadly pneumonic plague which broke out in Oakland, California, 1919, when a hunter infected by flea bites from the fur of a groundhog spread plague, infecting 14 cases of which 13 proved fatal. Stonier then discusses the similar mechanism for the larger-scale pneumonic plague outbreak amongst fur-trappers in Manchouli, Manchuria, 1910-11. That plague killed 60,000 because it was spread first in crowded underground inns in Manchouli, and later (as cases appeared) these infected people panicked and fled on the Chinese Eastern Railway to numerous towns throughout the whole country. On page 131 Stonier attempts to glue these historical plague examples to the aftermath of nuclear warfare, by claiming that the birds and mammal predators for insect disease vectors will be killed off by 1,000 roentgens of gamma radiation exposure, whereas adult insects will survive 100,000 roentgens and can reproduce at doses of up to 5,000 roentgens. He points out that conifers like pine trees are about as vulnerable as mammals (spruce seeds are killed by 1,000 roentgens, he states on p. 143), but in general plants can withstand 5,000 roentgens of gamma radiation, while mustard seeds can "absorb 92,000 roentgens and still produce viable plants" (Stonier, p. 131). On page 132 Stonier points out that 13 out of 15 flora species were injured or killed over five years by fallout radiation at the world's most highly contaminated fallout location, Gegen Islet at the northern edge of Rongelap Atoll, giving the island a grey rather than green colour as seen from aircraft five years later. Gegen Islet was the downwind fallout hotspot location 100 miles downwind of the 15 Mt *Bravo* test, giving a 3,000 rads gamma dose within 48 hours, and thousands more at a slower rate, later on. Moving southward in Rongelap Atoll, the radiation doses were smaller, and the damage less. At Kabelle Island, for instance, only 3 species of flora were killed, including the mangroves, and at Eniwetok Islet in Rongerik Atoll (further downwind) only 2 species of flora were affected by fallout. (References: F. R. Fosberg, "Plants and Fall-out", Nature, v. 183, 1959, p. 1448, and Robert A. Conard, Brookhaven National Laboratory report BNL-609, 1961, pp. 85-6.) Stonier believed that radiation kills off most birds and animals that normally keep eat insects, thus allowing plagues of relatively radiation-resistant insects to breed on the surviving vegetation and spread diseases to surviving humans: "The result: insect plagues. Associated with the spread of insects would be the spread of certain insect-borne diseases." This was based on ecological studies by G. M. Woodwell at Brookhaven National Laboratory, who exposed an oak and pine forest on Long Island, New York, to gamma radiation from cesium-137 (G. M. Woodwell, "Effects of Ionizing Radiation on Terrestrial Ecosystems", *Science*, v. 138, 1962, pp. 572-7). Stonier observes on p. 135 that "where the oaks received 5 roentgens per day, the defoliation by insects was about five times as great as that observed in control areas." This cesium-137 gamma exposure has no relevance to the overall effects of radioactive fallout, since it ignores the effects of beta radiation (which is easily stopped by tree bark) upon insects. Stonier cites in his bibliography, but chooses to ignore completely in his text (without explanation) the rapid recovery and lack of insect plagues on Bogombogo Island (codenamed "Belle Island" by America) at the North-West of Eniwetok Atoll in the North Pacific, which was selected for detailed ecological studies following two high yield nuclear weapons tests: Dr Ralph F. Palumbo, Radioactivity and Recovery of the Land Plants at Eniwetok Atoll, 1954-1957, University of Washington report UWFL-66, July 1960 (PDF linked here), see the recovery photos linked here. Bogombogo/Belle Island was 2.55 statute miles (4.10 km) from the centre of Elugelab Island, ground zero of the 10.4 megatons IVY-MIKE thermonuclear weapon test of November 1, 1952, and the 1.69 megatons 80% fission CASTLE-NECTAR test was detonated at the same spot on a barge over the IVY-MIKE crater on May 14, 1954. It received heavy blast and thermal damage, water wave flooding, and fallout radiation including extensive beta and gamma irradiation of plants (gamma of over 850 R/hr at 2 hours after *IVY-MIKE* according to page 34 of of report WT-615, which - from the mean fallout arrival time and peak dose rate time measured under the cloud - suggests an infinite dose of over 8,000 R, and then another 400 R to 6 months after CASTLE-NECTAR and beta doses near contaminated surfaces are about ten times larger, see Stonier p. 143). Dr Palumbo states in his article "Recovery of the Land Plants at Eniwetok Atoll Following a Nuclear Detonation" (Radiation Botany, vol. 1, 1962, pp. 182-9):

#### Pandemics won’t cause human extinction

Sebastian Farquhar 17. Director at Oxford's Global Priorities Project, Owen Cotton-Barratt, a Lecturer in Mathematics at St Hugh’s College, Oxford, John Halstead, Stefan Schubert, Haydn Belfield, Andrew Snyder-Beattie, 01-23-17, "Existential Risk Diplomacy and Governance", GLOBAL PRIORITIES PROJECT 2017, https://www.fhi.ox.ac.uk/wp-content/uploads/Existential-Risks-2017-01-23.pdf

1.1.3 Engineered pandemics For most of human history, natural pandemics have posed the greatest risk of mass global fatalities.37 However, there are some reasons to believe that natural pandemics are very unlikely to cause human extinction. Analysis of the International Union for Conservation of Nature (IUCN) red list database has shown that of the 833 recorded plant and animal species extinctions known to have occurred since 1500, less than 4% (31 species) were ascribed to infectious disease.38 None of the mammals and amphibians on this list were globally dispersed, and other factors aside from infectious disease also contributed to their extinction. It therefore seems that our own species, which is very numerous, globally dispersed, and capable of a rational response to problems, is very unlikely to be killed off by a natural pandemic. One underlying explanation for this is that highly lethal pathogens can kill their hosts before they have a chance to spread, so there is a selective pressure for pathogens not to be highly lethal. Therefore, pathogens are likely to co-evolve with their hosts rather than kill all possible hosts.39

### 2NC---AT: Meltdowns

#### No meltdowns

**Bradley 16**, Arthur Bradley Ph.D., author of the Handbook to Practical Disaster Preparedness for the Family, 3rd Edition, Prepper’s Instruction Manual: 50 Steps to Prepare for any Disaster, Disaster Preparedness for EMP Attacks and Solar Storms (Expanded Edition), and the Frontier Justice (The Survivalist Book 1)," <https://thesurvivalmom.com/long-term-blackout-nuclear-meltdown/)>

Emergency systems Nuclear plants obviously require electricity to operate their cooling pumps, not to mention their control systems. That power is normally tapped off of the electricity that the reactor generates. If the plant is offline, the power is provided by the electrical grid. But what happens when the grid itself goes down? The short answer is that large on-site diesel generators automatically activate to provide electricity. And if those should fail, portable diesel generators, which are also on-site, can be connected. Recent standardization has also ensured that generators can be swapped between plants without the need to retrofit connectors. There are also a couple of additional emergency systems that can be used specifically to cool the reactor. These include the turbine-driven-auxiliary-feedwater pump, which uses steam generated by the reactor to power a cooling turbine. The pump requires an operator, but it runs completely without electricity. This system, however, is meant only for emergency cooling of the reactor during those critical first few days when the fuel rod assemblies are being brought down in temperature, not for long-term cooling. And finally, in the worst case, most plants have a method of bringing in river or ocean water to flood the reactor. This typically damages the cooling system, but again, it helps to cool and cover the reactor core should all else fail. Unlike in other countries, permission from the federal government is not required to flood the reactor. Worst-case power-loss scenario With backup systems to the backup systems, it would seem that there’s nothing to worry about, right? Under all but the direst of circumstances, I think that assessment is correct. However, one could imagine a scenario in which the grid was lost and the diesel generators ran out of fuel. Speaking of fuel, how much is actually stored onsite? It depends on the plant, but at the Watts Bar Nuclear Plant, for example, there is enough fuel to run the emergency diesel generators for at least 42 days. I say at least because it would depend on exactly what was being powered. Once the reactor was cooled down, a much smaller system, known as the Residual Heat Removal System, would be all that was required to keep the fuel assemblies cool, both in the reactor and the spent fuel rods pool. The generators and onsite fuel supply could power that smaller cooling system for significantly longer than if they were powering the larger reactor cooling system. Even if we assumed a worst case of 42 days, it’s hard to imagine a scenario in which that would not be enough time to bring in additional fuel either by land, water, or air. Nonetheless, let’s push the question a little further. What would happen in the unlikely event that the diesel fuel was exhausted? Even with the reactor having been successfully cooled, the biggest risk would continue to be overheating of the fuel rod assemblies, both in the reactor and the spent fuel rods pool. Without circulation, the heat from the fuel rod assemblies could boil the surrounding water, resulting in steam. In turn, the water levels would drop, ultimately exposing the fuel rods to air. Once exposed to air, their temperatures would rise but not to the levels that would melt the zirconium cladding. Thankfully, that means that meltdown would not occur. The steam might well carry radioactive contaminants into the air, but there would be no release of hydrogen and, thus, no subsequent explosions. The situation would certainly be dangerous to surrounding communities, but it wouldn’t be the nuclear Armageddon that many people worry about.

### 2NC---AT: Ozone

#### Turn---HEMPs save the ozone

Cook 9 (Nigel B. PhD Computer Programming, BA Physics ,“Radiation Effects Research Foundation lumps data together to cover up benefits of low dose radiation in Hiroshima and Nagasaki Life Span Study (LSS)!” http://glasstone.blogspot.com/2009/04/radiation-effects-research-foundation.html 4/29/09)

One of several errors in the 1977 3rd edition of the U.S. Department of Defense book *The Effects of Nuclear Weapons* is the false claim on page 78 that air bursts like those over Hiroshima and Nagasaki damage the ozone (O3) layer which exists at altitudes of 15-30 km: '... nuclear explosions are accompanied by the formation [in the blast wave at high overpressures] of oxides of nitrogen [causing the red-brown colour to the rising fireball before condensing water vapor turns it white]. An air burst, for example, is estimated to produce about 1032 molecules of nitrogen oxides per megaton of TNT equivalent ... hence, the nitrogen oxides from such explosions would be expected to enhance mechanisms which tend to decrease the ozone concentration.' This is false because: (1) the initial gamma radiation from both surface and air bursts produce a large ozone layer around the early fireball, shielding the early thermal radiation from the fireball after nuclear explosions, and this ozone production is not mentioned in the book. The mechanism for the production of ozone naturally is the absorption by oxygen molecules (O2) of short-wavelength ultraviolet light, bordering the soft X-ray spectrum. In addition to ozone formation by gamma radiation, nuclear weapons release typically 70-80% of their energy as such soft X-rays in a blackbody distribution (Glasstone and Dolan, pp. 23-5) which is soon degraded by air scatter into ultraviolet radiation which forms ozone. The reaction is: 3O2 + energy -> 2O3. The heat released by the natural ozone-forming process is the reason for the increase in the temperature of the stratosphere with altitude. The natural chemical reaction **produces about 4,500 tons of ozone per second** in the stratosphere, which maintains equilibrium by being broken down at a similar rate by other natural chemical reactions. (2) the nitrogen oxides, largely nitrogen dioxide, in the fireball soon reacts with moisture in the white mushroom cloud to produce nitric acid, which is later precipitated in rainfall along with naturally produced nitric acid from lightning storms, and has no effect on the ozone layer. A lightning storm is qualitatively like a nuclear explosion in that it produces both ozone (from the electrical discharge air ionization) and nitrogen oxides (from the shock waves formed around the extremely hot lightning bolts, which are later heard as thunder). Nitric acid (HNO3) production from the mixing with nitrogen dioxide and water vapour in the fireball is described by the reaction: 3NO2 + H2O -> 2HNO3 + NO then the nitrogen oxide, NO, itself gets oxidized into nitric acid by the reaction: 4NO + 3O2 + 2H2O -> 4HNO3 It was a bigger hoax than Piltdown Man to suggest that nitrogen oxides from nuclear bomb tests could break down ozone; they instead get oxidised into nitric acid by atmospheric moisture and oxygen *before they can reach the ozone layer*. For a published discussion of the nitric acid production in the air around the fireball from an atmospheric nuclear explosion, see Murray Scheibe, *The Increased Attachment Due to Ionization-Induced Smog in EMP Environments,* Mission Research Corporation, California, MRC-R-532, DNA5077F, ADA087850, 1979: 'The increased electron attachment due to HNO3 production in the EMP source region is investigated. The HNO3 produced is found to be roughly linear with the total ionization up to an ionization value of about 2 x 10 to the 16th power ion pairs. Above this, the HNO3 production is less than linear.' P. Goldsmith, A. F. Tuck, J. S. Foot, E. L. Simmons and R. L. Newson, reported in their paper, 'Nitrogen oxides, nuclear weapon testing, Concorde and stratospheric ozone' published in Nature, vol. 244 (1973), issue 5418, pp. 545-551: 'Although amounts of nitrogen oxides equivalent to the output from many concordes were released into the atmosphere when nuclear testing was at its peak, the amount of ozone in the atmosphere was not affected.' In total, the U.S.A, U.S.S.R., U.K., France and China detonated 545.4 megatons in the atmosphere, the peak rate of testing occurring in 1962, see page 295 of Merril Eisenbud and Thomas F. Gesell, *Environmental Radioactivity,* Academic Press, 4th ed., 1997 (the ten biggest atmospheric tests are listed on an earlier post, here). *Finally, for high altitude explosions, there is no high pressure air blast wave, thus no production of nitrogen oxides whatsoever, but the gamma radiation striking the atmosphere still produces ozone!* Therefore, **such** **explosions have the exact opposite effect on the ozone layer to the claims being made**. This has some importance to the issue of holes in the ozone layer by CFCs, and the way to repair such damage.

### 2NC---AT: Growth

#### Economic decline doesn’t cause war---even if it does, we solve escalation

#### Turn---it increases cooperation

**Davis and Pelc 17**, 2017, Christina L. Davis is a Professor of Politics and International Affairs at Princeton; Krzysztof J. Pelc is an Associate Professor of Political Science at McGill University, “Cooperation in Hard Times: Self-restraint of Trade Protection,” Journal of Conflict Resolution, 61(2): 398-429

Conclusion Political economy theory would lead us to expect rising trade protection during hard times. Yet empirical evidence on this count has been mixed. Some studies find a correlation between poor macroeconomic conditions and protection, but the worst recession since the Great Depression has generated surprisingly moderate levels of protection. We explain this apparent contradiction. Our statistical findings show that under conditions of pervasive economic crisis at the international level, states exercise more restraint than they would when facing crisis alone. These results throw light on behavior not only during the crisis, but throughout the WTO period, from 1995 to the present. One concern may be that the restraint we observe during widespread crises is actually the result of a decrease in aggregate demand and that domestic pressure for import relief is lessened by the decline of world trade. By controlling for product-level imports, we show that the restraint on remedy use is not a byproduct of declining imports. We also take into account the ability of some countries to manipulate their currency and demonstrate that the relationship between crisis and trade protection holds independent of exchange rate policies. Government decisions to impose costs on their trade partners by taking advantage of their legal right to use flexibility measures are driven not only by the domestic situation but also by circumstances abroad. This can give rise to an individual incentive for strategic self-restraint toward trade partners in similar economic trouble. Under conditions of widespread crisis, government leaders fear the repercussions that their own use of trade protection may have on the behavior of trade partners at a time when they cannot afford the economic cost of a trade war. Institutions provide monitoring and a venue for leader interaction that facilitates coordination among states. Here the key function is to reinforce expectations that any move to protect industries will trigger similar moves in other countries. Such coordination often draws on shared historical analogies, such as the Smoot–Hawley lesson, which form a focal point to shape beliefs about appropriate state behavior. Much of the literature has focused on the more visible action of legal enforcement through dispute settlement, but this only captures part of the story. Our research suggests that tools of informal governance such as leader pledges, guidance from the Director General, trade policy reviews, and plenary meetings play a real role within the trade regime. In the absence of sufficiently stringent rules over flexibility measures, compliance alone is insufficient during a global economic crisis. These circumstances trigger informal mechanisms that complement legal rules to support cooperation. During widespread crisis, legal enforcement would be inadequate, and informal governance helps to bolster the system. Informal coordination is by nature difficult to observe, and we are unable to directly measure this process. Instead, we examine the variation in responses across crises of varying severity, within the context of the same formal setting of the WTO. Yet by focusing on discretionary tools of protection—trade remedies and tariff hikes within the bound rate—we can offer conclusions about how systemic crises shape country restraint independent of formal institutional constraints. Insofar as institutions are generating such restraint, we offer that it is by facilitating informal coordination, since all these instruments of trade protection fall within the letter of the law. Future research should explore trade policy at the micro level to identify which pathway is the most important for coordination. Research at a more macro-historical scope could compare how countries respond to crises under fundamentally different institutional contexts. In sum, the determinants of protection include economic downturns not only at home but also abroad. Rather than reinforcing pressure for protection, pervasive crisis in the global economy is shown to generate countervailing pressure for restraint in response to domestic crisis. In some cases, hard times bring more, not less, international cooperation.

### 2NC---AT: Water

#### HEMPs don’t risk contamination

Cook 6, Nigel Cook B. PhD Computer Programming, BA Physics “U.K. Home Office Scientific Advisory Branch 'Protect and Survive' civil defense research” [http://glasstone.blogspot.com/2006/08/nuclear-weapons-1st-edition-1956-by.html 7-1-06](http://glasstone.blogspot.com/2006/08/nuclear-weapons-1st-edition-1956-by.html%207-1-06)

'Water: Broadly the same principles apply as with food. Gamma rays have no effect upon water, but certainly in the case of hydrogen bomb explosions the deposition of contaminated dust on catchment areas and open reservoirs would constitute a serious hazard. A special version of the contamination meter has been designed for testing water, and water undertakings are well aware of the problems which face them from this type of hazard should it arise. It is worth noting that an ordinary domestic water softener in good condition completely removes the dangerous elements (strontium and barium) from contaminated water [since fallout from surface bursts on silicate based soil is insoluble glassy spheroids, it doesn't dissolve in water and the soluble activity hazards are trivial unless the detonation occurs on coral, limestone or chalk].

### 2NC---AT: Mutations

#### No correlation

Kearny 3, Cresson, scientist recruited by Nobel Prize Laureate and Manhattan Project Scientist Eugene Wigner as researcher for civil defense Oak Ridge National Laboratory, Nuclear War Survival Skills, <http://www.oism.org/nwss/s73p904.htm>

Myth: Most of the unborn children and grandchildren of people who have been exposed to radiation from nuclear explosions will be genetically damaged or will be malformed, delayed victims of nuclear war. ° Facts: The authoritative study by the National Academy of Sciences, A Thirty Year Study of the Survivors of Hiroshima and Nagasaki, was published in 1977. It concludes that the incidence of abnormalities is no higher among children later conceived by parents who were exposed to radiation during the attacks on Hiroshima and Nagasaki than is the incidence of abnormalities among Japanese children born to un-exposed parents. This is not to say that there would be no genetic damage, nor that some fetuses subjected to large radiation doses would not be damaged. But the overwhelming evidence does show that the exaggerated fears of radiation damage to future generations are not supported by scientific findings.

### 2NC---AT: Gas Tanks

#### No gas tank explosions

**Cook 08**, Nigel B. PhD Computer Programming BA Physics “Professor Bridgeman’s Introduction to the Physics of Nuclear Weapons Effects” http://glasstone.blogspot.com/2008\_11\_01\_archive.html 11/12/08

Nuclear tests on oil and gas storage tanks in the Nevada showed that even at the highest peak overpressures and thermal radiation fluences tested, they did not ignite or explode even where they were blasted off their stands, dented by impacts, or otherwise damaged. The metal containers easily protected the contents from the brief flash of thermal radiation, while the blast wave arriving some time later later failed to cause ignition. Individual leaves cast shadows on wooden poles at Hiroshima, proving that even very thin materials stopped an intense thermal radiation flash. No mention let alone analysis of any of this solid nuclear weapons effects evidence is done by any of the "nuclear winter" doom mongers, who falsely assume that somehow everything will ignite and then undergo sustained burning like a dry newspaper in a direct line of sight of the fireball.

### 2NC---AT: Firestorm

#### Blast would be contained to space

#### But, firestorms a myth anyway

**Cook 6**, Nigel B. PhD Computer Programming BA Physics “Ignition of fires by thermal radiation exposure” http://glasstone.blogspot.com/2006/04/ignition-of-fires-by-thermal-radiation.html 4/7/06

'The density of initial ignitions in the main fire zone, for UK houses, is likely to be very roughly one house in thirty, with a fire-spread factor of about 2 [i.e., each initial ignition will on average ignite one other building by thermal radiation, wind blown convection flames, and hot burning firebrands]. About one house in fifteen is expected to become burnt out. This situation would not constitute a "firestorm" or "mass fire", and the number of fire casualties should be small.' Firestorms have always required at least 50% of buildings to be ignited. A 71 pages long report by Robert M. Rodden, Floyd I. John, and Richard Laurino, *Exploratory Analysis of Fire Storms,* Stanford Research Institute, California, report AD616638, May 1965, identified the following parameters required by all firestorms: (1) More than 8 pounds of fuel per square foot (40 kg per square metre) of ground area. Hence firestorms occurred in wooden buildings, like Hiroshima or the medieval part of Hamburg. The combustible fuel load in London is just 24 kg/m2, whereas in the firestorm area of Hamburg in 1943 it was 156 kg/m2. The real reason for all the historical fire conflagrations was only exposed in 1989 by the analysis of L. E. Frost and E.L. Jones, ‘The Fire Gap and the Greater Durability of Nineteenth-Century Cities’ (*Planning Perspectives,* vol. 4, pp. 333-47). Each medieval city was built cheaply from inflammable ‘tinderbox’ wooden houses, using trees from the surrounding countryside*.* By 1800, Britain had cut down most of its forests to build wood houses and to burn for heating, so the price of wood rapidly increased (due to the expense of transporting trees long distances), until it finally exceeded the originally higher price of brick and stone; so from then on all new buildings were built of brick when wooden ones decayed. This rapidly reduced the fire risk. Also, in 1932, British Standard 476 was issued, which specified the fire resistance of building materials. In addition, new cities were built with wider streets and rubbish disposal to prevent tinder accumulation in alleys, which created more effective fire breaks. (2) More than 50% of structures ignited initially. (3) Initial surface winds of less than 8 miles per hour. (4) Initial ignition area exceeding 0.5 square mile. The fuel loading per unit ground area is equal to fuel loading per unit area of a building, multiplied by the builtupness fraction of the area. E.g., Hamburg had a 45% builtupness (45% of the ground area was actually covered by buildings), and the buildings were multistorey medieval wooden constructions containing 70 pounds of fuel per square foot. Hence, in Hamburg the fuel loading of ground area was 0.45\*70 = 32 pounds per square foot, which was enough for a firestorm. By contrast, modern cities have a builtupness of only 10-25% in most residential areas and 40% in commercial and downtown areas. Modern wooden American houses have a fuel loading of 20 pounds per square foot of building area with a builtupness below 25%, so the fuel loading per square foot of ground is below 20\*0.25 = 5 pounds per square foot, and would not produce a firestorm. Brick and concrete buildings contain on the average about 3.5 pounds per square foot of floor area, so they can't produce firestorms either**, even if they are all ignited.**

### 2NC---AT: Biodiversity

#### HEMPs don’t touch the ground, so they have no effect

#### Turn---*ONLY* a chance mutations mean more biodiversity

**Cook 10,** Nigel B. PhD Computer Programming, BA Physics, “How weapons and war effects exaggerations for disarmament forced Britain to collaborate with evil racist thugs at Munich in 1938, in the name of peace” http://glasstone.blogspot.com/2010/03/lifeboat-analogy-to-civil-defence.html 3/1/10

Stonier cites in his bibliography, but chooses to ignore completely in his text (without explanation) the rapid recovery and lack of insect plagues on Bogombogo Island (codenamed "Belle Island" by America) at the North-West of Eniwetok Atoll in the North Pacific, which was selected for detailed ecological studies following two high yield nuclear weapons tests: Dr Ralph F. Palumbo, Radioactivity and Recovery of the Land Plants at Eniwetok Atoll, 1954-1957, University of Washington report UWFL-66, July 1960 (PDF linked here), see the recovery photos linked here. Bogombogo/Belle Island was 2.55 statute miles (4.10 km) from the centre of Elugelab Island, ground zero of the 10.4 megatons IVY-MIKE thermonuclear weapon test of November 1, 1952, and the 1.69 megatons 80% fission CASTLE-NECTAR test was detonated at the same spot on a barge over the IVY-MIKE crater on May 14, 1954. It received heavy blast and thermal damage, water wave flooding, and fallout radiation including extensive beta and gamma irradiation of plants (gamma of over 850 R/hr at 2 hours after *IVY-MIKE* according to page 34 of of report WT-615, which - from the mean fallout arrival time and peak dose rate time measured under the cloud - suggests an infinite dose of over 8,000 R, and then another 400 R to 6 months after CASTLE-NECTAR and beta doses near contaminated surfaces are about ten times larger, see Stonier p. 143). Dr Palumbo states in his article "Recovery of the Land Plants at Eniwetok Atoll Following a Nuclear Detonation" (Radiation Botany, vol. 1, 1962, pp. 182-9): "The Mike detonation of 1952 had removed most of the plants and top soil from Belle Island, resulting in the depletion of some of the elements essential for plant growth. In spite of these deficiencies regrowth of the plants at Belle Island was rapid. ... A photograph of Belle Island taken [on May 22, 1954] eight days following the Nectar detonation shows the extent of the damage sustained by the plants. From the air the island looked brown and desolate. On closer inspection it was found that most of the plants had been scorched by the heat wave and many of them had been blown over or broken by the blast. ... Recovery of the plants was rapid. ... On the eighth day green buds, 1-3 mm in length, were observed on the stems of Scaevola and Messerschmidia plants. On the thirty-fifth day the shoot leaves were 7-15 cm long, covering much of the old stems and giving the plants a green and healthy appearance. By this time many of the other plants had formed new leaves and three species (Portulaca, Triumfetta, and Messerschmidia) **had produced new flowers and fruits.** The island now had lost its scorched appearance; from the air it looked green rather than brown as it had one month earlier. "In August, three months after the detonation, the plants were growing well and some species, such as Boerhaavia, had produced new flowers. The leaves of most of the species had grown to maximum size, and the branches had grown almost to the pre-Nectar dimensions."

### 2NC---AT: Cancer

#### HEMPs have no fallout

#### No correlations between bombs and cancer

Cook 10 (Nigel B. PhD Computer Programming, BA Physics, “How weapons and war effects exaggerations for disarmament forced Britain to collaborate with evil racist thugs at Munich in 1938, in the name of peace” http://glasstone.blogspot.com/2010/03/lifeboat-analogy-to-civil-defence.html 3/1/10)

The percentage of deaths due to delayed effects has always been dwarfed by the natural cancer and natural genetic defect rates, see for instance Radiation Research, volume 146, 1996, pp. 1-27. In a controlled sample of 36,500 survivors, 89 people got leukemia over a 40 year period, above the natural leukemia number of 176 in the unexposed control group, due to the thermal unstability of DNA which is naturally broken due to random molecular impacts from the Brownian motion of water molecules at body temperature, 37 °C. There were 4,687 other, "solid", tumour cancer deaths, which was 339 above the unexposed matched control group. Hence in the 36,500 Hiroshima survivors over 40 years there were 4,863 cancers of all kinds, which is 428 more than the unexposed control group. Hence, 12.2% naturally died from cancer over 40 years who weren’t exposed to radiation, while for the irradiated bomb survivors the figure was 13.3%. No increase whatsoever in genetic malformations could be detected: any effect was so low it was lost in the statistical noise of natural genetic defects - the effect of body temperature on DNA again - for the sample size. Nature is a way, way, way bigger problem than radiation from nuclear bombs.

### 2NC---AT: Heg

#### Heg guarantees extinction

Willson 13, Humanities PhD New College San Francisco

(S. Brain, JD, American University, “Developing Nonviolent Bioregional Revolutionary Strategies,” http://www.brianwillson.com/developing-nonviolent-bioregional-revolutionary-strategies/)

II. The United States of America is irredeemable and unreformable, a Pretend Society. The USA as a nation state, as a recent culture, is irredeemable, unreformable, an anti-democratic, vertical, over-sized imperial unmanageable monster, sustained by the obedience and cooperation, even if reluctant, of the vast majority of its non-autonomous population. Virtually all of us are complicit in this imperial plunder even as many of us are increasingly repulsed by it and speak out against it. Lofty rhetoric has conditioned us to believe in our national exceptionalism, despite it being dramatically at odds with the empirically revealed pattern of our plundering cultural behavior totally dependent upon outsourcing the pain and suffering elsewhere. We cling to living a life based on the social myth of US America being committed to justice for all, even as we increasingly know this has always served as a cover for the social secret that the US is committed to prosperity for a minority thru expansion at ANY cost. Our Eurocentric origins have been built on an extraordinary and forceful but rationalized dispossession of hundreds of Indigenous nations (a genocide) assuring acquisition of free land, murdering millions with total impunity. This still unaddressed crime against humanity assured that our eyes themselves are the wool. Our addiction to the comfort and convenience brought to us by centuries of forceful theft of land, labor, and resources is very difficult to break, as with any addiction. However, our survival, and healing, requires a commitment to recovery of our humanity, ceasing our obedience to the national state. This is the (r)evolution begging us. Original wool is in our eyes: Eurocentric values were established with the invasion by Columbus: Cruelty never before seen, nor heard of, nor read of – Bartolome de las Casas describing the behavior of the Spaniards inflicted on the Indigenous of the West Indies in the 1500s. In fact the Indigenous had no vocabulary words to describe the behavior inflicted on them (A Short Account of the Destruction of the Indies, 1552). Eurocentric racism (hatred driven by fear) and arrogant religious ethnocentrism (self-righteous superiority) have never been honestly addressed or overcome. Thus, our foundational values and behaviors, if not radically transformed from arrogance to caring, will prove fatal to our modern species. Wool has remained uncleansed from our eyes: I personally discovered the continued vigorous U.S. application of the “Columbus Enterprise” in Viet Nam, discovering that Viet Nam was no aberration after learning of more than 500 previous US military interventions beginning in the late 1790s. Our business is killing, and business is good was a slogan painted on the front of a 9th Infantry Division helicopter in Viet Nam’s Mekong Delta in 1969. We, not the Indigenous, were and remain the savages. The US has been built on three genocides: violent and arrogant dispossession of hundreds of Indigenous nations in North America (Genocide #1), and in Africa (Genocide #2), stealing land and labor, respectively, with total impunity, murdering and maiming millions, amounting to genocide. It is morally unsustainable, now ecologically, politically, economically, and socially unsustainable as well. Further, in the 20th Century, the Republic of the US intervened several hundred times in well over a hundred nations stealing resources and labor, while imposing US-friendly markets, killing millions, impoverishing perhaps billions (Genocide #3). Since 1798, the US military forces have militarily intervened over 560 times in dozens of nations, nearly 400 of which have occurred since World War II. And since WWII, the US has bombed 28 countries, while covertly intervening thousands of times in the majority of nations on the earth. It is not helpful to continue believing in the social myth that the USA is a society committed to justice for all , in fact a convenient mask (since our origins) of our social secret being a society committed to prosperity for a few through expansion at ANY cost. (See William Appleman Williams). Always possessing oligarchic tendencies, it is now an outright corrupt corporatocracy owned lock stock and barrel by big money made obscenely rich from war making with our consent, even if reluctant. The Cold War and its nuclear and conventional arms race with the exaggerated “red menace”, was an insidious cover for a war preserving the Haves from the Have-Nots, in effect, ironically preserving a western, consumptive way of life that itself is killing us. Pretty amazing! Our way of life has produced so much carbon in the water, soil, and atmosphere, that it may in the end be equivalent to having caused nuclear winter. The war OF wholesale terror on retail terror has replaced the “red menace” as the rhetorical justification for the continued imperial plunder of the earth and the riches it brings to the military-industrial-intelligence-congressional-executive-information complex. Our cooperation with and addiction to the American Way Of Life provides the political energy that guarantees continuation of U.S. polices of imperial plunder. III. The American Way Of Life (AWOL), and the Western Way of Life in general, is the most dangerous force that exists on the earth. Our insatiable consumption patterns on a finite earth, enabled by but a one-century blip in burning energy efficient liquid fossil fuels, have made virtually all of us addicted to our way of life as we have been conditioned to be in denial about the egregious consequences outsourced outside our view or feeling fields. Of course, this trend began 2 centuries earlier with the advent of the industrial revolution. With 4.6% of the world’s population, we consume anywhere from 25% to nearly half the world’s resources. This kind of theft can only occur by force or its threat, justifying it with noble sounding rhetoric, over and over and over. Our insatiable individual and collective human demands for energy inputs originating from outside our bioregions, furnish the political-economic profit motives for the energy extractors, which in turn own the political process obsessed with preserving “national (in)security”, e.g., maintaining a very class-based life of affluence and comfort for a minority of the world’s people. This, in turn, requires a huge military to assure control of resources for our use, protecting corporate plunder, and to eliminate perceived threats from competing political agendas. The U.S. War department’s policy of “full spectrum dominance” is intended to control the world’s seas, airspaces, land bases, outer spaces, our “inner” mental spaces, and cyberspaces. Resources everywhere are constantly needed to supply our delusional modern life demands on a finite planet as the system seeks to dumb us down ever more. Thus, we are terribly complicit in the current severe dilemmas coming to a head due to (1) climate instability largely caused by mindless human activities; (2) from our dependence upon national currencies; and (3) dependence upon rapidly depleting finite resources. We have become addicts in a classical sense. Recovery requires a deep psychological, spiritual, and physical commitment to break our addiction to materialism, as we embark on a radical healing journey, individually and collectively, where less and local becomes a mantra, as does sharing and caring, I call it the Neolithic or Indigenous model. Sharing and caring replace individualism and competition. Therefore, A Radical Prescription Understanding these facts requires a radical paradigmatic shift in our thinking and behavior, equivalent to an evolutionary shift in our epistemology where our knowledge/thinking framework shifts: arrogant separateness from and domination over nature (ending a post-Ice Age 10,000 year cycle of thought structure among moderns) morphs to integration with nature, i.e., an eco-consciousness felt deeply in the viscera, more powerful than a cognitive idea. Thus, we re-discover ancient, archetypal Indigenous thought patterns. It requires creative disobedience to and strategic noncooperation with the prevailing political economy, while re-constructing locally reliant communities patterned on instructive models of historic Indigenous and Neolithic villages.

### 2NC---AT: Food

#### No effect there is no fallout

#### Regardless, food wouldn’t be affected

Cook 6, Nigel B. PhD Computer Programming BA Physics “U.K. Home Office Scientific Advisory Branch 'Protect and Survive' civil defence research” http://glasstone.blogspot.com/2006/08/nuclear-weapons-1st-edition-1956-by.html 7-1-06

Food: Gamma rays have no harmful effects upon foodstuffs and the only significant hazard is the deposition of contaminated dist which may eventually find its way into the human system. In the area beyond that of general destruction, where buildings are still standing though damaged, stocks of food, especially those in containers or under cover, are unlikely to be affected. Deposition of contamination on growing crops will, however, be a hazard [although nearly all of it can be removed by washing crops, milling wheat and discarding husks, or by simply discarding the outer leaves of leafy crops]. Only food within the area of complete destruction could be affected by neutron irradiation and become radioactive.

### 2NC---AT: Core Explodes

#### HEMPs don’t ever hit the ground

#### Turn---warming not nukes causes the explosion---its offence

Chalko 4, Tom J. Chalko, PhD, 2004, “No second chance?¶ Can Earth explode as a result of Global Warming?” <https://pdfs.semanticscholar.org/13b5/68fd67265b8429ad8ed4a206df6ecb7d3b9a.pdf> //jyoung

Abstract: The heat generated inside our planet is predominantly of radionic (nuclear) origin. Hence, Earth in¶ its entirety can be considered a slow nuclear reactor with its solid ”inner core” providing a major contribution to the total energy output. Since radionic heat is generated in the entire volume and cooling can only occur at the surface, the highest temperature inside Earth occurs at the center of the inner core. Overheating the center of the inner core reactor due to the so-called greenhouse effect on the surface of Earth may cause a meltdown condition,¶ an enrichment of nuclear fuel and a gigantic atomic explosion.¶ Summary: Consequences of global warming are far more serious than previously imagined. The REAL danger for our entire civilization comes not from slow climate changes, but from overheating of the planetary interior. Life on Earth is possible only because of the efficient cooling of the planetary interior - a process that is limited¶ primarily by the atmosphere. This cooling is responsible for a thermal balance between the heat from the core reactor, the heat from the Sun and the radiation of heat into space, so that the average temperature on Earth’s¶ surface is about 13 degrees Celsius.¶ This article examines the possibility of overheating and the ”meltdown” of the solid planetary core due to the¶ atmospheric pollution trapping progressively more solar heat (the so-called greenhouse effect) and reducing the¶ cooling rate of the planetary interior.¶ The most serious consequence of such a ”meltdown” could be centrifugal segregation of unstable isotopes in¶ the molten part of the spinning planetary core. Such segregation can ”enrich” the nuclear fuel in the core to the¶ point of creating conditions for a chain reaction and a gigantic atomic explosion. Will Earth become another¶ ”asteroid belt” in the Solar system?¶ It is common knowledge (experiencing seasons) that solar heat is the dominant factor that determines temperatures on the surface of Earth. Under the polar ice however, the contribution of solar heat is minimal and this¶ is where the increasing contribution of the heat from the planetary interior can be seen best. Rising polar ocean¶ temperatures and melting polar ice caps should therefore be the first symptoms of overheating of the inner core¶ reactor.¶ While politicians and businessmen debate the need for reducing greenhouse emissions and take pride to evade¶ accepting any responsibility, the process of overheating the inner core reactor has already begun - polar oceans¶ have become warmer and polar caps have begun to melt. Do we have enough imagination, intelligence and¶ integrity to comprehend the danger before the situation becomes irreversible? There will be NO SECOND¶ CHANCE...

### 2NC---AT: Oceans

HEMPs don’t touch oceans

#### Even nuke war wouldn’t destroy oceans

IHT 8, International Herald Tribune, http://www.nytimes.com/2008/04/15/world/asia/15iht-bikini.1.11998906.html?\_r=1

**CANBERRA —** Coral is again flourishing in the crater left by the largest nuclear weapon ever detonated by the United States, 54 years after the blast on Bikini Atoll, marine scientists said Tuesday. A team of research divers visited Bravo crater, ground zero for the test of a thermonuclear weapon in the Marshall Islands on March 1, 1954, and found large numbers of fish and coral growing, although some species appeared to be locally extinct. "I didn't know what to expect, some kind of moonscape perhaps, but it was incredible," Zoe Richards, from Australia's James Cook University, said about the team's trip to the atoll in the South Pacific. "We saw communities not too far from any coral reef, with plenty of fish, corals and action going on, some really striking individual colonies," she said. The 15-megaton hydrogen bomb was 1,000 times more powerful than the weapon that destroyed Hiroshima, Japan, in 1945, and it vaporized islands with temperatures hitting 55,000 degrees Celsius, or about 99,000 degrees Fahrenheit. The Bikini blast shook islands as far away as 200 kilometers, or 125 miles.

### 2NC---AT: Unpredictable

**After thousands of nuclear detonations and simulations, we know exactly what will happen in a nuclear war  
Cook 10**, Nigel B. PhD Computer Programming BA Physics, “[Dirkwood Corporation data on the mortality versus Thermal Radiation and Blast Parameters in Hiroshima, Nagasaki, and the Texas City Disaster](http://glasstone.blogspot.com/2010/10/dirkwood-analysis-of-mortality-versus.html)” [http://glasstone.blogspot.com/2010/10/dirkwood-analysis-of-mortality-versus.html 10/7/10](http://glasstone.blogspot.com/2010/10/dirkwood-analysis-of-mortality-versus.html%2010/7/10)

Sequence of events: 1. nuclear weapons effects data is kept secret, 2. critics of civil defense policy openly publish claims that the secret data does not exist ("nobody knows the effects of nuclear weapons reliably"), 3. nobody in government is able to disclose the facts, 4. critics of civil defense policy eventually manage to persuade the public (which is denied the secret data) that the government really has no idea what the threats are or how to combat them, 5. the public end up influencing government policy through the democratic process. This is what happened in the 1920s and 1930s. In 1989, Philip J. Dolan's 1972 two-part Capabilities of Nuclear Weapons, DNA-EM-1, 1972, originally Secret - Restricted Data, was declassified with some page change updates from 1978 and 1981. Chapters 5 and 7 of this manual are online on this blog, and we have summarized some updates which have been made to this manual which have become declassified, on blast, nuclear radiation, thermal radiation (a massive change of thermal partitions and transmission data), cratering (massive changes, reducing crater sizes at high yields), fallout, and space effects. In 1992, I requested the earlier Capabilities of Atomic Weapons from the the Library U. K. Atomic Weapons Research Establishment (now AWE), and was told that Dolan's more recent *Capabilities of Nuclear Weapons* was then in the British Library on Microfiche. In 1993, William M. Arkin of the Natural Resources Defense Council requested (under the American Freedom of Information Act) the successor, Harold L. Brode's 1992 version of EM-1, which was subsequently slowly declassified with some important deletions (it is much longer than Dolan's version, with each chapter a separate lengthy document). Arkin writes about receiving the updated version in the July 1997 issue of the Bulletin of the Atomic Scientists, leering at the depth of research and totally ignoring the civil defense implications of accurate effects data for survival and damage mitigation during an enemy attack. The Natural Resources Defense Council apparently has decided to keep the actual details of the declassified data from the latest version under wraps (maybe it doesn't fit their Cold War era political agenda, whereby we will be safe when we disarm). At the same time that it was being declassified, the people of the Defense Special Weapons Agency who were declassifying it decided to summarize the declassified material (which is not everything) into a single brief summary volume. This was edited in 1996 by John A. Northrop (who as Deputy Director of the U. S. Defense Nuclear Agency in 1972, wrote the notice of promulgation on page iii of the 1972 edition of *Capabilities of Nuclear Weapons*). Northrop headed S-cubed research into nuclear terrorism effects in the 1970s and 1980s, e.g. J. A. Northrop, The role of civil preparedness in nuclear terrorism mitigation planning, Systems, Science and Software, Washington Research Center, report SSS-R-80-4185, ADA081560 (1979): “An assessment of the objectives and capabilities of terrorist groups leads to the conclusion that although an explosion of a small nuclear bomb in a city is improbable, planning for an adequate emergency response is necessary. At the Federal level current planning places primary emphasis on management of terrorist events themselves, rather than on subsequent mitigation. The responsible agencies that will be involved must develop working relationships which will allow a rapid and coherent response to the massive damage and casualties that would result. Some state planning has been made, but local authority planning is very limited. These plans, and their integration at all levels of government, would be greatly enhanced by the drifting of models which could be adapted to individual state and local requirements. Preliminary assessments of effects of low-yield nuclear explosions in cities show significant changes, produced by massive building structures, to conventional data. Such data when further developed will provide important guidance to urban nuclear emergency planners. A new methodology is proposed for modeling the economic impact of terrorist attacks tailored to the nationwide incapacitation of unique industrial processes.” See also J. A. Northrop, B. E. Freeman, and R. E. Duff, *Program to Develop and Codify Urban Nuclear Weapon Effects. Final Report,* S-Cubed, La Jolla, California, report SSS-R-83-6228, ADA284141 (1983): “A program is developed which, if implemented, would assess those effects of a detonation of a terrorist nuclear weapon located in a highly built-up urban area which are unique to the environment, and consider possible techniques for damage limitation. It is assumed that the weapon is of low-yield, that its hiding place can be located, and that there is sufficient time before its detonation for the application of mitigation techniques. A series of radiation-hydrodynamic, hydrodynamic, radiation transport, and fallout calculations are defined which would provide insight into the modification to classic nuclear phenomenology produced by unique urban hiding locations, possible mitigating of the blast and thermal threats by materials deliberately placed around the weapon, and changes in the propagation of blast, fallout, and thermal radiation due to surrounding buildings. It is anticipated that, were such a theoretical study program to be implemented, it would provide useful guidance to nuclear emergency response planners.” Northrop's 1996 Handbook of Nuclear Weapon Effects: Calculational Tools Abstracted from DSWAs Effects Manual One (EM-1) (Defense Weapons Special Agency, Washington, D.C.) is unclassified but of limited distribution, exactly the status of Dr Carl F. Miller's report *Fallout and Radiological Countermeasures* between 1963-9. But it contains data on the prompt high frequency EMP source (the prompt gamma ray output of modern nuclear weapon designs) and the spectrum of the thermal radiation as a function of burst altitude and weapon yield which is vital for civil defense and is omitted from the 1977 edition of Glasstone and Dolan's *Effects of Nuclear Weapons*. Dolan's 1972 *Capabilities of Nuclear Weapons* DNA-EM-1 in Table 5-3 and Table 5-1 as well as many graphs of data, analyzed the radiation outputs from eight types of nuclear weapons. The revised version by Brode analyzes 13 nuclear weapons designs, and Northrop's 1996 extract handbook gives data from 4 of these designs: type 3 (subkiloton, unboosted fission implosion), type 5 (boosted fission implosion, 1 to a few tens of kt), type 8 (thermonuclear secondary with single yield, a few tens of kt to 5 Mt), and type 13 (the enhanced radiation weapon, 1-10 kt). Most fission weapons have neutron outputs on the order of 1023 neutrons/kt (see for instance Table 5-1 in DNA-EM-1), the enhanced radiation weapon emits 1.77 x 1024 neutrons/kt, according to Northrop (1996). Northrop's data on prompt gamma ray output from different nuclear weapon designs. The shocking thing is the prompt gamma ray output (from fission and inelastic neutron scattering reactions w ith heavy nuclei in the bomb over the first 20 nanoseconds). An enhanced radiation bomb emits a prompt gamma ray output of 6.70 x 1023 MeV/kt with a mean gamma ray energy of 2.0 MeV, according to Northrop (1996). This is about 2.6 % of the weapon yield! Dolan's DNA-EM-1 chapters 5 and 7 (1978) gave a figure of 0.1-0.5 % for the range of prompt gamma radiation outputs. Additionally, Northrop states that the prompt gamma ray out for the type 8 thermonuclear secondary weapon with a single yield of up to 5 Mt is 3.55 x 1023Wkt-0.29 MeV/kt, i.e. 1.4Wkt-0.29 % of yield, which is 0.18 for 1 Mt, not 0.1 % as suggested by most unclassified EMP prediction treatments! The high prompt gamma ray output from the neutron bomb provides a example of how the weapon design can be engineered to produce immense outputs of EMP from a high altitude detonation. In fact, the use of enhanced neutron radiation bombs at high altitude has always been on the cards for ABM defenses, since one way to neutralize incoming enemy warheads is to melt down the fissile material they contain, using the neutron radiation from a defensive warhead. Neutron bombs have always been of relevance to ABM defense as well as deterring massed tank invasions. Data on the thermal radiation spectrum from nuclear weapons in Northrop's limited-distribution handbook. This data is needed in the public domain to help counter anti-civil defense propaganda about there being no reliable data on the details of burn-causing thermal radiation. In fact, **extensive data exists** on the effects of nuclear weapons from intensive scientific studies at weapon tests and also from extensive computer simulations. The reason that critics of civil defense can falsely claim nothing much is known and get away with such a claim is simply that there are restraints on the publication of data which is needed for making a convincing case for civil defense. It's either secret or (when finally declassified) its "not secret but limited in distribution", which amounts to the same thing for the public (which just wants to know what the facts really are, so they can decide whether civil defense is justified by the data, for themselves).

## 2NC---AT Indicts

### 2NC---AT: Farley

#### No BMD incentive - commission doesn’t advocate either

Pry 10**,** Peter Vincent, served on the staffs of the Commission to Assess the Threat to the United States from Electromagnetic Pulse Attack, the U.S. House Armed Services Committee, and the Central Intelligence Agency. He currently is director of the U.S. Nuclear Strategy Forum and president of EMPACT America. “What America Needs to Know About EMPs,” <http://www.foreignpolicy.com/articles/2010/03/17/the_truth_about_emps?page=full>

Weinberger cites New Republic senior editor Michael Crowley as an example of a critic of the EMP Commission. Crowley is indeed a typical critic of the EMP Commission -- he knows nothing about EMP and obviously never bothered to read the EMP Commission's reports. Crowley alleges in his article "The Newt Bomb" that the EMP Commission is really a conspiracy to promote national missile defense and preventive war against Iran. Both claims are untrue, as is evident from the EMP Commission's recommendations, which focus on passive defense of critical infrastructures. Far from "hyping" the EMP threat, in its reports and public testimony, the commission went to great lengths to emphasize that there is no excuse for the United States to be vulnerable to nuclear or natural EMP and that the country can protect itself with a little effort and very modest investment. Most of our recommendations are common-sense solutions -- good planning, training, selective hardening -- that have universal applicability against other threats, including cyberwarfare, sabotage, and natural disasters. According to one estimate, the worst consequences of an EMP event could be avoided for as little as $100 million, by selectively protecting key transformers in the electric grid. Unlike other weapon-of-mass-destruction threats, which apparently will always be with us, the EMP Commission offered a way to put the EMP threat out of business.

### 2NC---AT: Butt

#### Butt’s calculations are biased and inaccurate

**Radasky 10**, awarded Lord Kelvin Medal by the IEC for his electrical expertise, July, Dr. William Radasky served on the EMP Commission staff and was awarded the Lord Kelvin Medal by the International Electrotechnical Commission (IEC) for his contributions to developing standards for the protection of electronic equipment from high power electromagnetic threats, including HEMP. He is also an EMP Fellow, an IEEE Fellow, and has published over 400 reports, papers and articles dealing with high power EM transients. Dr. Peter Vincent Pry served on the staffs of the EMP Commission, the House Armed Services Committee, the Central Intelligence Agency, and currently is Director of the United States Nuclear Strategy Forum and President of EMPact America. “Rebuttal to “The EMP threat: fact, fiction, and response,” <http://www.thespacereview.com/article/1656/1>

Dr. Butt’s calculations are deliberately biased to limit the EMP effects by first selecting a threat yield of 1-kiloton, and then claiming effects “only” in one state. He argues that terrorists or rogue states using a 1-kiloton weapon would want to optimize the EMP field strength by detonating at the lowest possible altitude, trading a gain in increased EMP field strength for a greatly reduced area of effect, limited to a radius on the ground of 725 kilometers. Dr. Butt: …the “sweet spot” for maximizing the EMP lethality of such weapons would be a detonation altitude of about 40 kilometers--significantly higher, or lower, and the peak fields at ground level will decrease....For 40 kilometers altitude, the maximum extent of the induced EMP E1-fields is within a 725-kilometer radius. However, contrary to Dr. Butt, terrorists or rogue states may prefer to trade reduced EMP field strength for a gain in area coverage, detonating their low-yield nuclear weapon at a higher altitude, covering the eastern part of the United States with an EMP field. Dr. Butt is mistaken that only the maximum region of the E1 HEMP field is important. That is completely wrong, as the peak electric field is not the only important parameter for coupling to cables and equipment. Extensive research has found that more horizontal angles of incidence of the E1 HEMP are much more efficient in coupling to lines, despite their lower field strengths. The many errors in Dr. Butt’s understanding of HEMP phenomenology appear to result from a lack of familiarity with some of the most basic texts on EMP, such as E.F. Vance’s Coupling to Shielded Cables and MIL-STD-188-125, which provides a method of hardening and testing ground-based C4I facilities to HEMP. The MIL-STD-464 cited by Dr. Butt as a source is recognized among specialists as having little value for EMP aspects.

#### Butt quotes experts out of context

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Other errors Dr. Butt tries hard to mislead readers that Department of Defense and other authoritative Commissions disagree with the EMP Commission, and do not regard a nuclear EMP attack as a threat—by quoting outdated or obsolete opinions. For example, Dr. Butt quotes General Marsh dismissing the EMP threat in 1997—four years before the establishment of the EMP Commission. Dr. Butt misrepresents the views of the 2009 Strategic Posture Commission on the EMP threat, implying that the Strategic Posture Commission disagrees with the EMP Commission. Dr. Butt: “The 2009 Strategic Posture Commission puts it more delicately by saying that ‘the Commission is divided over how imminent a threat this is…’” Dr. Butt quotes the Strategic Posture Commission out of context. The Strategic Posture Commissioners are unanimous that EMP is a threat, disagreeing only over whether the threat is immediate or longer term. In fact, the Strategic Posture Commission independently arrived at the same consensus view as the EMP Commission—that terrorists and rogue states could inflict a catastrophic EMP attack on the United States. The Strategic Posture Commission urges immediate implementation of EMP Commission recommendations to protect the national power grid. According to America’s Strategic Posture: The Final Report of the Congressional Commission on the Strategic Posture of the United States: Lastly, the United States should take steps to reduce the vulnerability of the nation and the military to attacks with weapons designed to produce electromagnetic pulse (EMP) effects. We make this recommendation although the Commission is divided over how imminent a threat this is. Some commissioners believe it to be a high priority threat, given foreign activities and terrorist intentions. Others see it as a serious potential threat, given the high level of vulnerability. Those vulnerabilities are of many kinds. U.S. power projection forces might be subjected to an EMP attack by an enemy calculating—mistakenly that such an attack would not involve risks of U.S. nuclear retaliation. The homeland might be attacked by terrorists or even by state actors with an eye to crippling the U.S. economy and American society. From a technical perspective, it is possible that such attacks could have catastrophic consequences… The EMP Commission has recommended numerous measures that would mitigate the damage. The Stimulus Bill of February 9, 2009, allocates $11 billion to DOE for “smart grid activities, including to modernize the electric grid.” Unless such improvements in the electric grid are focused in part on reducing EMP vulnerabilities, vulnerability might well increase.32 Dr. Butt misrepresents the official position of the Department of Defense on the EMP threat. The Secretary of Defense and his representatives have notified the Congress by letter and in hearings that the department concurs with the EMP Commission’s threat assessment, and will implement the commission’s recommendations. A new directorate has been created within the Office of the Secretary of Defense dedicated to EMP protection. Military training events and exercises were held in 2010 featuring EMP scenarios. Under the FY2009 National Defense Authorization Act, the Defense Department is required to report to Congress until 2015 on progress toward implementing the EMP Commission recommendations. Dr. Butt asserts the following: “Although the EMP Commissioners have offered a Chinese-language PowerPoint presentation outlining the effects of EMP devices as evidence that China has an interest in such weapons, this presentation is actually of Taiwanese origin… and it is not pertinent to any official Chinese military document.” No member or staff of the EMP Commission has ever misrepresented the Taiwanese PowerPoint on EMP as originating from the People’s Republic of China. However, Taiwan is an excellent source of intelligence on China, just as Israel is on the Middle East, and South Korea is on North Korea. The briefing, from Taiwan’s National Defense University, alleges that China has developed Super-EMP weapons, having very low yield, working from nuclear weapons design information stolen from the United States. There is no dearth of Chinese military doctrinal writings on EMP and its efficacy against the United States.33 Dr. Butt’s reliance on the work of Sandia Labs examining the vulnerability of nuclear power plants in the early 1980s, nearly 30 years ago, is misplaced, as the work is now obsolete. Digital controls were not as prevalent then, or as vulnerable to E1, as they are today. Dr. Butt’s statement that the “Earth’s magnetic field varies across the globe and also varies with time at a given location” apparently confuses the geomagnetic field created by the Earth’s core with the very minor variations in the geomagnetic field by the telluric variations (typically a few nT). The geomagnetic field variation induced by a geomagnetic storm or nuclear E3 HEMP can be on the order of several thousand nT. Finally, Dr. Butt describes Dr. Peter Vincent Pry as one of the EMP Commissioners. Dr. Pry was not an EMP Commissioner, but was on the Commission staff.

### 2NC---AT: Hall

#### 1. Prefer Pry he’s the most qualified and has access to classified info on nuclear tests Hall is a rando posting on quora

#### 2. There’s no hardening

Weiss ’19 [Matthew and Martin; May 29; National Sales Director at United Medical Instruments, UMI and Research assistant at the American Jewish University; Neurosurgeon at UCLA-Olive View Medical Center; Energy, Sustainability, and Society, “An assessment of threats to the American power grid,” vol. 9]

The EMP Commission, in its 2008 report, found that it is not practical to try to protect the entire electrical power system or even all high-value components. It called however for a plan designed to reduce recovery and restoration times and minimize the net impact of an event [20]. This would be accomplished by “hardening” the grid, i.e., actions to protect the nation’s electrical system from disruption and collapse, either natural or man-made [21]. The shielding is accomplished through surge arrestors and similar devices [22]. The cost to harden the grid, from our tabulation of Congressional EMP figures, is $3.8 billion. There has been no hardening of the grid

#### 3. Regardless HEMPs go above the hardening standard

### 2NC---AT: EMP Commission Indict

#### The EMP Commission should come first in threat assessment

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Methodology Dr. Butt makes much of the fact that there are still individuals who disagree with the EMP Commission’s threat assessment. Dr. Butt’s methodology appears to assume that any dissent from the EMP Commission automatically proves that the commission is wrong. But there will always be those who disagree with any Commission’s findings—no matter that the methodology, research, and analysis are excellent—just as there are those who disagree with the 9/11 Commission, the WMD Commission, or any other commission one cares to name. The best any commission can do is to hear all points of view, rigorously and fairly examine everyone’s arguments and data, fully and fairly debate the facts, and come to a consensus judgment, submit that judgment for review by expert individuals and institutions, and based on everything learned from this process, arrive at a final consensus, if possible. This the EMP Commission did, and achieved a consensus among the commissioners, who represented a wide array of backgrounds and viewpoints. There will always be those who disagree with the EMP Commission. Nonetheless, the EMP Commission’s threat assessment and recommendations—the product of eight years of intensive research and analysis unprecedented for this issue—represents the best work so far produced by this nation on EMP, and is the best informed basis for national security policy.

#### The EMP commission is the most objective and informative basis for EMP policy

Pry 10**,** Peter Vincent, served on the staffs of the Commission to Assess the Threat to the United States from Electromagnetic Pulse Attack, the U.S. House Armed Services Committee, and the Central Intelligence Agency. He currently is director of the U.S. Nuclear Strategy Forum and president of EMPACT America. “What America Needs to Know About EMPs,” <http://www.foreignpolicy.com/articles/2010/03/17/the_truth_about_emps?page=full>

Weinberger accuses the EMP Commission of deliberately "exaggerating the capabilities of a potential EMP attack." This is a serious allegation, as deliberately misrepresenting the facts about the EMP threat would constitute an ethical and legal violation. As evidence, Weinberger offers the opinion of Philip Coyle of the Center for Defense Information. Whatever Coyle's opinion may be, he is no authority on the commission's work and has participated in none of it. In any case, even he only accuses the EMP Commission of using "inflammatory language" but not of misrepresenting facts. As a member of the EMP Commission's staff, I can assure the public that the EMP commissioners adhered to the highest standards of professionalism and scientific objectivity. If the findings of the EMP Commission sound alarming, it is because they are. The EMP commissioners did their duty and followed the data. The EMP Commission's threat assessment and recommendations represent the best work so far produced by the United States on EMP and is the best-informed basis for national security policy. The EMP Commission's conclusions were also backed up by the findings of another congressional commission, this one chaired by former Defense Secretary William Perry. Their 2009 report independently concluded that terrorists, rogue states, China, and Russia could pose an EMP threat to the United States and advocated immediate implementation of the EMP Commission's recommendations. The National Academy of Sciences has also urged implementation of the EMP Commission's recommendations. Are all of these commissions and blue-ribbon scientific studies a conspiracy to "hype" the EMP threat? Weinberger correctly observes that there "has long been debate about just how devastating an EMP weapon would be on the United States." This is exactly why Congress established the EMP Commission, after five years of congressional hearings on EMP that produced no consensus about the threat. There will always be individuals who disagree with any commission's findings -- no matter that the methodology, research, and analysis are excellent -- just as there are those who disagree with the 9/11 Commission, the weapons-of-mass-destruction commission, the Warren Commission, or any other commission. Weinberger alleges that the EMP Commission and concern about the EMP threat is strictly partisan. But the EMP Commission's bipartisan credentials are impeccable. It was established by a Republican-dominated Congress in 2001 and re-established by a Democrat-dominated Congress in 2006. Commissioners were appointed on a bipartisan basis. The EMP threat, and the necessity to do something about it, is one of the few issues on which Democrats and Republicans in Congress are working together.

## 2NC---AT: AI D

### 2NC---AI Impact

#### AI outweighs

#### a. On magnitude---AI engineers a dystopia worse than extinction.

Toby Ord 20, senior research fellow in philosophy at Oxford University and world-renowned risk-assessment expert who has advised WHO, the World Bank, the WEF, and the US National Intelligence Council, 3/3/2020, *The Precipice: Existential Risk and the Future of Humanity*, pp. 194-196, cc

Losing our potential means getting locked into a bad set of futures. We can categorize existential catastrophes by looking at which aspects of our future get locked in. This could be a world without humans (extinction) or a world without civilization (unrecoverable collapse). But it could also take the form of an unrecoverable dystopia—a world with civilization intact, but locked into a terrible form, with little or no value.116

[Footnote 116]

In the worst cases, perhaps even negative value—an outcome worse than extinction.

[Footnote 116 ends]

This has not happened yet, but the past provides little comfort. For these kinds of catastrophes only became possible with the advent of civilization, so our track record is much shorter. And there is reason to think that the risks may increase over time as the world becomes more interconnected and experiments with new technologies and ideologies.

I won’t attempt to address these dystopian scenarios with the same level of scientific detail as the risks we’ve explored so far, for the scenarios are diverse and our present understanding of them very limited. Instead, my aim is just to take some early steps toward noticing and understanding these very different kinds of failure.

We can divide the unrecoverable dystopias we might face into three types, on the basis of whether they are desired by the people who live in them. There are possibilities where the people don’t want that world, yet the structure of society makes it almost impossible for them to coordinate to change it. There are possibilities where the people do want that world, yet they are misguided and the world falls far short of what they could have achieved. And in between there are possibilities where only a small group wants that world but enforces it against the wishes of the rest. Each of these types has different hurdles it would need to overcome in order to become truly locked in.

Note that to count as existential catastrophes, these outcomes don’t need to be impossible to break out of, nor to last millions of years. Instead, the defining feature is that entering that regime was a crucial negative turning point in the history of human potential, locking off almost all our potential for a worthy future. One way to look at this is that when they end (as they eventually must), we are much more likely than we were before to fall down to extinction or collapse than to rise up to fulfill our potential. For example, a dystopian society that lasted all the way until humanity was destroyed by external forces would be an existential catastrophe. However, if a dystopian outcome does not have this property, if it leaves open all our chances for success once it ends—it is a dark age in our story, but not a true existential catastrophe.

The most familiar type is the enforced dystopia. The rise of expansionist totalitarianism in the mid-twentieth century caused intellectuals such as George Orwell to raise the possibility of a totalitarian state achieving global dominance and absolute control, locking the world into a miserable condition.117 The regimes of Hitler and Stalin serve as a proof of principle, each scaling up to become imperial superpowers while maintaining extreme control over their citizens.118 However, it is unclear whether Hitler or Stalin had the expansionist aims to control the entire world, or the technical and social means to create truly lasting regimes.119

This may change. Technological progress has offered many new tools that could be used to detect and undermine dissent, and there is every reason to believe that this will continue over the next century. Advances in AI seem especially relevant, allowing automated, detailed monitoring of everything that happens in public places— both physical and online. Such advances may make it possible to have regimes that are far more stable than those of old.

That said, technology is also providing new tools for rebellion against authority, such as the internet and encrypted messages. Perhaps the forces will remain in balance, or shift in favor of freedom, but there is a credible chance that they will shift toward greater control over the populace, making enforced dystopias a realistic possibility.

A second kind of unrecoverable dystopia is a stable civilization that is desired by few (if any) people. It is easy to see how such an outcome could be dystopian, but not immediately obvious how we could arrive at it, or lock it in, if most (or all) people do not want it.120

The answer lies in the various population-level forces that can shape global outcomes. Well-known examples include market forces creating a race to the bottom, Malthusian population dynamics pushing down the average quality of life, or evolution optimizing us toward the spreading of our genes, regardless of the effects on what we value. These are all dynamics that push humanity toward a new equilibrium, where these forces are finally in balance. But there is no guarantee this equilibrium will be good.

For example, consider the tension between what is best for each and what is best for all. This is studied in the field of game theory through “games” like the prisoner’s dilemma and the tragedy of the commons, where each individual’s incentives push them toward producing a collectively terrible outcome. The Nash equilibrium (the outcome we reach if we follow individual incentives) may be much worse for everyone than some other outcome we could have achieved if we had overcome these local incentives.

The most famous example is environmental degradation, such as pollution. Because most of the costs of pollution aren’t borne by the person who causes it, we can end up in a situation where it is in the self-interest of each person to keep engaging in such activities, despite this making us all worse off. It took significant moral progress and significant political action to help us break out of this. We may end up in new traps that are even harder to coordinate our way out of. This could be at the level of individuals, or at the level of groups. We could have nations, ideological blocs, or even planets or descendent species of Homo sapiens locked in harmful competition—doing what is best for their group, but bad for groups on the whole.

I don’t know how likely it is that we suffer a sufficiently bad (and sufficiently intractable) tragedy of the commons like this. Or that we are degraded by evolutionary pressures, or driven to lives of very low quality by Malthusian population dynamics, or any other such situation. I’d like to hope that we could always see such things coming and coordinate to a solution. But it’s hard to be sure that we could.

The third possibility is the “desired dystopia.”121 Here it is easier to see how universal desire for an outcome might cause us to lock it in, though less clear how such an outcome could be dystopian. The problem is that there are many compelling ideas that can radically shape our future —especially ideologies and moral theories, as these make direct normative claims about the world we should strive to create. If combined with the technological or social means for instilling the same views in the next generation (indoctrination, surveillance), this has the potential to be disastrous.

The historical record is rife with examples of seriously defective ideologies and moral views that gripped large parts of the world. Moreover, even reasonable normative views often recommend that they be locked in—for otherwise a tempting rival view may take over, with (allegedly) disastrous results.122 Even though the most plausible moral views have a lot of agreement about which small changes to the world are good and which are bad, they tend to come strongly apart in their recommendations about what an optimal world would look like. This problem thus echoes that of AI alignment, where a strong push toward a mostly correct ideal could instead spell disaster.

Some plausible examples include: worlds that completely renounce further technological progress (which ensures our destruction at the hands of natural risks),123 worlds that forever fail to recognize some key form of harm or injustice (and thus perpetuate it blindly), worlds that lock in a single fundamentalist religion, and worlds where we deliberately replace ourselves with something that we didn’t realize was much less valuable (such as machines incapable of feeling).124

All of these unrecoverable dystopias can be understood in terms of lock-in. Key aspects of the future of the civilization are being locked in such that they are almost impossible to change. If we are locked into a sufficiently bad set of futures, we have an unrecoverable dystopia; an existential catastrophe.

#### b. On probability---dwarfs the risks from nuke war, climate change, AND pandemics *COMBINED*.

Toby Ord 20, senior research fellow in philosophy at Oxford University and world-renowned risk-assessment expert who has advised WHO, the World Bank, the WEF, and the US National Intelligence Council, 3/3/2020, *The Precipice: Existential Risk and the Future of Humanity*, pp. 194-196, cc

The numbers represent my overall degrees of belief that each of the catastrophes will befall us this century. This means they aren’t simply an encapsulation of the information and argumentation in the chapters on the risks. Instead, they rely on an accumulation of knowledge and judgment on each risk that goes beyond what can be distilled into a few pages. They are not in any way a final word, but are a concise summary of all I know about the risk landscape.

Existential catastrophe via: Asteroid or comet impact Chance within next 100 years: ∼ 1 in 1,000,000

Existential catastrophe via: Supervolcanic eruption Chance within next 100 years: ∼ 1 in 10,000

Existential catastrophe via: Stellar explosion Chance within next 100 years: ∼ 1 in 1,000,000,000

Existential catastrophe via: Total natural risk Chance within next 100 years: ∼ 1 in 10,000

Existential catastrophe via: Nuclear war Chance within next 100 years: ∼ 1 in 1,000

Existential catastrophe via: Climate change Chance within next 100 years: ∼ 1 in 1,000

Existential catastrophe via: Other environmental damage Chance within next 100 years: ∼ 1 in 1,000

Existential catastrophe via: “Naturally” arising pandemics Chance within next 100 years: ∼ 1 in 10,000

Existential catastrophe via: Engineered pandemics Chance within next 100 years: ∼ 1 in 30

Existential catastrophe via: Unaligned artificial intelligence Chance within next 100 years: ∼ 1 in 10

TABLE 6.1 My best estimates for the chance of an existential catastrophe from each of these sources occurring at some point in the next 100 years (when the catastrophe has delayed effects, like climate change, I’m talking about the point of no return coming within 100 years). There is significant uncertainty remaining in these estimates and they should be treated as representing the right order of magnitude—each could easily be a factor of 3 higher or lower. Note that the numbers don’t quite add up: both because doing so would create a false feeling of precision and for subtle reasons covered in the section on “Combining Risks.”

One of the most striking features of this risk landscape is how widely the probabilities vary between different risks. Some are a million times more likely than others, and few share even the same order of magnitude. This variation occurs between the classes of risk too: I estimate anthropogenic risks to be more than 1,000 times more likely than natural risks.6 And within anthropogenic risks, I estimate the risks from future technologies to be roughly 100 times larger than those of existing ones, giving a substantial escalation in risk from Chapter 3 to 4 to 5.

Such variation may initially be surprising, but it is remarkably common in science to find distributions like this spanning many orders of magnitude, where the top outliers make up most of the total. This variation makes it extremely important to prioritize our efforts on the right risks. And it also makes our estimate of the total risk very sensitive to the estimates of the top few risks (which are among the least well understood). So getting better understanding and estimates for those becomes a key priority.

In my view, the greatest risk to humanity’s potential in the next hundred years comes from unaligned artificial intelligence, which I put at one in ten. One might be surprised to see such a high number for such a speculative risk, so it warrants some explanation.

A common approach to estimating the chance of an unprecedented event with earth-shaking consequences is to take a skeptical stance: to start with an extremely small probability and only raise it from there when a large amount of hard evidence is presented. But I disagree. Instead, I think the right method is to start with a probability that reflects our overall impressions, then adjust this in light of the scientific evidence.7 When there is a lot of evidence, these approaches converge. But when there isn’t, the starting point can matter.

In the case of artificial intelligence, everyone agrees the evidence and arguments are far from watertight, but the question is where does this leave us? Very roughly, my approach is to start with the overall view of the expert community that there is something like a one in two chance that AI agents capable of outperforming humans in almost every task will be developed in the coming century. And conditional on that happening, we shouldn’t be shocked if these agents that outperform us across the board were to inherit our future. Especially if when looking into the details, we see great challenges in aligning these agents with our values.

Some of my colleagues give higher chances than me, and some lower. But for many purposes our numbers are similar. Suppose you were more skeptical of the risk and thought it to be one in 100. From an informational perspective, that is actually not so far apart: it doesn’t take all that much evidence to shift someone from one to the other. And it might not be that far apart in terms of practical action either—an existential risk of either probability would be a key global priority.

#### c. On timeframe---the transition to superintelligence is rapid and opaque.

James Miller 18, based at Smith College, South Deerfield, Massachusetts. 10/11/2018. “When Two Existential Risks Are Better than One.” Foresight. Crossref, doi:10.1108/FS-04-2018-0038\*Note

\*PAGI = powerful artificial general intelligence

2. The dangers of unfriendly powerful artificial general intelligence Unlike with whatever wetware runs the human brain, it would be relatively easy to make changes to a PAGI’s software. PAGI could even make changes to itself. Such selfmodification could possibly allow PAGI to undergo an intelligence explosion where it figures out how to improve its own intelligence, then, as it gets smarter, it figures out new ways to improve its intelligence. It has been theorized that through recursive self-improvement a PAGI could go from being a bit smarter than humans to becoming a computer superintelligence in a matter of days (Good, 1965; Yudkowsky, 2008).

### 2NC---Indict

#### AFF cards are profit politicized skepticism---err NEG.

Seth D. Baum 18, executive director of the Global Catastrophic Risk Institute and PhD in geography from Penn State, 8/22/2018, “Superintelligence Skepticism as a Political Tool,” *Information*, 9(9), <https://doi.org/10.3390/info9090209>, cc

The purpose of this paper is to explore the potential for skepticism about artificial superintelligence to be used for political ends. Artificial superintelligence (for brevity, henceforth just superintelligence) refers to AI that is much smarter than humans. Current AI is not superintelligent, but the prospect of superintelligence is a topic of much discussion in scholarly and public spheres. Some believe that superintelligence could someday be built, and that, if it is built, it would have massive and potentially catastrophic consequences. Others are skeptical of these beliefs. While much of the existing skepticism appears to be honest intellectual debate, there is potential for it to be politicized for other purposes.

In simple terms (to be refined below), politicized skepticism can be defined as public articulation of skepticism that is intended to achieve some outcome other than an improved understanding of the topic at hand. Politicized skepticism can be contrasted with intellectual skepticism, which seeks an improved understanding. Intellectual skepticism is essential to scholarly inquiry; politicized skepticism is not. The distinction between the two is not always clear; statements of skepticism may have both intellectual and political motivations. The two concepts can nonetheless be useful for understanding debates over issues such as superintelligence.

There is substantial precedent for politicized skepticism. Of particular relevance for superintelligence is politicized skepticism about technologies and products that are risky but profitable, henceforth risk–profit politicized skepticism. This practice dates to 1950s debates over the link between tobacco and cancer and has since been dubbed the tobacco strategy [1]. More recently, the strategy has been applied to other issues including the link between fossil fuels and acid rain, the link between fossil fuels and global warming, and the link between industrial chemicals and neurological disease [1,2]. The essence of the strategy is to promote the idea that the science underlying certain risks is unresolved, and therefore the implicated technologies should not be regulated. The strategy is typically employed by an interconnected mix of industry interests and ideological opponents of regulation. The target audience is typically a mix of government officials and the general public, and not the scientific community.

As is discussed in more detail below, certain factors suggest the potential for superintelligence to be a focus of risk–profit politicized skepticism. First and foremost, superintelligence could be developed by major corporations with a strong financial incentive to avoid regulation. Second, there already exists a lot of skepticism about superintelligence, which could be exploited for political purposes. Third, as an unprecedented class of technology, it is inherently uncertain, which suggests that superintelligence skepticism may be especially durable, even within apolitical scholarly communities. These and other factors do not guarantee that superintelligence skepticism will be politicized, or that its politicization would follow the same risk–profit patterns as the tobacco strategy. However, these factors are at least suggestive of the possibility.

Superintelligence skepticism may also be politicized in a different way: to protect the reputations and funding of the broader AI field. This form of politicized skepticism is less well-documented than the tobacco strategy, and appears to be less common. However, there are at least hints of it for fields of technology involving both grandiose future predictions and more mundane near-term work. AI is one such field of technology, in which grandiose predictions of superintelligence and other future AI breakthroughs contrast with more modest forms of near-term AI. Another example is nanotechnology, in which grandiose predictions of molecular machines contrast with near-term nanoscale science and technology [3].

### 2NC---AT: Shermer

#### Shermer defense is pure silliness.

Dr. Olle Häggström 17, professor of mathematical statistics, PhD from the Chalmers University of Technology, research specialist in AI, 9/17/2017, “Michael Shermer fails in his attempt to argue that AI is not an existential threat,” http://haggstrom.blogspot.com/2017/09/michael-shermer-fails-in-his-attempt-to.html?m=1, cc

Why Artificial Intelligence is Not an Existential Threat is an aticle by leading science writer Michael Shermer1 in the recent issue 2/2017 of his journal Skeptic (mostly behind paywall). How I wish he had a good case for the claim contained in the title! But alas, the arguments he provides are weak, bordering on pure silliness. Shermer is certainly not the first high-profile figure to react to the theory of AI (artificial intelligence) existential risk, as developed by Eliezer Yudkowsky, Nick Bostrom and others, with an intuitive feeling that it cannot possibly be right, and the (slightly megalomaniacal) sense of being able to refute the theory, single-handedly and with very moderate intellectual effort. Previous such attempts, by Steven Pinker and by John Searle, were exposed as mistaken in my book Here Be Dragons, and the purpose of the present blog post is to do the analogous thing to Shermer's arguments.

The first half of Shermer's article is a not-very-deep-but-reasonably-competent summary of some of the main ideas of why an AI breakthrough might be an existential risk to humanity. He cites the leading thinkers of the field: Eliezer Yudkowsky, Nick Bostrom and Stuart Russell, along with famous endorsements from Elon Musk, Stephen Hawking, Bill Gates and Sam Harris.

The second half, where Shermer sets out to refute the idea of AI as an existential threat to humanity, is where things go off rails pretty much immediately. Let me point out three bad mistakes in his reasoning. The main one is (1), while (2) and (3) are included mainly as additional illustrations of the sloppiness of Shermer's thinking.

(1) Shermer states that

most AI doomsday prophecies are grounded in the false analogy between human nature and computer nature,

whose falsehood lies in the fact that humans have emotions, while computers do not. It is highly doubtful whether there is a useful sense of the term emotion for which a claim like that holds generally, and in any case Shermer mangles the reasoning behind Paperclip Armageddon - an example that he discusses earlier in his article. If the superintelligent AI programmed to maximize the production of paperclips decides to wipe out humanity, it does this because it has calculated that wiping out humanity is an efficient step towards paperclip maximization. Whether to ascribe to the AI doing so an emotion like aggression seems like an unimportant (for the present purpose) matter of definition. In any case, there is nothing fundamentally impossible or mysterious in an AI taking such a step. The error in Shermer's claim that it takes aggression to wipe out humanity and that an AI cannot experience aggression is easiest to see if we apply his argument to a simpler device such as a heat-seeking missile. Typically for such a missile, if it finds something warm (such as an enemy vehicle) up ahead slightly to the left, then it will steer slightly to the left. But by Shermer's account, such steering cannot happen, because it requires aggression on the part of the heat-seeking missile, and a heat-seeking missile obviously cannot experience aggression, so wee need not worry about heat-seeking missiles (any more than we need to worry about a paperclip maximizer).2

(2) Citing a famous passage by Pinker, Shermer writes:

As Steven Pinker wrote in his answer to the 2015 Edge Question on what to think about machines that think, "AI dystopias project a parochial alpha-male psychology onto the concept of intelligence. They assume that superhumanly intelligent robots would develop goals like deposing their masters or taking over the world." It is equally possible, Pinker suggests, that "artificial intelligence will naturally develop along female lines: fully capable of solving problems, but with no desire to annihilate innocents or dominate the civilization." So the fear that computers will become emotionally evil are unfounded [...].

Even if we accepted Pinker's analysis,3 Shermer's conclusion is utterly unreasonable, based as it is on the following faulty logic: If a dangerous scenario A is discussed, and we can give a scenario B that is "equally possible", then we have shown that A will not happen.

## 2NC---AT: Nano D

### 2NC---Nano Impact

#### Even a small chance of Universe destruction outweighs certain human extinction. Earth is cosmically insignificant.

Dr. Nick Hughes 18, Postdoctoral Research Fellow at University College Dublin, PhD in Philosophy from University of St Andrews & University of Olso, and Dr. Guy Kahane, Professor of Philosophy at the University of Oxford, D. Phil. in Philosophy from Oxford University, “Our Cosmic Insignificance”, 7-6, <http://www.unariunwisdom.com/our-cosmic-insignificance/>

Humanity occupies a very small place in an unfathomably vast Universe. Travelling at the speed of light – 671 million miles per hour – it would take us 100,000 years to cross the Milky Way. But we still wouldn’t have gone very far. Our modest Milky Way galaxy contains 100–400 billion stars. This isn’t very much: according to the latest calculations, the observable universe contains around 300 sextillion stars. By recent estimates, our Milky Way galaxy is just one of 2 trillion galaxies in the observable Universe, and the region of space that they occupy spans at least 90 billion light-years. If you imagine Earth shrunk down to the size of a single grain of sand, and you imagine the size of that grain of sand relative to the entirety of the Sahara Desert, you are still nowhere near to comprehending how infinitesimally small a position we occupy in space. The American astronomer Carl Sagan put the point vividly in 1994 when discussing the famous ‘Pale Blue Dot’ photograph taken by Voyager 1. Our planet, he said, is nothing more than ‘a mote of dust suspended in a sunbeam’. Stephen Hawking delivers the news more bluntly. We are, he says, “just a chemical scum on a moderate-sized planet, orbiting round a very average star in the outer suburb of one among a hundred billion galaxies.” And that’s just the spatial dimension. The observable Universe has existed for around 13.8 billion years. If we shrink that span of time down to a single year, with the Big Bang occurring at midnight on 1 January, the first Homo sapiens made an appearance at 22:24 on 31 December. It’s now 23:59:59, as it has been for the past 438 years, and at the rate we’re going it’s entirely possible that we’ll be gone before midnight strikes again. The Universe, on the other hand, might well continue existing forever, for all we know. Sagan could have added, then, that our time on this mote of dust will amount to nothing more than a blip. In the grand scheme of things we are very, very small. For Sagan, the Pale Blue Dot underscores our responsibility to treat one another with kindness and compassion. But reflection on the vastness of the Universe and our physical and temporal smallness within it often takes on an altogether darker hue. If the Universe is so large, and we are so small and so fleeting, doesn’t it follow that we are utterly insignificant and inconsequential? This thought can be a spur to nihilism. If we are so insignificant, if our existence is so trivial, how could anything we do or are – our successes and failures, our anxiety and sadness and joy, all our busy ambition and toil and endeavour, all that makes up the material of our lives – how could any of that possibly matter? To think of one’s place in the cosmos, as the American philosopher Susan Wolf puts it in ‘The Meanings of Lives’ (2007), is ‘to recognise the possibility of a perspective … from which one’s life is merely gratuitous’. The sense that we are somehow insignificant seems to be widely felt. The American author John Updike expressed it in 1985 when he wrote of modern science that: We shrink from what it has to tell us of our perilous and insignificant place in the cosmos … our century’s revelations of unthinkable largeness and unimaginable smallness, of abysmal stretches of geological time when we were nothing, of supernumerary galaxies … of a kind of mad mathematical violence at the heart of the matter have scorched us deeper than we know. In a similar vein, the French philosopher Blaise Pascal wrote in *Pensées* (1669): When I consider the short duration of my life, swallowed up in an eternity before and after, the little space I fill engulfed in the infinite immensity of spaces whereof I know nothing, and which know nothing of me, I am terrified. The eternal silence of these infinite spaces frightens me. Commenting on this passage in *Between Man and Man* (1947), the Austrian-Israeli philosopher Martin Buber said that Pascal had experienced the ‘uncanniness of the heavens’, and thereby came to know ‘man’s limitation, his inadequacy, the casualness of his existence’. In the film *Monty Python’s* *The Meaning of Life* (1983), John Cleese and Eric Idle conspire to persuade a character, played by Terry Gilliam, to give up her liver for donation. Understandably reluctant, she is eventually won over by a song that sharply details just how comically inconsequential she is in the cosmic frame. Even the relatively upbeat Sagan wasn’t, in fact, immune to the pessimistic point of view. As well as viewing it as a lesson in the need for collective goodwill, he also argued that the Pale Blue Dot challenges ‘our posturings, our imagined self-importance, and the delusion that we have some privileged position in the Universe’. When we reflect on the vastness of the universe, our humdrum cosmic location, and the inevitable future demise of humanity, our lives can seem utterly insignificant. As we complacently go about our little Earthly affairs, we barely notice the black backdrop of the night sky. Even when we do, we usually see the starry skies as no more than a pleasant twinkling decoration. This sense of cosmic insignificance is not uncommon; one of Joseph Conrad’s characters describes one of those dewy, clear, starry nights, oppressing our spirit, crushing our pride, by the brilliant evidence of the awful loneliness, of the hopeless obscure insignificance of our globe lost in the splendid revelation of a glittering, soulless universe. I hate such skies. The young Bertrand Russell, a close friend of Conrad, bitterly referred to the Earth as “the petty planet on which our bodies impotently craw.” Russell wrote that: Brief and powerless is Man’s life; on him and all his race the slow, sure doom falls pitiless and dark. Blind to good and evil, reckless of destruction, omnipotent matter rolls on its relentless way…This is why Russell thought that, in the absence of God, we must build our lives on “a foundation of unyielding despair.” When we consider ourselves as a mere dot in a vast universe, when we consider ourselves in light of everything there is, nothing human seems to matter. Even the worst human tragedy may seem to deserve no cosmic concern. After all, we are fighting for attention with an incredibly vast totality. How could this tiny speck of dust deserve even a fraction of attention, from that universal point of view? This is the image that is evoked when, for example, Simon Blackburn writes that “to a witness with the whole of space and time in its view, nothing on the human scale will have meaning”. Such quotations could be easily multiplied—we find similar remarks, for example, in John Donne, Voltaire, Schopenhauer, Byron, Tolstoy, Chesterton, Camus, and, in recent philosophy, in Thomas Nagel, Harry Frankfurt, and Ronald Dworkin. The bigger the picture we survey, the smaller the part of any point within it, and the less attention it can get… When we try to imagine a viewpoint encompassing the entire universe, humanity and its concerns seem to get completely swallowed up in the void. Over the centuries, many have thought it absurd to think that we are the only ones. For example, Anaxagoras, Epicurus, Lucretius, and, later, Giordano Bruno, Huygens and Kepler were all confident that the universe is teeming with life. Kant was willing to bet everything he had on the existence of intelligent life on other planets. And we now know that there is a vast multitude of Earth-like planets even in our own little galaxy. The experience of cosmic insignificance is often blamed on the rise of modern science, and the decline of religious belief. Many think that things started to take a turn for the worse with Copernicus. Nietzsche, for example, laments ‘the nihilistic consequences of contemporary science’, and adds that Since Copernicus it seems that man has found himself on a descending slope—he always rolls further and further away from his point of departure toward… —where is that? Towards nothingness? Freud later wrote about a series of harsh blows to our self-esteem delivered by science. The first blow was delivered by Copernicus, when we learned, as Freud puts it, that “our earth was not the centre of the universe but only a tiny fragment of a cosmic system of scarcely imaginable vastness…” It is still common to refer, in a disappointed tone, to the discovery that we aren’t at the centre of God’s creation, as we had long thought, but located, as Carl Sagan puts it, “in some forgotten corner”. We live, Sagan writes, “on a mote of dust circling a humdrum star in the remotest corner of an obscure galaxy.”

#### Alien lives should be valued as equal to humans---anything else is arbitrary and a logic of devaluation that is at the root of violence

Joe Packer 7, then MA in Communication from Wake Forest University, now PhD in Communication from the University of Pittsburgh and Professor of Communication at Central Michigan University, Alien Life in Search of Acknowledgment, p. 62-63

Once we hold alien interests as equal to our own we can begin to revaluate areas previously believed to hold no relevance to life beyond this planet. A diverse group of scholars including Richard Posner, Senior Lecturer in Law at the University of Chicago, Nick Bostrom, philosophy professor at Oxford University, John Leslie philosophy professor at Guelph University and Martin Rees, Britain’s Astronomer Royal, have written on the emerging technologies that threaten life beyond the planet Earth. Particle accelerators labs are colliding matter together, reaching energies that have not been seen since the Big Bang. These experiments threaten a phase transition that would create a bubble of altered space that would expand at the speed of light killing all life in its path. Nanotechnology and other machines may soon reach the ability to self replicate. A mistake in design or programming could unleash an endless quantity of machines converting all matter in the universe into copies of themselves. Despite detailing the potential of these technologies to destroy the entire universe, Posner, Bostrom, Leslie, and Ree’s only mention of alien life in their works is in reference to the threat aliens post to humanity. The rhetorical construction of otherness only in terms of the threats it poses, but never in terms of the threat one poses to it, has been at the center of humanity’s history of genocide, colonization, and environmental destruction. Although humanity certainly has its own interests in reducing the threat of these technologies evaluating them without taking into account the danger they pose to alien life is neither appropriate nor just. It is not appropriate because framing the issue only in terms of human interests will result in priorities designed to minimize the risks and maximize the benefits to humanity, not all life. Even if humanity dealt with the threats effectively without referencing their obligation to aliens, Posner, Bostrom, Leslie, and Ree’s rhetoric would not be “just,” because it arbitrarily declares other life forms unworthy of consideration. A framework of acknowledgement would allow humanity to address the risks of these new technologies, while being cognizant of humanity’s obligations to other life within the universe. Applying the lens of acknowledgment to the issue of existential threats moves the problem from one of self destruction to universal genocide. This may be the most dramatic example of how refusing to extend acknowledgment to potential alien life can mask humanity’s obligations to life beyond this planet.

### 2NC---Nano Outweighs

#### Nanoscale risks are unique and outweigh nukes---math supports probability

(Duncan H. Forgan 19. Associate Lecturer at the Centre for Exoplanet Science at the University of St Andrews, Scotland, founding member of the UK Search for Extra-terrestrial Intelligence (SETI) research network and leads UK research efforts into the search. 04/30/2019. “14.3 Estimates of Existential Risk from Nanoscale Manipulation.” Solving Fermi’s Paradox, Cambridge University Press.)/LRCH Jrhee \*graph omitted bc it wouldn’t copy

The nature of the nanoscale risk is quite different from the risks posed by (say) nuclear weapons. The nuclear arsenals of the Earth remain under the control of a very small number of individuals. As genetic engineering and nanotechnology mature as fields of research, the ability to manipulate the nanoscale becomes available to an increasing number of individuals. Any one of these individuals could accidentally (or purposefully) trigger a catastrophic event that destroys a civilisation. If there are E individuals with access to potentially destructive technology, and the probability that an individual destroys civilisation in any given year is P, then we can define the probability that the civilisation exists after time t and can communicate, C, as a set of independent Bernoulli trials, i.e., P(C|t, E, P) = (1 − P)Et . (14.1) Therefore, we can compute the number of civilisations existing between t = 0, t0 as N(t0) = B t0 0 P(C|t , E, P)dt (14.2) where we have assumed a constant birth rate B. This can be easily integrated to show (Sotos, 2017): N(t0) = B St0 − 1 ln S , S = (1 − P)E (14.3) At large t, this tends to the steady-state solution N(t) → B E P (14.4) i.e., there is an inverse relationship between the number of individuals in a given civilisation, and the number of civilisations remaining (Figure 14.1). The generality of this solution to Fermi’s Paradox – that the democracy of technology is the cause of its downfall – is particularly powerful. All we have assumed is that technology can be destructive, and that it eventually becomes accessible to a large enough number of individuals that the product E P becomes sufficiently large. The number of communicating civilisations as a function of time, given E individuals causing self-destruction with a probability of P per individual per year. The civilisation birth rate B is fixed at one per year. This is a sufficiently general solution that we may consider it to be hard – our definition of intelligence hinges on technology, and almost all advanced technology has a destructive use. We can already use the Great Silence to rule out the upper curves in Figure 14.1, which would yield civilisation counts that would be visible on Earth (see also section 19.2). This suggests that if this is the solution to Fermi’s Paradox, then roughly E P > 10−3.

### 2NC---AT: Impossible

#### Nano’s feasible and likely

Dennis Pamlin 15, Executive Project Manager of the Global Risks Global Challenges Foundation, and Stuart Armstrong, James Martin Research Fellow at the Future of Humanity Institute of the Oxford Martin School at University of Oxford, Global Challenges Foundation, February, <http://globalchallenges.org/wp-content/uploads/12-Risks-with-infinite-impact.pdf>

Nanotechnology is best described as a general capacity, rather than a specific tool. In relation to infinite impacts this is a challenge, as there are many ways that nanotechnology can be used that could result in infinite impacts, but also many others where it can help reduce infinite impacts. Different possible sequences from today’s situation to precise atomic manufacturing are well documented and the probability that none of the possible paths would deliver results is very small. What specific sequence and with what results is however very uncertain. Compared with many other global challenges nanotechnology could result in many different risks - and opportunities, from an accelerated ability to manufacture (new) weapons623 to the creation of new materials and substances. These are certainly orders of magnitude more likely, far likelier than any probability of the “grey goo” that has resulted in significant misunderstanding. The data availability is difficult to estimate as there are very different kinds of data, and also an obvious lack of data, as nanotechnology is in its very early days. There are some estimates from experts, but the uncertainty is significant. A relative probability estimate is a possible ffrst step, comparing nanotechnology solutions with existing systems where the probability is better known. Admiral David E. Jeremiah, for example, said at the 1995 Foresight Conference on Molecular Technology: “Military applications of molecular manufacturing have even greater potential than nuclear weapons to radically change the balance of power.” 624 A systems forecasting approach could probably provide better estimates and help develop complementary measures that would support the positive parts of nanotechnology while reducing the negative.

### 2NC---AT: Squo Solves

#### No checks or countermeasures to Nano

Dr. Olle Häggström 16 (Professor of Mathematical Statistics at Chalmers University of Technology and Associated Researcher at the Institute for Future Studies, Member of the Royal Swedish Academy of Sciences, PhD in Mathematical Statistics and MSc in Electrical Engineering, Here Be Dragons: Science, Technology and the Future of Humanity, p. 136-138, smarx, MLC)

The comparison to biology is apt, but it is not clear how convincing his idea is that it would take “some maniac” to initiate grey goo “for this very purpose.”313 Can we state with certainty that it cannot happen by mistake? It is true that self-replication will require “clever design,” but we can expect non-maniac nanotechnology engineers to attempt that, as it seems to be the most promising way to produce nanobots in the huge quantities we will need for a variety of applications. Such construction will presumably be done with a degree of precaution so as to avoid the self-replication going overboard as in the grey goo scenario, but such precautions could fail. At this point, the grey goo skeptic could point again to biology, and the fact that life has existed on our planet for billions of years without turning into grey (or green) goo, as an argument for why self-replication is unlikely to spontaneously produce such a catastrophe. While this argument has some force, it is far from conclusive, as the newly formed nanobots may, in the abstract space of possible living organisms, be located quite far from all biological life, and have very different physical and chemical properties. It is hardly absurd to think that this might give the nanobots a robust reproductive power unmatched by anything that the evolution of biological life has discovered. At the very least, this issue deserves further study. A possible middle ground could be that, on one hand, it is possible to proceed with nanobot technology without risking a grey goo scenario, provided that we respect certain safety protocols, whereas, on the other hand, grey goo would be a real danger without these precautions. Phoenix and Drexler (2004) have a number of suggestions for how nanobots can be made to self-replicate in controlled and safe fashion. A key insight is that the self-replication ability of an agent (be it a biological organism or a robot) is always contingent on its environment. Even a set of blacksmith’s tools can, in the right environment (one that provides suitable input of skills and muscle power), produce a duplicate set, and can thus be described as self-replicating. What is always needed for self-replication capability is the raw material and energy needed to produce the replicates.314 Hence, we could avoid grey goo if we construct the self-replicating machines to contain elements not available in the natural environment. But we may not even have to go that far. Phoenix and Drexler point out that a general-purpose molecular assembler will typically not be a general purpose molecular disassembler. It will, most likely, be far easier to construct an APM machine that requires its raw material to be delivered in the form of a limited range of simple chemicals (such as acetylene or acetone), rather than having the ability to extract molecular fragments and atoms from arbitrary chemical compounds. Suppose that we regulate the technology so as to make a specific list of sufficient safety precautions obligatory. With a risk such as grey goo, where the consequences of a single mishap could be global and even put an end to humanity, it is clearly not sufficient that most practitioners of the technology adhere to the regulation, or that almost all of them do: anything short of obedience to regulation from all practitioners would be unsatisfactory. Can this be ensured? This is not clear. Kurzweil (2006) advocates another safety layer, in the form of nanobots specifically designed to fight grey-goo-like outbreaks. Without defenses, the available biomass could be destroyed by gray goo very rapidly. Clearly, we will need a nanotechnology immune system in place before these scenarios become a possibility. . . . Eric Drexler, Robert Freitas, Ralph Merkle, Mike Treder, Chris Phoenix, and others have pointed out that future nanotech manufacturing devices can be created with safeguards that would prevent the accidental creation of self-replicating nanodevices. However, this observation, although important, does not eliminate the threat of gray goo as I pointed out above. There are other reasons (beyond manufacturing) that self-replicating nanobots will need to be created. The nanotechnology immune system mentioned above, for example, will ultimately require self-replication; otherwise it would be unable to defend us against the development of increasingly sophisticated types of goo. It is also likely to find extensive military applications. Moreover, a determined adversary or terrorist can defeat safeguards against unwanted self-replication; hence, the need for defense. The suggestion of setting up this kind of defense system against grey goo – which Kurzweil elsewhere calls “police nanobots” and “blue goo”315 – goes back to Drexler (1986). It makes me very uneasy. Joy (2000) points out that the system.

#### Nano regulation is impossible

Stephen J. Ridge 18, Master of Arts in Security Studies from the Naval Postgraduate School, Assistant Senior Watch Officer, U.S. Department of Homeland Security, National Operations Center, “A REGULATORY FRAMEWORK FOR NANOTECHNOLOGY”, Thesis, March, p. 2-4

There are many roadblocks to developing suitable nanotechnology regulation. One major roadblock for nanotechnology regulation stems from the lack of consensus on the definition of nanotechnology. It is difficult to construct an architectural framework for nanotechnology regulation when many leaders within the field cannot agree on what the term even means. According to Andrew Maynard, Professor in the School for the Future of Innovation in Society at Arizona State University and co-chair of the World Economic Forum Global Agenda Council on Nanotechnology, “a sensible definition [for nanotechnology] has proved hard, if not impossible, to arrive at.”3 A brief perusal of nanotechnology stakeholders reveals a myriad of definitions upon which their interaction with the technology is based. For instance, nanotechnology is defined by the U.S. National Nanotechnology Initiative as the understanding and control of matter at dimensions between approximately 1 and 100 nanometers where unique phenomena enable novel applications. Encompassing nanoscale science, engineering, and technology, nanotechnology involves imaging, measuring, modeling, and manipulating matter at this length scale.4 In 2010, the European Commission released this definition for public comment: “a material that consists of particles with one or more external dimensions in the size range 1 nm-100 nm for more than 1 percent of their number;” and/or “has internal or surface structures in one or more dimensions in the size range 1 nm-100 nm;” and/or “has a greater than 60 m2/ cm3, excluding materials consisting of particles with a size lower than 1 nm, excluding materials consisting of particles with a size lower than 1 nm.”5 In the 2003 law 21st Century Nanotechnology Research and Development Act, the U.S. Congress defines “nanotechnology” as “the science and technology that will enable one to understand, measure, manipulate, and manufacture at the atomic, molecular, and supramolecular levels, aimed at creating materials, devices, and systems with fundamentally new molecular organization, properties, and functions.”6 The inaugural issue of Nature Nanotechnology in 2006 asked a wide array of researchers, industrialists, and scientists what nanotechnology means to them. Unsurprisingly, the 13 different individuals queried yielded 13 different responses. This lack of a commonly agreed upon nanotechnology lexicon makes regulation difficult. Another roadblock arises because nanotechnology is still an emerging technology. When establishing regulation, the regulating entity and those empowering the regulation assume that the regulating entity has the knowledge of what “good behavior” in an industry should be.7 This assumption is somewhat flawed because predicting the way a new technology will be developed and adopted is very difficult. Therefore, predicting what “good behavior” in an industry will look like is also very difficult.8 This challenge of regulation does not mean regulation should be ignored until the technology is mature, but rather that it is necessary to implement a regulatory framework that can both address problems as they arise and attempt to prevent future problems by exercising foresight into what the near-term and long-term technological developments may be. Next, the properties of engineered nanomaterials make categorization of these materials difficult under current regulatory definitions. For example, according to the National Nanotechnology Initiative (NNI), at the nanoscale, a particle’s properties such as “melting point, fluorescence, electrical conductivity, magnetic permeability, and chemical reactivity change as a function size of the size of the particle.”9 Additionally, according to the NNI “nanoscale materials have far larger surface areas than similar masses of largerscale materials. As surface area per mass of a material increases, a greater amount of the material can come into contact with surrounding materials, thus affecting reactivity.”10 These physical properties provide much of the basis for why the technology has the potential to be revolutionary. However, according to Beaudrie, Kandlikar, and Satterfield, “not enough is known about the relationship between nanomaterial physicochemical characteristics and behavior to anticipate risks. The result is a serious lack of predictive analytical capacity to anticipate harmful implications.”11 Also problematic is that nanotechnology research and development encompass many different fields of science and across several sectors of society. These sectors include: energy, electronics, defense/homeland security, chemicals, communications/information technology, manufacturing, government, food and agriculture, pharmaceutical/health companies, transportation, education, and commerce/economics. This broad range of potential application blurs the lines of regulatory responsibility across different regulatory agencies. Also, each of these sectors contains stakeholders who have differing concerns and interests in the technology and are often competing with one another for the funding of research and development.

## 2NC---AT: Warming D

### 2NC---Warming Impact

#### Warming causes extinction via invisible thresholds and exponential feedbacks.

Yew-Kwang Ng 19. A professor of economics, Nanyang Technological University and will join the School of Economics, Fudan University from mid/late 2019. He is a fellow of the Academy of Social Sciences in Australia and a member of Advisory Board, Global Priorities Institute, Oxford University. In 2007, he received the highest award (Distinguished Fellow) of the Economic Society of Australia. 05/2019. “KEYNOTE: Global Extinction and Animal Welfare: Two Priorities for Effective Altruism.” Global Policy, vol. 10, no. 2, pp. 258–266.

Catastrophic climate change

Though by no means certain, CCC causing global extinction is possible due to interrelated factors of non-linearity, cascading effects, positive feedbacks, multiplicative factors, critical thresholds and tipping points (e.g. Barnosky and Hadly, 2016; Belaia et al., 2017; Buldyrev et al., 2010; Grainger, 2017; Hansen and Sato, 2012; IPCC 2014; Kareiva and Carranza, 2018; Osmond and Klausmeier, 2017; Rothman, 2017; Schuur et al., 2015; Sims and Finnoff, 2016; Van Aalst, 2006).7

A possibly imminent tipping point could be in the form of ‘an abrupt ice sheet collapse [that] could cause a rapid sea level rise’ (Baum et al., 2011, p. 399). There are many avenues for positive feedback in global warming, including:

• the replacement of an ice sea by a liquid ocean surface from melting reduces the reflection and increases the absorption of sunlight, leading to faster warming;

• the drying of forests from warming increases forest fires and the release of more carbon; and

• higher ocean temperatures may lead to the release of methane trapped under the ocean floor, producing runaway global warming.

Though there are also avenues for negative feedback, the scientific consensus is for an overall net positive feedback (Roe and Baker, 2007). Thus, the Global Challenges Foundation (2017, p. 25) concludes, ‘The world is currently completely unprepared to envisage, and even less deal with, the consequences of CCC’.

The threat of sea-level rising from global warming is well known, but there are also other likely and more imminent threats to the survivability of mankind and other living things. For example, Sherwood and Huber (2010) emphasize the adaptability limit to climate change due to heat stress from high environmental wet-bulb temperature. They show that ‘even modest global warming could ... expose large fractions of the [world] population to unprecedented heat stress’ p. 9552 and that with substantial global warming, ‘the area of land rendered uninhabitable by heat stress would dwarf that affected by rising sea level’ p. 9555, making extinction much more likely and the relatively moderate damages estimated by most integrated assessment models unreliably low.

While imminent extinction is very unlikely and may not come for a long time even under business as usual, the main point is that we cannot rule it out. Annan and Hargreaves (2011, pp. 434–435) may be right that there is ‘an upper 95 per cent probability limit for S [temperature increase] ... to lie close to 4°C, and certainly well below 6°C’. However, probabilities of 5 per cent, 0.5 per cent, 0.05 per cent or even 0.005 per cent of excessive warming and the resulting extinction probabilities cannot be ruled out and are unacceptable. Even if there is only a 1 per cent probability that there is a time bomb in the airplane, you probably want to change your flight. Extinction of the whole world is more important to avoid by literally a trillion times.

#### Climate change trigger feedback loops causing quick extinction. Prefer peer-reviewed climate models.

Dr. Peter Kareiva 18, ecology and applied mathematics PhD from Cornell University, director of the Institute of the Environment and Sustainability at UCLA, Pritzker Distinguished Professor in Environment & Sustainability at UCLA, September 2018, "Existential risk due to ecosystem collapse: Nature strikes back," *Futures*, a peer-reviewed journal, Vol 102, <https://doi.org/10.1016/j.futures.2018.01.001>, pacc

Climate change has a long history of disrupting civilizations and sometimes precipitating the collapse of cultures or mass emigrations (McMichael, 2017). For example, the 12th century drought in the North American Southwest is held responsible for the collapse of the Anasazi pueblo culture. More recently, the infamous potato famine of 1846-1849 and the large migration of Irish to the US can be traced to a combination of factors, one of which was climate. Specifically, 1846 was an unusually warm and moist year in Ireland, providing the climatic conditions favorable to the fungus that caused the potato blight. As is so often the case, poor government had a role as well—as the British government forbade the import of grains from outside Britain (imports that could have helped to redress the ravaged potato yields).

Climate change intersects with freshwater resources because it is expected to exacerbate drought and water scarcity, as well as flooding. Climate change can even impair water quality because it is associated with heavy rains that overwhelm sewage treatment facilities, or because it results in higher concentrations of pollutants in groundwater as a result of enhanced evaporation and reduced groundwater recharge. Ample clean water is not a luxury - it is essential for human survival. Consequently, cities, regions and nations that lack clean freshwater are vulnerable to social disruption and disease.

Finally, ocean acidification is linked to climate change because it is driven by CO2 emissions just as global warming is. With close to 20% of the world's protein coming from oceans (FAO, 2016), the potential for severe impacts due to acidification is obvious. Less obvious, but perhaps more insidious, is the interaction between climate change and the loss of oyster and coral reefs due to acidification. Acidification is known to interfere with oyster reef building and coral reefs. Climate change also increases storm frequency and severity. Coral reefs and oyster reefs provide protection from storm surge because they reduce wave energy (Spalding et al., 2014). If these reefs are lost due to acidification at the same time as storms become more severe and sea level rises, coastal communities will be exposed to unprecedented storm surge—and may be ravaged by recurrent storms.

A key feature of the risk associated with climate change is that mean annual temperature and mean annual rainfall are not the variables of interest. Rather it is extreme episodic events that place nations and entire regions of the world at risk. These extreme events are by definition "rare" (once every hundred years), and changes in their likelihood are challenging to detect because of their rarity, but are exactly the manifestations of climate change that we must get better at anticipating (Diffenbaugh et al., 2017). Society will have a hard time responding to shorter intervals between rare extreme events because in the lifespan of an individual human, a person might experience as few as two or three extreme events. How likely is it that you would notice a change in the interval between events that are separated by decades, especially given that the interval is not regular but varies stochastically? A concrete example of this dilemma can be found in the past and expected future changes in storm-related flooding of New York City. The highly disruptive flooding of New York City associated with Hurricane Sandy represented a flood height that occurred once every 500 years in the 18th century, and that occurs now once every 25 years, but is expected to occur once every 5 years by 2050 (Garner et al, 2017). This change in frequency of extreme floods has profound implications for the measures New York City should take to protect its infrastructure and its population, yet because of the stochastic nature of such events, this shift in flood frequency is an elevated risk that will go unnoticed by most people.

4. The combination of positive feedback loops and societal inertia is fertile ground for global environmental catastrophes

Humans are remarkably ingenious, and have adapted to crises throughout their history. Our doom has been repeatedly predicted, only to be averted by innovation (Ridley, 2011). However, the many stories of human ingenuity successfully addressing existential risks such as global famine or extreme air pollution represent environmental challenges that are largely linear, have immediate consequences, and operate without positive feedbacks. For example, the fact that food is in short supply does not increase the rate at which humans consume food—thereby increasing the shortage. Similarly, massive air pollution episodes such as the London fog of 1952 that killed 12,000 people did not make future air pollution events more likely. In fact it was just the opposite—the London fog sent such a clear message that Britain quickly enacted pollution control measures (Stradling, 2016). Food shortages, air pollution, water pollution, etc. send immediate signals to society of harm, which then trigger a negative feedback of society seeking to reduce the harm.

In contrast, today's great environmental crisis of climate change may cause some harm but there are generally long time delays between rising CO2 concentrations and damage to humans. The consequence of these delays are an absence of urgency; thus although 70% of Americans believe global warming is happening, only 40% think it will harm them (http://climatecommunication.yale.edu/visualizations-data/ycom-us-2016/). Secondly, unlike past environmental challenges, the earth's climate system is rife with positive feedback loops. In particular, as CO2 increases and the climate warms, that very warming can cause more CO2 release which further increases global warming, and then more CO2, and so on. Table 2 summarizes the best documented positive feedback loops for the Earth's climate system. These feedbacks can be neatly categorized into carbon cycle, biogeochemical, biogeophysical, cloud, ice-albedo, and water vapor feedbacks. As important as it is to understand these feedbacks individually, it is even more essential to study the interactive nature of these feedbacks. Modeling studies show that when interactions among feedback loops are included, uncertainty increases dramatically and there is a heightened potential for perturbations to be magnified (e.g., Cox et al., 2000; Hajima et al., 2014; Knutti & Rugenstein, 2015; Rosenfeld et al., 2014). This produces a wide range of future scenarios.

Positive feedbacks in the carbon cycle involves the enhancement of future carbon contributions to the atmosphere due to some initial increase in atmospheric CO2. This happens because as CO2 accumulates, it reduces the efficiency in which oceans and terrestrial ecosystems sequester carbon, which in return feeds back to exacerbate climate change (Friedlingstein et al., 2001). Warming can also increase the rate at which organic matter decays and carbon is released into the atmosphere, thereby causing more warning (Melillo et al, 2017). Increases in food shortages and lack of water is also of major concern when biogeophysical feedback mechanisms perpetuate drought conditions. The underlying mechanism here is that losses in vegetation increases the surface albedo, which suppresses rainfall, and thus enhances future vegetation loss and more suppression of rainfall—thereby initiating or prolonging a drought (Chamey et al., 1975). To top it off, overgrazing depletes the soil, leading to augmented vegetation loss (Anderies et al., 2002).

Climate change often also increases the risk of forest fires, as a result of higher temperatures and persistent drought conditions. The expectation is that forest fires will become more frequent and severe with climate warming and drought (Scholze et al., 2006), a trend for which we have already seen evidence (Allen et al., 2010). Tragically, the increased severity and risk of Southern California wildfires recently predicted by climate scientists (Jin et al, 2015), was realized in December 2017, with the largest fire in the history of California (the "Thomas fire" that burned 282,000 acres, https://www.vox.com/2017/12/27/16822180/thomas-fire-california-largest-wildfire ). This catastrophic fire embodies the sorts of positive feedbacks and interacting factors that could catch humanity off-guard and produce a true apocalyptic event. Record-breaking rains produced an extraordinary flush of new vegetation, that then dried out as record heat waves and dry conditions took hold, coupled with stronger than normal winds, and ignition. Of course the record-fire released CO2 into the atmosphere, thereby contributing to future warming.

Out of all types of feedbacks, water vapor and the ice-albedo feedbacks are the most clearly understood mechanisms. Losses in reflective snow and ice cover drive up surface temperatures, leading to even more melting of snow and ice cover—this is known as the ice-albedo feedback (Curry et al., 1995). As snow and ice continue to melt at a more rapid pace, millions of people may be displaced by flooding risks as a consequence of sea level rise near coastal communities (Biermann & Boas, 2010; Myers, 2002; Nicholls et al., 2011). The water vapor feedback operates when warmer atmospheric conditions strengthen the saturation vapor pressure, which creates a warming effect given water vapor's strong greenhouse gas properties (Manabe & Wetherald, 1967).

Global warming tends to increase cloud formation because warmer temperatures lead to more evaporation of water into the atmosphere, and warmer temperature also allows the atmosphere to hold more water. The key question is whether this increase in clouds associated with global warming will result in a positive feedback loop (more warming) or a negative feedback loop (less warming). For decades, scientists have sought to answer this question and understand the net role clouds play in future climate projections (Schneider et al., 2017). Clouds are complex because they both have a cooling (reflecting incoming solar radiation) and warming (absorbing incoming solar radiation) effect (Lashof et al., 1997). The type of cloud, altitude, and optical properties combine to determine how these countervailing effects balance out. Although still under debate, it appears that in most circumstances the cloud feedback is likely positive (Boucher et al., 2013). For example, models and observations show that increasing greenhouse gas concentrations reduces the low-level cloud fraction in the Northeast Pacific at decadal time scales. This then has a positive feedback effect and enhances climate warming since less solar radiation is reflected by the atmosphere (Clement et al., 2009).

The key lesson from the long list of potentially positive feedbacks and their interactions is that runaway climate change, and runaway perturbations have to be taken as a serious possibility. Table 2 is just a snapshot of the type of feedbacks that have been identified (see Supplementary Material for a more thorough explanation of positive feedback loops). However, this list is not exhaustive and the possibility of undiscovered positive feedbacks portends even greater existential risks. The many environmental crises humankind has previously averted (famine, ozone depletion, London fog, water pollution, etc.) were averted because of political will based on solid scientific understanding. We cannot count on complete scientific understanding when it comes to positive feedback loops and climate change.

5. It is multiplicative stresses (or "double whammies") that should be our greatest concern

It is easy to see how positive feedback loops exacerbate existential risks. A second, but less obvious danger is the linkage of seemingly unrelated processes or phenomenon that increase risk. A good example is wildfires and tornadoes. Both of these represent natural disasters that can cause great damage. Until recently no one linked these two phenomena, and no one would have imagined that an increase in wildfires might cause an increase in tornados. However, researchers in 2016 documented a linkage between wildfires in Central America and the worst episode of tornadoes in North America's recorded history (Saide et al., 2016)—more than 120 twisters in one day, which killed 316 people. The mechanism is that the aerosol particles produced by wildfires increase the vertical sheer in atmospheric wind speeds, which in turn makes tornadoes more likely and more severe.

While tornadoes and wildfires are both local there are other trends that are national or even global that entail interacting risks factors—or what the renowned ecologist Robert T. Paine called a "double whammy" (Paine, 1993). Paine makes the argument that whereas one perturbation or stress on its own might not be terribly worrisome, if an ecosystem is hit with two stresses or threats at the same time (or in quick succession) the result can be surprisingly catastrophic. For example, aging infrastructure in the United States (dams, bridges, levees, etc.) is often talked about as a disaster waiting to happen (Reid, 2008). Similarly, increased extreme rainfall is widely appreciated as a likely outcome of climate change. Putting the two together, we have a recipe for turning improbable events into something that should be expected. A specific example of what was once a highly unlikely tragedy, but is now perhaps a probable disaster is the failure of a large dam. If large aging dams fail due to the combination of decaying infrastructure and unprecedented rainfall, downstream communities could be destroyed. Existing dams were engineered for flood frequencies and rainfall regimes that have been replaced by much more extreme weather events. This should raise general concerns about flood-safety. Not only are the designs for major dams obsolete due to climate changes, the dams themselves are obsolete. In the United States alone, more than 85% of large dams will be more than 50 years old by 2020 (Hossain et al., 2009). Based on data from the National Performance of Dam Failures, the top ten causes of dam incidents in the United States are depicted in Fig. 2a. The most frequent type of incident was attributed to inflow floods—that is more than 1000 dam failures. The reason this is a global concern is that observations (Fig. 2b) in dry and wet regions all over the world show that extreme precipitation events have been increasing since the 1950s (Donat et al., 2017). The combined effect of intensified rainfall and old dams pose a clear risk to communities worldwide.

California, which has used dams and reservoirs to store water on a massive scale, recently suffered through several consecutive years of both low rainfall and high temperatures that produced a 5-year record-breaking drought (Diffenbaugh et al., 2015). The drought ended when the state experienced massive amounts of precipitation in early 2017 leading to its wettest rainy season, on record (Vahedifard et al., 2017). The rainfall unleashed floods, landslides, and nearly collapsed the Oroville Dam, the tallest dam in North America. The tremendous water flows severely damaged the dam's spillways, prompting the evacuation of about 190,000 people downriver of the dam (Park & Mclaughlin, 2017). This particular crisis is an example of how the intersection of climate change and infrastructure that is either aging or that was designed for different conditions can potentially lead to a catastrophe (Vahedifard et al., 2017). With the likelihood of more frequent extreme events in the future, situations like the one experienced at the Oroville Dam will become more common.

The intersection of climate change and human activity is also elevating the risk of severe wildfires in large portions of the world. Models suggest that precipitation was the primary driver behind global fire regimes during the preindustrial era, and then shifted towards an anthropogenic-driven regime during the industrial period (Pechony & Shindell, 2010). Now it appears that temperature will play a strong role in the 21st century in global wildfires (Pechony & Shindell, 2010). The combination of increasing temperatures at the global scale with increased propensity of wildfires due to human activity at the local level, could lead to massive infernos (Bonan, 2008). Wildfire severity and frequency will be dramatically increased wherever the mean temperature in a region increases by 3°C or more; unfortunately, in the Sahel, central Australia, central Asia, southern Africa, the western U.S., and in most of South America, warming is indeed expected to exceed 3°C (Scholze et al., 2006). This is a global threat.

#### Err Aff on impact calculus---you’re cognitively biased against climate impacts because you haven’t experienced them, AND they’re in the far future.

Dr. Adam Briggle 21, Ph.D. in environmental studies, Colorado Boulder, associate professor and the director of graduate studies in the philosophy department at the University of North Texas,   
“The Unnatural Growth of the Natural,” Chapter 2 in *Thinking Through Climate Change*, pp 14-17, doi:10.1007/978-3-030-53587-2, pacc

The scale of the Anthropocene and the speed of the Great Acceleration pose a fundamental dilemma spotted by the German philosopher Gunther Anders early in the atomic age. For nearly all of history, our abilities to imagine (vorstellen) outstripped our abilities to produce (her-stellen). We could dream big, but we lacked the energy to build big. Now, things are inverted. Our productive powers exceed our imaginative ones. We are making a world that we cannot comprehend. The scholar Timothy Morton (2013) puts this in terms of 'hyperobjects,' phenomena that are so massively distributed across time and space as to confound our usual way of making sense of things.

Climate change is the prime example. It is there in the flood or the wildfire, but it is also not there. We can neither escape it nor keep our attention trained on it. Despite billions of dollars of scientific research, we have still never experienced or felt the climate. What we experience is weather, and it's always changing, so what's the big deal? That might explain why fossil fuels remain at around 80% of the world's energy mix—the same as it was back in 1987 (Harder 2019). The global economy hasn't decarbonized any faster during the era of climate science than it did in the two decades prior to all that knowledge (Pielke 2019).

Are we even capable of grasping what we are doing? As Nietzsche asked in his parable of the madman from The Gay Science, "Is not the greatness of this deed too great for us?" (1882, para. 125).

Climate change is everywhere and nowhere. It is now, but it can't be now because the now is the time of weather. After Hurricane Dorian devastated the Bahamas in 2019, the homeless survivors looked like victims of bad weather rather than climate. You can see how we might react to a climate apocalypse like the proverbial frog in the boiling pot of water comfortably slipping into oblivion.

Before he was forced to flee Nazi Germany in 1933, Anders married the political thinker (and fellow student of Martin Heidegger) Hannah Arendt. In her 1958 book The Human Condition, Arendt worried that we may soon no longer be able to "understand, that is to think and speak about the things which nevertheless we are able to do."

Hans Jonas (1984), another student of Heidegger's and a lifetime friend of Arendt, argued that all previous ethics could assume "that the range of human action and therefore responsibility was narrowly circumscribed." Our high-energy machines have altered the scale of our action and since ethics has to do with action, our ethics must change. But we may simply not be wired for this. If you strap someone into a functional magnetic resonance imaging machine (fMRI) and watch as they think about themselves, their medial prefrontal cortex lights up. We care deeply about ourselves. The lights get dimmer and dimmer as we think about people further removed from this central ego—family, friends, and acquaintances (see Walsh 2019). Thinking about a stranger in the Bahamas who lost their home hardly creates any spark at all.

It's not just spatial scales that challenge our moral psychology. It's also time. The prefrontal cortex even dims when you think about yourself in the future. As economists know, we discount the near future, which means it is worth less. The far future is entirely worthless, but of course what we call the "far future" is no time at all for the planet. There's the problem: we are geological agents unable to think geologically. Time and space are slipping from our grasp. This is why "global weirding" is a good term for what is happening.

Anders (1957) wrote that your first thought upon waking up in the morning should be 'Atom.' You should call to mind the enormous powers pulsing under the seemingly steady day-to-day world. "For you should not begin your day," he continued, "with the illusion that what surrounds you is a stable world." Your second thought should be: "The possibility of the Apocalypse is our work. But we know not what we are doing." Even the experts are ignorant when it comes to the whole. We cannot "realize the reality which we can bring into being." There is a gap between our actions and our imagination. Weird things are falling through the crack.

What was a gap in the time of Arendt and Anders is now a chasm. We have altered the energy balance of the entire planet. Now our first thought on waking in the morning should be CARBON, because the extra energy trapped in the ribbon-thin atmosphere from greenhouse gas emissions is equivalent to that released by 400,000 nuclear bombs exploding every day (Hansen 2012). We are proving that Heraclitus was right with his original philosophy of energy: all is fire.

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The challenge facing us is unlike any other in human history: We have to fathom the world that we are making. The understanding that we require is not just scientific or technological, and the 'energy' we have to fathom is not just the stuff stored in chemical bonds, flowing through pipelines, or buzzing across wires. The energy transition that caused the Anthropocene is not just the one to nuclear power and fossil fuels. Something deeper happened over the last few hundred years. There was a revaluation of values, a transition from a world of virtues to a world of volts. As a result, the metabolic energies of human labor and consumption became unhinged and we started eating the planet.

Living organisms constantly wrest themselves from non-self. They pull in air and nourishment for their metabolic fires. The basic energies of life are labor and consumption (which are two stages of the same process), and they are incessant. I will feel the pangs of hunger tonight even though I just ate lunch. It will come again in the morning and for the rest of my life. The caloric demands of the consuming and laboring body cease only upon death. But this incessant activity, Arendt argued, is one that spins round and round a wheel and in that sense it "remained stationary" for all of human history. All along the long shaft of the hockey stick, human energy was "imprisoned in the eternal recurrence of the life process to which it was tied" (Arendt 1958, p. 46).

The jutting blade of the hockey stick, the Great Acceleration, is the rupturing of the chains that had kept this incessant life process spinning cyclically. Labor and consumption were taken from the dark interior of the private realm and admitted into the public realm. The household economy became the global economy. Labor, Arendt notes, has become liberated "from its circular, monotonous recurrence and transformed...into a swiftly progressing development whose results have in a few centuries totally changed the whole inhabited world" (p. 47). As Nietzsche put it, we lost all sense of limit or measure and embraced "the thrill of the infinite." We went from a world of virtues to a world of volts.

Arendt thought that this was a paradox. She called it "the unnatural growth of the natural," because the natural metabolic energy transformations were unleashed beyond all natural boundaries. We call this economic growth. Just as I need to feed my own metabolic fire with lunch, we need to feed this global metabolic fire. The difference is, though, that my body only grows to a point and then stops. The collective body of the Anthropocene keeps growing beyond all proportion and measure. There is no limit, no sense of sufficiency.

Can this continue? As I was writing this book, climate change morphed into the climate crisis. Greenland experienced a record ice melt. There were record heat waves in Europe, and unprecedented fires and floods around the world. The hockey stick blades kept reaching alarming new highs. Despite climate treaties, global CO2 emissions kept going up. The Intergovernmental Panel on Climate Change (IPCC), the world's most respected source of climate science, issued new studies with grim news about the impact of the human economy on planet Earth. Saying that they have a "moral obligation" to "tell it like it is," over 11,000 scientists broke with the more conservative rhetoric of the IPCC and issued a statement proclaiming that "Earth is facing a climate emergency" (Ripple et al. 2019). Prominent voices warned that the Earth may soon be uninhabitable (Wallace-Wells 2019) and that the human game may be playing itself out (McKibben 2019).

### 2NC---AT: Inevitable

#### It’s not too late

Lindsey Walter 18, Policy Advisor in the Clean Energy Program at Third Way, M.P.A. in Environmental Science and Policy at Columbia’s School of International and Public Affairs, Fulbright Scholar, “3 Reasons For Hope in the IPCC’s New Climate Report”, 10-9, https://www.thirdway.org/op-ed/3-reasons-for-hope-in-the-ipccs-new-climate-report

#1 We’re Not Too Late…Yet

The report states that “past emissions alone are unlikely to raise [global mean surface temperature] to 1.5°C above pre-industrial levels.” This means it is not inevitable that we will hit 1.5°C warming due to our past emissions.

There is still an opportunity, albeit a short one, to change our priorities and policies, commit to drastically reducing our emissions, and prevent a level of global warming that will cause irreversible and devastating impacts on people and the planet.

But don’t mistake this bit of good news as a justification to take a breather or confirmation that we are doing well enough already. The report also explains, “If emissions continue at their present rate, human-induced warming will exceed 1.5°C by around 2040.” We are definitely not on track, but the evidence shows we still have time to remedy that.

#2 We Can Fight Climate Change By Becoming More Resilient

To halt global warming, we ultimately need to reduce the amount of carbon dioxide in the atmosphere. But we can also fight back by making ourselves more resilient to the impacts of climate change, thereby reducing the toll it takes on people and the global economy. More than previous IPCC reports, this one makes it clear that resiliency solutions are climate change solutions, adding even more tools to our toolbox to help us fix this problem.

Poor and disadvantaged communities are the most impacted by climate change, bearing the brunt of the consequences for our global actions. By steering a relatively small percentage of our overall climate efforts toward lifting these people out of poverty and providing more economic and social opportunity, we can drastically lessen the damage from climate change.

Becoming more resilient is a proactive approach to protecting communities while tackling emissions reductions simultaneously--basically allowing us to attack climate change on two flanks.

#3 We are Capable of Making Rapid Transitions

The report explains that we need to make sweeping, global changes at a rate that has “no documented historic precedent” in order to stay below 1.5°C. But it also reminds us that we have made transitions this rapid “within specific sectors, technologies, and spatial contexts.” These examples of smaller, successful transitions offer reason for hope--that we could replicate and build upon them, again and again, across the globe, in order to see large-scale change. So it’s not a matter of “can we?”, but “will we?”.

Already, we’ve seen significant innovation in technologies to produce zero-carbon energy and even remove carbon dioxide from the atmosphere; both of which are highlighted as critical components of 1.5°C strategy. In fact, rapid transitions with wind, solar, and electricity storage suggest a larger “system transition in electricity generation may be underway.” Advancements in other low- and zero-carbon energy sources, including nuclear, geothermal, and carbon capture, could provide further crucial emissions reductions for the energy sector.

A rapid transition to a low-carbon world is challenging, but we can achieve it if we commit to doing so.

### 2NC---SV Add-on

#### Warming creates ‘compound injustice’ that accelerates structural violence along racial, gendered, and ableist lines

Alice Venn 19, LL.B. (Hons) from the Univeristy of Warwick, Advanced LL.M. in Public International Law with Leiden University's Grotius Centre for International Legal Studies, PhD Candidate in Environment, Energy & Resilience at the University of Bristol Law School, “Social justice and Climate Change”, Managing Global Warming: An Interface of Technology and Human Issues, ScienceDirect

24.1. Introduction

“In the US as elsewhere, the injustice of climate change means the most vulnerable people in society—the poor, the young, the elderly, the unemployed and the marginalised—are most affected by climate impacts such as severe flooding and prolonged drought.” [1] Mary Robinson.

The remarks of the former UN High Commissioner for Human Rights and Special Envoy on Climate Change on the announcement of the withdrawal of the United States from the Paris Agreement in June 2017 poignantly illustrate the social injustice inherent in climate change impacts and, often, climate policy responses themselves. The adverse impacts of climate change, from sea-level rise, to extreme weather events and temperature rises [2] are felt most acutely by those groups in society who already experience marginalization and socioeconomic hardship [3], for whom adaptive capacity is limited. Climate change, in turn, represents a significant stress factor with the potential to compound poverty [4] and to jeopardize human security [5] and health [6]. Both direct and indirect climate impacts, including heightened food and water insecurity [7], and even the increased risk of outbreaks of collective violence [8], are more likely to affect low-income countries and communities. Natural disasters intensified by climate change such as tropical cyclones and hurricanes [9] have been found to present graver risks to people with disabilities [10], women [11], racial minorities and the poorest members of society [12]. A self-perpetuating cycle of climate vulnerability and social injustice is thereby created in which those most affected by socioeconomic hardship and marginalization are most severely impacted by climate change and, in turn, see their adaptive capacity further reduced. Shue labels this “compound injustice” where the existence of an injustice lays the foundation for further injustice [13]. The inherent inequity in the manifestation of climate impacts is evident at both the global level, where Least Developed Countries and Small Island Developing States with limited economic resources face disproportionate climate loss and damage [14], and at the subnational level, where socioeconomic, cultural, and structural inequalities serve to exacerbate the climate vulnerability of particular groups and individuals [15].

#### Allowing warming to continue perpetuates racist inequalities

J. Andrew Hoerner 8, Director of the Sustainable Economics Program at Redefining Progress, and Nia Robinson, Director of the Environmental Justice and Climate Change Initiative, “A Climate of Change: African Americans, Global Warming, and a Just Climate Policy for the U.S.”, Environmental Justice and Climate Change Initiative Report, June

Everywhere we turn, the issues and impacts of climate change confront us. One of the most serious environmental threats facing the world today, climate change has moved from the minds of scientists and offices of environmentalists to the mainstream. Though the media is dominated by images of polar bears, melting glaciers, flooded lands, and arid desserts, there is a human face to this story as well. Climate change is not only an issue of the environment; it is also an issue of justice and human rights, one that dangerously intersects race and class. All over the world people of color, Indigenous Peoples and low-income communities bear disproportionate burdens from climate change itself, from ill-designed policies to prevent it, and from side effects of the energy systems that cause it. A Climate of Change explores the impacts of climate change on African Americans, from health to economics to community, and considers what policies would most harm or benefit African Americans—and the nation as a whole. African Americans are thirteen percent of the U.S. population and on average emit nearly twenty percent less greenhouse gases than non-Hispanic whites per capita. Though far less responsible for climate change, African Americans are significantly more vulnerable to its effects than non- Hispanic whites. Health, housing, economic well-being, culture, and social stability are harmed from such manifestations of climate change as storms, floods, and climate variability. African Americans are also more vulnerable to higher energy bills, unemployment, recessions caused by global energy price shocks, and a greater economic burden from military operations designed to protect the flow of oil to the U.S.

Climate Justice: The Time Is Now

Ultimately, accomplishing climate justice will require that new alliances are forged and traditional movements are transformed. An effective policy to address the challenges of global warming cannot be crafted until race and equity are part of the discussion from the outset and an integral part of the solution. This report finds that: Global warming amplifies nearly all existing inequalities. Under global warming, injustices that are already unsustainable become catastrophic. Thus it is essential to recognize that all justice is climate justice and that the struggle for racial and economic justice is an unavoidable part of the fight to halt global warming. Sound global warming policy is also economic and racial justice policy. Successfully adopting a sound global warming policy will do as much to strengthen the economies of low-income communities and communities of color as any other currently plausible stride toward economic justice. Climate policies that best serve African Americans also best serve a just and strong United States. This paper shows that policies well-designed to benefit African Americans also provide the most benefit to all people in the U.S. Climate policies that best serve African Americans and other disproportionately affected communities also best serve global economic and environmental justice. Domestic reductions in global warming pollution and support for such reductions in developing nations financed by polluter-pays principles provide the greatest benefit to African Americans, the peoples of Africa, and people across the Global South. A distinctive African American voice is critical for climate justice. Currently, legislation is being drafted, proposed, and considered without any significant input from the communities most affected. Special interests are represented by powerful lobbies, while traditional environmentalists often fail to engage people of color, Indigenous Peoples, and low-income communities until after the political playing field has been defined and limited to conventional environmental goals. A strong focus on equity is essential to the success of the environmental cause, but equity issues cannot be adequately addressed by isolating the voices of communities that are disproportionately impacted. Engagement in climate change policy must be moved from the White House and the halls of Congress to social circles, classrooms, kitchens, and congregations. The time is now for those disproportionately affected to assume leadership in the climate change debate, to speak truth to power, and to assert rights to social, environmental and economic justice. Taken together, these actions affirm a vital truth that will bring communities together: Climate Justice is Common Justice. African Americans and Vulnerability In this report, it is shown that African Americans are disproportionately affected by climate change. African Americans Are at Greater Risk from Climate Change and Global Warming Co-Pollutants

• The six states with the highest African American population are all in the Atlantic hurricane zone, and are expected to experience more intense storms resembling Katrina and Rita in the future.

• Global warming is expected to increase the frequency and intensity of heat waves or extreme heat events. African Americans suffer heat death at one hundred fifty to two hundred percent of the rate for non-Hispanic whites.

• Seventy-one percent of African Americans live in counties in violation of federal air pollution standards, as compared to fifty-eight percent of the white population. Seventy-eight percent of African Americans live within thirty miles of a coal-fired power plant, as compared to fifty-six percent of non-Hispanic whites.

# AFF

## 2AC---Offense

### 2AC---Grid Impact

#### Grid collapse causes extinction

Weiss ’19 [Matthew and Martin; May 29; National Sales Director at United Medical Instruments, UMI and Research assistant at the American Jewish University; Neurosurgeon at UCLA-Olive View Medical Center; Energy, Sustainability, and Society, “An assessment of threats to the American power grid,” vol. 9]

In testimony before a Congressional Committee, it has been asserted that a prolonged collapse of this nation’s electrical grid—through starvation, disease, and societal collapse—could result in the death of up to 90% of the American population [1].

There is no published model disclosing how these numbers were arrived at, nor are we able to validate a primary source for this claim. Testimony given by the Chairman of the Congressional EMP Commission, while expressing similar concerns, gave no estimate of the deaths that would accrue from a prolonged nationwide grid collapse [2].

The power grid is posited to be vulnerable to geomagnetic storms generated by solar activity, electromagnetic pulses (EMP, also referred to as HEMP) produced by high altitude nuclear detonations, cyberattack, and kinetic (physical) attack. Evidence for and against the validity of each of these threats follows below. Much of the knowledge on these matters is classified. The studies for and against EMP, other than for limited testing of a few components of the infrastructure by the EMP commission, are based not on physical demonstrations but mathematical models and simulations. Moreover, the underlying physics and technology involved—the electrical engineering and materials science—is likely beyond the understanding of the reader, and certainly beyond that of these writers. With these limitations in mind, we proceed.

The electrical grid

HV (high voltage) transformers—transmitting voltages of greater than 100 kV—are what make it possible to send electricity over great distances to thousands of substations, where smaller transformers reduce the voltage.

HV transformers are the weak link in the system, and the Federal Energy Regulatory Commission (FERC) has identified 30 of these as being critical. The simultaneous loss of just 9, in various combinations, could cripple the network and lead to a cascading failure, resulting in a “coast-to coast blackout” [3].

If the HV transformers are irreparably damaged it is problematic whether they can be replaced. The great majority of these units are custom built. The lead time between order and delivery for a domestically manufactured HV transformer is between 12 and 24 months [4], and this is under benign, low demand conditions.

The first practical application of the transformer was invented in the USA by William Stanley, but largely as a consequence of American trade policy (“It doesn’t make any difference whether a country makes potato chips or computer chips”- attributed to Michael Boskin, Chairman of President George H W Bush’s Council of Economic Advisors) [5] there is little manufacturing capability remaining in the USA. Worldwide production is less than 100 per year and serves the rapidly growing markets of China and India. Only Germany and South Korea produce for export.

Ordered today, delivery of a unit from overseas (responsible for 85% of current American purchasing) would take nearly 3 years [6]. The factory price for an HV transformer can be in excess of $10 million—too expensive to maintain an inventory solely as spares for emergency replacement.

Potential mechanisms of collapse

Geomagnetic storms

Geomagnetic storms are due to coronal mass ejections (CMEs)—massive eruptions of plasma expelled from the sun’s corona. Plasma is the fourth fundamental state of matter, consisting of free electrons and positively charged ions. The sun, like all stars, is plasma.

Coronal mass ejections often occur with solar flares, but each can also take place in the absence of the other. The latter emits radiation in all bands of the electromagnetic spectrum (e.g., white light, ultraviolet light, X-rays, and gamma rays) and unlike CMEs, affect little more than radio communications.

CME’s take several days to reach the Earth. The radiation generated by solar flares on the other hand arrives in 8 min.

Coronal mass ejections carry an intense magnetic field. If a storm enters the earth’s magnetosphere, it causes rapid changes in the configuration of the earth’s magnetic field. Electric current is generated in the magnetosphere and ionosphere, generating electromagnetic fields at ground level. The movement of magnetic fields around a conductor, i.e., a wire or pipe, induces an electric current. The longer the wire, the greater the amplification. The current induced is akin to DC (direct current), which the electrical system poorly tolerates. Our grid is based on AC. The excess current can cause voltage collapse, or worse, cause permanent damage to large transformers.

The current flowing through HV transformers during a geomagnetic disturbance can be estimated using storm simulation and transmission grid data [7]. From these results, transformer vulnerability to internal heating can be assessed.

The largest recorded geomagnetic storm occurred Sept 1–2, 1859—the Carrington event, named after the English amateur astronomer, Richard Carrington. Auroras were seen as far south as the Caribbean. Campers in the Rocky Mountains were awakened shortly after midnight by “an auroral light so bright that one could easily read common print. Some of the party insisted it was daylight and began preparation for breakfast” [8]. Telegraph wires transmitted electric shocks to operators and ignited fires.

In May 1921, there was another great geomagnetic disturbance (GMD), the railroad storm. The National Academy of Sciences estimates that if that storm occurred today, it could cause 1–2 trillion dollars damage and full recovery could take 4–10 years [9].

The basis for this assertion is a presentation made by J Kappenman of Metatech, the Goleta California engineering consulting firm, given as part of the NAS Space weather workshop titled “Future Solutions, Vulnerabilities and Risks”, on May 23, 2008. The simulation asserts that a 1921 intensity storm could damage or destroy over 300 transformers in the US, and leave 130 million people without power [10]. Elsewhere, Kappenman states that in a worst case situation, geomagnetic disturbances could instantly create loss of over 70% of the nation’s electrical service [11].

In March 1989, a geomagnetic storm caused collapse of the power grid in Quebec, leaving 6 million without power for 9 h. NERC (the North American Electric Reliability Council), a self-regulated trade organization formed by the electric utility industry, asserts that the blackout was not due to overheating of transformers from geomagnetically induced current, but to the near-simultaneous tripping of seven relays, and this is correct [12]. The rapid voltage collapse (within 93 s) likely prevented transformer thermal damage. The same storm, however, destroyed a major transformer at the Salem nuclear plant in New Jersey [13]. The 1989 Hydro-Quebec storm was 1/10th the intensity of the 1921 Railroad Storm [14].

A report for Lloyd’s in 2013 states a Carrington-level extreme geomagnetic storm is almost inevitable in the future. Using its own models and simulations, it puts the US population at risk at between 20 and 40 million, with the outages lasting up to 1–2 years [15].

Because of geography and ground conductivity, the risk of a transformer sustaining damage is 1000 times greater in some US counties than in others. The highest risk is to the counties along the corridor between Washington DC and New York [16].

The first written account of a solar storm is possibly in the book of Joshua. Written reports of aural sightings by Greeks and Romans begin in 371 BC.

A Carrington-level storm narrowly missed the earth in 2012 [17]. NASA has produced a video on the CME [18]. Formerly considered a 1 in 100-year event, the likelihood of a Carrington intensity storm striking the earth has most recently been placed at 12% per decade [19].

Mitigation

The EMP Commission, in its 2008 report, found that it is not practical to try to protect the entire electrical power system or even all high-value components. It called however for a plan designed to reduce recovery and restoration times and minimize the net impact of an event [20]. This would be accomplished by “hardening” the grid, i.e., actions to protect the nation’s electrical system from disruption and collapse, either natural or man-made [21]. The shielding is accomplished through surge arrestors and similar devices [22]. The cost to harden the grid, from our tabulation of Congressional EMP figures, is $3.8 billion.

There has been no hardening of the grid

The commission and organization that are responsible for public policy on grid protection are FERC and NERC. FERC (The Federal Energy Regulatory Commission) is an independent agency within the Department of Energy. NERC, the self-regulatory agency formed by the electric utility industry, was renamed the North American Electric Reliability Corporation in 2006.

In June of 2007, FERC granted NERC the legal authority to enforce reliability standards for the bulk power system in the USA. FERC cannot mandate any standards. FERC only has the authority to ask NERC to propose standards for protecting the grid.

NERC’s position on GMD is that the threat is exaggerated.

A report by NERC in 2012 asserts that geomagnetic storms will not cause widespread destruction of transformers, but only a short-term (temporary) grid instability [23]. The NERC report did not use a model that was validated against past storms, and their work was not peer-reviewed.

The NERC report has been criticized by members of the Congressional EMP commission. Dr. Peter Pry asserts that the final draft was “written in secret by a small group of NERC employees and electric utility insiders….. The report relied on meetings of industry employees in lieu of data collection or event investigation” [22].

NERC, in turn, criticizes Kappenman’s work. NERC states that the Metatech work cannot be independently confirmed [24]. NERC reliability manager Mark Lauby criticized the report for being based on proprietary code [24]. Kappenman’s report, however, received no negative comments in peer review [24].

The NERC standards

The reliability standards and operational procedures established by NERC, and approved by FERC, are disputed [25]. Among the points are these:

1. The standards against GMD do not include Carrington storm class levels. The NERC standards were arrived at studying only the storms of the immediate prior 30 years, the largest of which was the Quebec storm. The GMD “benchmark event”, i.e., the strongest storm which the system is expected to withstand, is set by NERC as 8 V/km [26]. NERC asserts this figure defines the upper limit intensity of a 1 in 100-year storm [26]. The Los Alamos National Laboratory, however, puts the intensity of a Carrington-type event at a median of 13.6 V/km, ranging up to 16.6 V/km [27]. Another analysis finds the intensity of a 100-year storm could be higher than 21 V/km [28].

2. The 15–45 min warning time of a geomagnetic storm provided by space satellites (ACE and DSCOVR) will be insufficient for operators to confer, coordinate, and execute actions to prevent grid damage and collapse.

Testimony of Edison Electric Institute official Scott Aaronson under questioning by Senator Ron Johnson in a hearing before the Senate Homeland Security and Governmental Affairs Committee in 2016 encapsulates some of the issues. Video of the exchange is available on the web [29]. The Edison Electric Institute (EEI) is the trade association that represents all US investor-owned electric companies.

Johnson: Mr. Aaronson, I just have to ask you – the protocol of warning 15–30 min – who is going to make that call? I mean, who is going to make that for a massive geomagnetic disturbance, that nobody knows how many of these transformers are going to be affected. Who is going to make that call to shut them off line – to take them off line – so those effects do not go through those wires and destroy those large transformers that cannot be replaced?

Aaronson: So, the grid operators are tightly aligned. We talked about the fact that there are 1900 entities that make up the bulk electric system. There are transmission operators and so on…

Johnson (interrupting): Who makes the call? Who makes the call – we are going to shut them all down in 30 min, in 15 min?

Aaronson: It’s not as simple as cutting the power. That’s not how this is going to work but there is again, there is this shared responsibility among the sector.

Johnson: Who makes the call?

Aaronson: I do not know the answer to that question [29].

Mr. Aaronson’s is Managing Director for Cyber and Infrastructure Security at EEI.

Congressman Trent Franks, R Az introduced HR 2417, the SHEILD Act, on 6/18/2013. The bill would give FERC the authority to require owners and operators of the bulk power system to take measures to protect the grid from GMD or EMP attack. The costs would be recovered by raising regulated rates.

Franks states he had been led to believe that his bill would be brought to the House floor for a vote. But he states House Energy and Commerce Committee Chairman Fred Upton R, Mich., let it die in committee. He has been unable to get an explanation from Upton [30].

Between 2011 and 2016, Mr. Upton has received $1,180,000 in campaign contributions from the electric utility industry [31].

The electric utility industry is heavily involved in campaign donations. During the 2014 federal election cycle, the electric utility industry made $21.6 million in campaign contributions [32]. The electrical utility industry is particularly involved in state politics. For instance, in Florida, between 2004 and 2012 electric utility companies donated $18 million into legislative and state political campaigns. In that state, the electric utilities employ one lobbyist for every two legislators [33].

Electric utility revenue in 2015 was 391 billion dollars [34].

Electromagnetic pulse

Of the scenarios that might lead to electrical network collapse, EMP has received the widest public attention. It has been the subject of television series, films, and novels. HEMP (for high altitude) is the more accurate acronym, but as media and the public use EMP, we will use both interchangeably.

The issue has become highly politicized. The most prominent article in the media against EMP as a threat is by Patrick Disney, “The Campaign to Terrify You about EMP” published in the Atlantic in 2011. “From Newt Gingrich to a Congressional ‘EMP Caucus’, some conservatives warn the electronic frying blast could pose gravely underestimated dangers on the U.S…..Ballistic missile defense seems to be the panacea for this groups concern, though a generous dose of preemption and war on terror are often prescribed as well” [35].

As of 2009, Mr. Disney was acting Policy Director for the National Iranian American Council (NIAC). NIAC has been accused of acting as a lobby for the Islamic Republic of Iran [36].

Mr. Disney is quoted as stating his strategy, in advancing an Iranian interest, is to “create a media controversy” [36].

The campaign to discredit EMP has been largely successful. To a very large part of the body politic EMP is identified as a cause limited to the far right.

A high-altitude electromagnetic pulse (EMP) is produced when a nuclear device is detonated above the atmosphere. No radiation, blast, or shock wave is felt on the ground, nor are there any adverse health effects, but electromagnetic fields reach the surface.

An EMP has three components, E1 through E3, defined by speed of the pulse. Each has specific characteristics, and specific potential effects on the grid. E1, the first and fastest component, affects primarily microelectronics. E3, the later and slower component, affects devices attached to long conductive wires and cables, especially high-voltage transformers.

A single nuclear blast will generate an EMP encompassing half the continental USA [37]. Two or three explosions, over different areas, would blanket the entire continental USA.

The potential impact of an EMP is determined by the altitude of the nuclear detonation, the gamma yield of the device, the distance from the detonation point, the strength and direction of the earth’s magnetic field at locations within the blast zone and the vulnerability of the infrastructures exposed. The E1 gamma signal is greatest for bursts between 50 and 100 km altitude. E3 signals are optimized at busts between 130 and 500 km altitude, much greater heights than for E1 [38]. Higher altitude widens the area covered, but at the expense of field levels. The 1963 atmospheric test ban has prevented further testing.

E1 and its effects

The E1 pulse (“fast pulse”) is due to gamma radiation (photons), generated by a nuclear detonation at high altitude, colliding with atoms in the upper atmosphere. The collisions cause electrons to be stripped from the atoms, with the resultant flow of electrons traveling downward to earth at near the speed of light. The interaction of the electrons with the earth’s magnetic field turns the flow into a transverse current that radiates forward as an intense electromagnetic wave. The field generates extremely high voltages and current in electrical conductors that can exceed the voltage tolerance of many electronic devices. All this occurs within a few tens of nanoseconds.

The Congressional EMP Commission postulated that E1 would have its primary impact on microelectronics, especially SCADAs (Supervisory Control and Data Acquisition), DCSs (digital control systems), and PLCs (programmable logic controllers). These are the small computers, numbering now in the millions, that allow for the unmanned operation of our infrastructure.

To assess the vulnerability of SCADAs to EMP, and therefore the vulnerability of our infrastructure, the EMP Commission funded a series of tests, exposing SCADA components to both radiated electric fields and injected voltages on cables connected to the components. The intent was to observe the response of the equipment, when in an operational mode, to electromagnetic energy simulating an EMP. “The bottom line observation at the end of the testing was that every system tested failed when exposed to the simulated EMP environment” [6].

E1 can generate voltages of 50,000 V. Normal operating voltages of today’s miniaturized electronics tend to be only a few (3-4) volts. States the EMP Commission: “The large number and widespread reliance on such systems by all the nation’s critical infrastructures represent a systemic threat to their continued operation following an EMP event” [39]. A scenario seen in films is all automobiles and trucks being rendered inoperable. This would not be the case. Modern automobiles have as many as 100 microprocessors that control virtually all functions, but the vulnerability has been reduced by the increased application of electromagnetic compatibility standards. The EMP Commission found that only minor damage occurred at an E1 field level of 50 kV/m, but there were minor disruptions of normal operations at lower peak levels as well [40].

There is a self-published post (J. Steinberger, Nobel laureate physics, 1988) disputing the potential effects of E1 [41]. This is an isolated opinion.

Shielding against E1 could theoretically be accomplished through the construction of a Faraday cage around specific components or an entire facility. The cage is composed of conductive materials and an insulation barrier that absorbs pulse energy and channels it directly into the ground. The cage shields out the EM signals by “shorting out” the electric field and reflecting it.

To be an effective Faraday cage, the conductive case must totally enclose the system. Any aperture, even microscopic seams between metal plates, can compromise the protection. To be useful, however, a device must have some connection with the outside world and not be completely isolated. Surge protective devices can be used on metallic cables to prevent large currents from entering a device, or the metallic cables can be replaced by fiber optic cables without any accompanying metal. The US Military has taken extensive measures to protect (“harden”) its equipment against E1. “On the civilian side, the problem has not really been addressed” [42].

E3 and its effects

E3 is caused by the motion of ionized bomb debris and atmosphere relative to the geomagnetic field, resulting in a perturbation of that field. This induces currents of thousands of amperes in long conductors such as transmission lines that are several kilometers or greater in length. Direct currents of hundreds to thousands of amperes will flow into transformers. As the length of the conductor increases, the amperage amplifies.

The physics of E3 are similar to that of a GMD, but not identical. GMD comes from charged particles showering down from space creating current flow in the ionosphere. These currents create magnetic fields on the ground. A nuclear burst on the other hand generates particles which create a magnetic bubble that pushes on the earth’s magnetic field producing a changing magnetic field at the Earth’s surface. A geomagnetic storm will have substorms that can move over the Earth for more than 1 day, while the E3 HEMP occurs only immediately following a nuclear burst.

There are three studies on the potential effects of a HEMP E3 on the power grid.

The first study, published in 1991, found there would be little damage [43]. Although supporting the utility industry’s position, it has not been subsequently cited by either NERC or the industry. The study is criticized for expressing a smaller threat intensity [44]. The second, published in 2010 by Metatech, calculated that a nuclear detonation 170 km over the USA would collapse the entire US power grid [45]. The third study, by EPRI (an organization funded by the electric utility industry) published in February 2017, asserts that a single high-altitude burst over the continental USA would damage only a few, widely scattered transformers [46]. The study is disputed for underestimating threat levels and using erroneous models [44].

These results are incompatible. One’s interpretation of the studies on E3 (and GMD) is based largely on the credibility one gives to the underlying Commission or Institute, and not the published calculations.

FERC has decided not to proceed with a GMD standard that includes EMP [47]. It will be recalled the GMD standard is 8 V/km. The EMP Commission, utilizing unclassified measured data from the Soviet era nuclear tests, found an expected peak level for E3 HEMP for a detonation over the continental USA would be 85 V/km [48].

The position of the electric utility industry is that E3 from a nuclear detonation is not a critical threat [49]. Others have come to a different conclusion. Israel has hardened her grid [50]. She perceives herself to face an existential threat, and it is not the Sun.

The electric utility industry states the cost of hardening the grid against EMP is the government’s responsibility, not the industry’s [51].

Cyberattack

The vulnerability from a cyberattack is exponentially magnified by our dependence on SCADAs.

In 2010, a computer worm attacking SCADA systems was detected. Although widely spread, it was designed to only attack SCADA systems manufactured by Siemens for P-1 centrifuges of the Iranian nuclear enrichment program. The attack destroyed between 10 and 20% of Iranian centrifuges. Iran’s program was likely only briefly disrupted [52]. In December 2015, a cyberattack was directed against the Ukrainian power grid. It caused little damage as the grid was not fully automated.

There is an argument that the cyber threat is exaggerated. Thomas Rid states that viruses and malware cannot at present collapse the electric grid. “(The world has) never seen a cyber- attack kill a single human being or destroy a building” [53]. The electric utility industry offers a similar perspective. In testimony on cybersecurity before the Senate Homeland Security and Governmental Affairs Committee, its representative states that “There are a lot of threats to the grid…..from squirrels to nation states, and frankly, there have been more blackouts as a result of squirrels (gnawing wire insulation) then there are from nation states” [54].

Others however express concern [55]. Moreover, in a report by the Department of Defense in 2017, it is noted that “the cyber threat to critical US infrastructure is outpacing efforts to reduce pervasive vulnerabilities.” [56] That report notes that “due to our extreme dependence on vulnerable information systems, the United States today lives in a virtual glass house” [57].

On March 15, 2018, the Department of Homeland Security issued an alert that the Russian government had engineered a series of cyberattacks targeting American and European nuclear power plants and water and electric systems [58]. It is reported these attacks could allow Russia to sabotage or shut down power plants at will [59].

The ability to operate a system in the absence of computer-driven actions is fast disappearing. The electric power industry spends over $1.4 billion dollars annually to replace electromechanical systems and devices that involve manual operation with new SCADA equipment [60]. With modest increases in efficiency come exponential increases in vulnerability. The extent to which reduced labor costs (and perhaps reduced energy costs) are passed on to the public is uncertain.

#### Grid collapse causes meltdowns---Extinction

Nadesan ’14 [Majia; September 13; professor of communication at ASU, their interdisciplinary research examines the ethical implications of societal governing logics and risk-management strategies; “The Nuclear Energy Paradigm Collides with Earth Changes and Technospheric Breakdown,” The Millenium Report, themillenniumreport.com/2014/09/will-fukushima-become-an-extinction-level-event]

As Technospheric Breakdown Accelerates, Nuclear Power Generation Mishaps will Increase and Intensify

There is really no way around this eventuality. As all the nuclear power plants age, they will succumb to the micro-stresses which inevitably occur in such an ever-deteriorating environment. Most people are unaware of the true depth and breadth of technospheric breakdown since it is a concept rarely taken up by academia or the media. The following excerpts provide a wider perspective of this unavoidable byproduct of the Industrial Revolution.

Technospheric breakdown is something that occurs everywhere around the globe, 24/7, without interruption, and with tremendous repercussions. Let’s start with anything that has been manufactured in the factories of the modern world or built on the surface of the Earth. Simply put, everything is in the constant state of breaking down, degeneration, deterioration.

What does this really mean when we say that every bridge is slowly breaking down, every road is in greater disrepair with each passing day, every reservoir is gradually degrading, every office building, every factory, every school, every home, etc. most of which adhered to very low building standards in the first place?

What does it mean when the infrastructure for every sewer system, municipal water division, electrical grid, airport, railway station, etc. is in a slow but sure process of degrading and breaking down. So, unfortunately, is every nuclear power plant across the planet. (Cosmic Convergence)

What makes this ongoing process of physical degradation so insidious is that it almost always occurs subliminally. Through a gathering array of various forces throughout post-modern civilization, there does exist a sort of conspiracy of circumstances which has greatly magnified the effects of technospheric breakdown. The completed marriage between the industrial base of the Western powers and the financial class throughout the world has guaranteed that this slow motion collapse will continue unabated. How so?

Because so many corporate decisions are made according to their impact on the bottom line, many inferior nuclear power plants have been constructed around the globe. Likewise, because the mega-banks and investment houses are now dictating to a financially-strapped Nuclear Energy Industry, substandard nuclear reactors have been designed, engineered and continue to be put into operation across the planet. One only has to take a close look at the websites dedicated to decommissioned nuclear reactors or cold shutdowns or partially closed nuclear power plants or emergency actions taken at various nuclear power generation sites to grasp just how precarious a position the entire industry is currently in.

Unknown to even many of the nuclear engineers who address these issues ‘in the office’, or who fix the cascade of problems at nuke plants themselves, is the notion of slow motion, subclinical, pernicious technospheric breakdown. It often manifests in ways where cause and effect cannot be easily established because of some of the unseen forces produced by atomic fission. With that said, it should be noted that a chapter could easily be dedicated to this particular issue alone, so significant is it to the future of nuclear power generation

Then there is the problem of nuclear wastes and natural rights, yes?

No one has articulated this point better than Albert Bates in his definitive essay entitled The Karma of Kerma: Nuclear Wastes and Natural Rights (Bates, A.K., 1988)

This extremely lucid and illuminating, sober and sane treatment of the greatest ongoing environmental disaster of our times lays bare the most basic legal and human rights issues which converge around the production, treatment and storage of nuclear wastes. Were the governments of the world to read and take to heart its simple and straightforward thesis, the current incarnation of nuclear energy production would have been abandoned years ago:

The disposal of radioactive substances in a manner that anticipates their eventual partial release into the human environment imposes a health burden upon future generations that cannot be justified by any moral or legal rationale. Like an irresistible force meeting an immovable object, the concept of the greater good for the many in the present generation runs against the concept of the inalienable rights of each individual in future eras. At present, in matters involving nuclear power, our governmental agencies have taken the side of the irresistible force. But when federal agencies venture to tread beyond of the scope of the foundation principles with which the federal government was fashioned, they endanger more than human lives. At risk in the nuclear waste debate are long-held concepts of ordered liberty. (Bates A. K., 1988)

Fukushima has illustrated exactly why this elegantly stated legal concept of human rights and moral imperative is so pertinent to the public discourse. When massive amounts of radioactive wastewater are dumped into the Pacific Ocean, not only human life will be adversely affected. Marine life has been negatively impacted in ways that will take decades to observe and comprehend. The outright destruction of the environment in and around Fukushima and the Pacific Ocean must also be considered in any meaningful assessment of collateral damage.

Perhaps even more than Chernobyl, Fukushima has allowed the global community to view the whole event through the lens of legal responsibility and ethical outcomes so that new international standards can be written and implemented regarding nuclear waste conveyance and disposal. If nothing else, this discussion has raised awareness about the most nagging issue concerning the NEP. Whereas the human rights aspect confers the legal right to not be contaminated by nuclear radiation has barely been addressed by those responsible for it consequences, it now enjoys a prominent place throughout the worldwide debate.

Accidents and mishaps, manmade and natural disasters happen. Things are fixed fairly quickly in this postmodern age, and life goes on. Whether these events occur in a full-blown war zone or in the wake of a hurricane, the affected population usually does everything it can to rebuild and move on.

However, when these events take place in or near nuclear power plants, life doesn’t just go on. It often stops. Depending on the circumstances and seriousness of a nuclear event, sometimes life stops in that area for a long time.

Our civilization has now been given three unmistakable wakeup calls since the advent of the nuclear power generation era. First there was Three Mile Island in Pennsylvania, then there was Chernobyl in the Ukraine, and lastly the world is still reeling from the specter of possibilities which are presented by Fukushima.

Surely it is not by chance that these three flagrant examples of nuclear Perfect Storms occurred around the globe affecting major nations and populations centers. Each of these disasters has served to wake up whole swaths of humanity to the dangers and risks which are associated with the current Nuclear Energy Paradigm. To ignore, or deny, or refute the obvious lessons which all three nuclear catastrophes have given to humankind would be folly of the highest order.

The global impact of Fukushima, which has disseminated radionuclides (radioactive contaminants) by air and by way of the largest of the seven seas, stands as dramatic testimony to all that can go wrong — seriously wrong — with the current nuclear energy business model and method of power generation. Can it get any worse than Fukushima? That we are compelled to even ask this question speaks volumes about the true state of the affairs on that 25 square mile patch of land and contiguous sea which surround the Fukushima Daiichi nuclear disaster site.

Given this inescapable testament of nuclear folly, it is now incumbent upon the community of nations to rally around the obvious necessity of terminating the current form of the Nuclear Energy Paradigm. Why? Because when a “China Syndrome” occurs anywhere in the world, it will inevitably affect the entire planet. In other words, an INES Level 7 (Wikipedia, International Nuclear Event Scale) nuclear catastrophe does not respect borders. Nor does it discriminate between the young and old, healthy and sick, or those who live close to ground zero from those who live far away.

Therefore, any nation that chooses to set up a nuclear energy-producing operation from this point forward has an inviolable responsibility to its neighbors, as it does to the rest of the world. Likewise, those nations have a moral obligation to proceed in a manner that guarantees its neighbors will not be exposed to the consequences of its nuclear accidents, even when they are caused by duel natural disaster events as we saw at Fukushima.

Just as Europe was contaminated with radiation from Chernobyl (Yablokov, A.V., 2009), and North America has been contaminated from Fukushima, it is understood that once a nuclear catastrophe spirals out of control, the genie of radioactive contamination cannot be put back in the bottle. The entire Pacific Rim, in fact, has varying degrees of exposure to the radioactive waste water being conveyed by the ocean from Fukushima, as does the Western Hemisphere to seaborne radioactive isotopes like Cesium-137 and airborne isotopes such as Iodine-131(Center for Marine and Environmental Radiation).

Consequently, Japan is responsible for the damage wrought to the largest ocean on Earth. Have they acknowledged this? Have they approached the nations both near and far which have been affected by their cavalier and irresponsible approach to siting reactors up and down their seismic shorelines? Has the United Nations even addressed this extremely important issue known as national accountability? Or territorial sovereignty?

Conclusion

It doesn’t get very much more weighty than the ‘fallout from Fukushima’. All of the affected nations have been curiously silent on this issue. It is almost as though a conspiracy of silence has descended upon the concerned countries because of how unpredictable and intractable the nuclear containment problems have been at the Daiichi plant.

At the end of the day the current race of humanity will look back on the Fukushima Nuclear Disaster as the defining moment for both the industry and the underlying paradigm. If they haven’t already, the various stakeholders will be forced to re-evaluate the integrity of their nuclear enterprises around the globe. Hopefully, they will begin to take aggressive preemptive measures to address whatever needs to be addressed at every nuclear site still in operation.

If a decisive response is not formulated and implemented on a global scale, in light of the hard lessons learned from Fukushima, the current planetary civilization will be compelled to face up to these fatal flaws in most unpleasant ways, which will continue to manifest with each major Earth change. In a similar way, the inherent defects of the NEP will only be accentuated as technospheric breakdown accelerates. The profound and fundamental shortcomings which pervade the entire nuclear energy industry can no longer be hidden or ignored.

After all, it was the dangerous combination of willful blindness and feigned ignorance which got the world into this position in the first place.

“Does anyone in their right mind believe that nuclear power plants can ever be designed, engineered or constructed to withstand 9.0 earthquakes followed by 15 meter high tsunamis? Sorry if we offend, but such a display of so deadly a combination of ignorance and arrogance must represent the very height of hubris. Particularly in view of the inevitable consequences which have manifested at Fukushima, how is it that so few saw this pre-ordained and disastrous outcome, except by willful blindness?”

### 2AC---Nuclear War Causes Extinction

#### Even a small nuclear war causes extinction and destroys the ozone

Starr 14 [Steven Starr, the Senior Scientist for Physicians for Social Responsibility and Director of the Clinical Laboratory Science Program at the University of Missouri. Starr has published in the Bulletin of the Atomic Scientists and the Strategic Arms Reduction (STAR) website of the Moscow Institute of Physics and Technology, June 11, 2014, “There Can be No Winners in a Nuclear War”, Truth Out, [https://truthout.org/articles/there-can-be-no-winners-in-a-nuclear-war](https://truthout.org/articles/there-can-be-no-winners-in-a-nuclear-war/)]

Nuclear war has no winner. Beginning in 2006, several of the world’s leading climatologists (at Rutgers, UCLA, John Hopkins University, and the University of Colorado-Boulder) published a series of studies that evaluated the long-term environmental consequences of a nuclear war, including baseline scenarios fought with merely 1% of the explosive power in the US and/or Russian launch-ready nuclear arsenals. They concluded that the consequences of even a “small” nuclear war would include catastrophic disruptions of global climate and massive destruction of Earth’s protective ozone layer. These and more recent studies predict that global agriculture would be so negatively affected by such a war, a global famine would result, which would cause up to 2 billion people to starve to death. These peer-reviewed studies – which were analyzed by the best scientists in the world and found to be without error – also predict that a war fought with less than half of US or Russian strategic nuclear weapons would destroy the human race. In other words, a US-Russian nuclear war would create such extreme long-term damage to the global environment that it would leave the Earth uninhabitable for humans and most animal forms of life. A recent article in the Bulletin of the Atomic Scientists, “Self-assured destruction: The climate impacts of nuclear war,” begins by stating: “A nuclear war between Russia and the United States, even after the arsenal reductions planned under New START, could produce a nuclear winter. Hence, an attack by either side could be suicidal, resulting in self-assured destruction.” In 2009, I wrote “Catastrophic Climatic Consequences of Nuclear Conflicts” for the International Commission on Nuclear Non-proliferation and Disarmament. The article summarizes the findings of these studies. It explains that nuclear firestorms would produce millions of tons of smoke, which would rise above cloud level and form a global stratospheric smoke layer that would rapidly encircle the Earth. The smoke layer would remain for at least a decade, and it would act to destroy the protective ozone layer (vastly increasing the UV-B reaching Earth) as well as block warming sunlight, thus creating Ice Age weather conditions that would last 10 years or longer. Following a US-Russian nuclear war, temperatures in the central US and Eurasia would fall below freezing every day for one to three years; the intense cold would completely eliminate growing seasons for a decade or longer. No crops could be grown, leading to a famine that would kill most humans and large animal populations. Electromagnetic pulse from high-altitude nuclear detonations would destroy the integrated circuits in all modern electronic devices, including those in commercial nuclear power plants. Every nuclear reactor would almost instantly meltdown; every nuclear spent fuel pool (which contain many times more radioactivity than found in the reactors) would boil off, releasing vast amounts of long-lived radioactivity. The fallout would make most of the US and Europe uninhabitable. Of course, the survivors of the nuclear war would be starving to death anyway. Once nuclear weapons were introduced into a US-Russian conflict, there would be little chance that a nuclear holocaust could be avoided. Theories of “limited nuclear war” and “nuclear de-escalation” are unrealistic. In 2002 the Bush administration modified US strategic doctrine from a retaliatory role to permit preemptive nuclear attack; in 2010, the Obama administration made only incremental and miniscule changes to this doctrine, leaving it essentially unchanged. Furthermore, Counterforce doctrine – used by both the US and Russian military – emphasizes the need for preemptive strikes once nuclear war begins. Both sides would be under immense pressure to launch a preemptive nuclear first-strike once military hostilities had commenced, especially if nuclear weapons had already been used on the battlefield. Both the US and Russia each have 400 to 500 launch-ready ballistic missiles armed with a total of at least 1800 strategic nuclear warheads, which can be launched with only a few minutes warning. Both the US and Russian Presidents are accompanied 24/7 by military officers carrying a “nuclear briefcase,” which allows them to transmit the permission order to launch in a matter of seconds. Yet top political leaders and policymakers of both the US and Russia seem to be unaware that their launch-ready nuclear weapons represent a self-destruct mechanism for the human race. For example, in 2010, I was able to publicly question the chief negotiators of the New START treaty, Russian Ambassador Anatoly Antonov and (then) US Assistant Secretary of State Rose Gottemoeller, during their joint briefing at the UN (during the Non-Proliferation Treaty Review Conference). I asked them if they were familiar with the recent peer-reviewed studies that predicted the detonation of less than 1% of the explosive power contained in the operational and deployed US and Russian nuclear forces would cause catastrophic changes in the global climate, and that a nuclear war fought with their strategic nuclear weapons would kill most people on Earth. They both answered “no.” More recently, on April 20, 2014, I asked the same question and received the same answer from the US officials sent to brief representatives of the NGOS at the Non-Proliferation Treaty Preparatory Committee meeting at the UN. None of the US officials at the briefing were aware of the studies. Those present included top officials of the National Security Council. It is frightening that President Obama and his administration appear unaware that the world’s leading scientists have for years predicted that a nuclear war fought with the US and/or Russian strategic nuclear arsenal means the end of human history. Do they not know of the existential threat these arsenals pose to the human race . . . or do they choose to remain silent because this fact doesn’t fit into their official narratives? We hear only about terrorist threats that could destroy a city with an atomic bomb, while the threat of human extinction from nuclear war is never mentioned – even when the US and Russia are each running huge nuclear war games in preparation for a US-Russian war. Even more frightening is the fact that the neocons running US foreign policy believe that the US has “nuclear primacy” over Russia; that is, the US could successfully launch a nuclear sneak attack against Russian (and Chinese) nuclear forces and completely destroy them. This theory was articulated in 2006 in “The Rise of U.S. Nuclear Primacy,” which was published in Foreign Affairs by the Council on Foreign Relations. By concluding that the Russians and Chinese would be unable to retaliate, or if some small part of their forces remained, would not risk a second US attack by retaliating, the article invites nuclear war. Colonel Valery Yarynich (who was in charge of security of the Soviet/Russian nuclear command and control systems for 7 years) asked me to help him write a rebuttal, which was titled “Nuclear Primacy is a Fallacy.” Colonel Yarynich, who was on the Soviet General Staff and did war planning for the USSR, concluded that the “Primacy” article used faulty methodology and erroneous assumptions, thus invalidating its conclusions. My contribution lay in my knowledge of the recently published (in 2006) studies, which predicted even a “successful” nuclear first-strike, which destroyed 100% of the opposing side’s nuclear weapons, would cause the citizens of the side that “won” the nuclear war to perish from nuclear famine, just as would the rest of humanity.

#### Ozone independently causes extinction

**Greenpeace 95** – Environmental Organization (“Full of Holes: Montreal Protocol and the Continuing Destruction of the Ozone Layer -- A Greenpeace Report with contributions from Ozone Action, http://archive.greenpeace.org/ozone/holes/holebg.html)

When chemists Sherwood Rowland and Mario Molina first postulated a link between chlorofluorocarbons and ozone layer depletion in 1974, the news was greeted with scepticism, but taken seriously nonetheless. The vast majority of credible scientists have since confirmed this hypothesis. The ozone layer around the Earth shields us all from harmful ultraviolet radiation from the sun. Without the ozone layer, life on earth would not exist. Exposure to increased levels of ultraviolet radiation can cause cataracts, skin cancer, and immune system suppression in humans as well as innumerable effects on other living systems. This is why Rowland's and Molina's theory was taken so seriously, so quickly - the stakes are literally the continuation of life on earth.

#### Err aff---nuclear war is under-researched and secondary effects ensure extinction

Seth Baum 15, Executive Director of the Global Catastrophic Risk Institute (gcrinstitute.org), a nonprofit think tank that he co-founded in 2011. His research focuses on risk, ethics, and policy questions for major risks to human civilization including nuclear war, global warming, and emerging technologies. Dr. Baum received a Ph.D. in geography from Pennsylvania State University with a dissertation on climate change policy. He then completed a post-doctoral fellowship with the Columbia University Center for Research on Environmental Decisions. His research has appeared in many journals including Ecological Economics, Science and Engineering Ethics, Science and Global Security, and Sustainability. He is currently co-editor of a special issue of the journal Futures titled “Confronting future catastrophic threats to humanity.”, “The Risk of Nuclear Winter”, FAS, May 29 2015, <https://fas.org/pir-pubs/risk-nuclear-winter/>

Since the early 1980s, the world has known that a large nuclear war could cause severe global environmental effects, including dramatic cooling of surface temperatures, declines in precipitation, and increased ultraviolet radiation. The term nuclear winter was coined specifically to refer to cooling that result in winter-like temperatures occurring year-round. Regardless of whether such temperatures are reached, there would be severe consequences for humanity. But how severe would those consequences be? And what should the world be doing about it? To the first question, the short answer is nobody knows. The total human impacts of nuclear winter are both uncertain and under-studied. In light of the uncertainty, a risk perspective is warranted that considers the breadth of possible impacts, weighted by their probability. More research on the impacts would be very helpful, but we can meanwhile make some general conclusions. That is enough to start answering the second question, what we should do. In regards to what we should do, nuclear winter has some interesting and important policy implications. Today, nuclear winter is not a hot topic but this was not always the case: it was international headline news in the 1980s. There were conferences, Congressional hearings, voluminous scientific research, television specials, and more. The story is expertly captured by Lawrence Badash in his book A Nuclear Winter’s Tale.1)Much of the 1980s attention to nuclear winter was driven by the enthusiastic efforts of Carl Sagan, then at the height of his popularity. But underlying it all was the fear of nuclear war, stoked by some of the tensest moments of the Cold War. When the Cold War ended, so too did attention to nuclear winter. That started to change in 2007, with a new line of nuclear winter research2) that uses advanced climate models developed for the study of global warming. Relative to the 1980s research, the new research found that the smoke from nuclear firestorms would travel higher up in the atmosphere, causing nuclear winter to last longer. This research also found dangerous effects from smaller nuclear wars, such as an India-Pakistan nuclear war detonating “only” 100 total nuclear weapons. Two groups—one in the United States3) and one in Switzerland4)—have found similar results using different climate models, lending further support to the validity of the research. Some new research has also examined the human impacts of nuclear winter. Researchers simulated agricultural crop growth in the aftermath of a 100-weapon India-Pakistan nuclear war.5)The results are startling- the scenario could cause agriculture productivity to decline by around 10 to 40 percent for several years after the war. The studies looked at major staple crops in China and the United States, two of the largest food producers. Other countries and other crops would likely face similar declines. Following such crop declines, severe global famine could ensue. One study estimated the total extent of the famine by comparing crop declines to global malnourishment data.6) When food becomes scarce, the poor and malnourished are typically hit the hardest. This study estimated two billion people at risk of starvation. And this is from the 100-weapon India-Pakistan nuclear war scenario. Larger nuclear wars would have more severe impacts. This is where the recent research stops. To the best of my knowledge there are no recent studies examining the secondary effects of famines, such as disease outbreaks and violent conflicts. There are no recent studies examining the human impacts of ultraviolet radiation. That would include an increased medical burden in skin cancer and other diseases. It would also include further loss of agriculture ecosystem services as the ultraviolet radiation harms plants and animals. At this time, we can only make educated guesses about what these impacts would be, informed in part by what research was published 30 years ago. When analyzing the risk of nuclear winter, one question is of paramount importance: Would there be permanent harm to human civilization? Humanity could have a very bright future ahead; to dim that future is the worst thing nuclear winter could do. It is vastly worse than a few billion deaths from starvation. Not that a few billion deaths is trivial—obviously it isn’t—but it is tiny compared to the loss of future generations. Carl Sagan was one of the first people to recognize this point in a commentary he wrote on nuclear winter for Foreign Affairs.7) Sagan believed nuclear winter could cause human extinction, in which case all members of future generations would be lost. He argued that this made nuclear winter vastly more important than the direct effects of nuclear war, which could, in his words, “kill ‘only’ hundreds of millions of people.” Sagan was however, right that human extinction would cause permanent harm to human civilization. It is debatable whether nuclear winter could cause human extinction. Alan Robock, a leader of the recent nuclear winter research, believes it is unlikely. He writes: “Especially in Australia and New Zealand, humans would have a better chance to survive.”8) This is hardly a cheerful statement, and it leaves open the chance of human extinction. I think that’s the best way of looking at it. Given all the uncertainty and the limited available research, it is impossible to rule out the possibility of human extinction. I don’t have a good answer for how likely it is. But the possibility should not be dismissed. Even if some humans survive, there could still be permanent harm to human civilization. Small patches of survivors would be extremely vulnerable to subsequent disasters. They also could not keep up the massively complex civilization we enjoy today. It would be a long and uncertain rebuilding process and survivors might never get civilization back to where it is now. More importantly, they might never get civilization to where we now stand poised to take it in the future. Our potentially bright future could be forever dimmed.9) Nuclear winter is a very large and serious risk. But that on its own doesn’t mean much—just another thing to worry about. What’s really important are the implications of nuclear winter for public policy and private action.

war between India and Pakistan would pose an existential threat to both countries. A larger nuclear war would threaten humanity itself. These realities make bolt-from-blue strikes much less likely and in turn, reduce the imperative for pre-emptive strikes.

### 2AC---Economy Turn

#### Even a small EMP weapon destroys the economy

**Radasky 10**, awarded Lord Kelvin Medal by the IEC for his electrical expertise, July, Dr. William Radasky served on the EMP Commission staff and was awarded the Lord Kelvin Medal by the International Electrotechnical Commission (IEC) for his contributions to developing standards for the protection of electronic equipment from high power electromagnetic threats, including HEMP. He is also an EMP Fellow, an IEEE Fellow, and has published over 400 reports, papers and articles dealing with high power EM transients. Dr. Peter Vincent Pry served on the staffs of the EMP Commission, the House Armed Services Committee, the Central Intelligence Agency, and currently is Director of the United States Nuclear Strategy Forum and President of EMPact America. “Rebuttal to “The EMP threat: fact, fiction, and response,” <http://www.thespacereview.com/article/1656/1>

EMP from a 1-kiloton weapon, though “weak” in comparison to a megaton-range EMP, could still have catastrophic consequences for the critical infrastructures that sustain the U.S. economy and society. This is so because the US electrical power grid, which supports all the other critical infrastructures, is extremely fragile and vulnerable to any EMP attack. Modern microelectronics are over one million times more vulnerable to EMP than electronic systems of the 1960s, and could be damaged or destroyed by the EMP from a low-yield nuclear weapon detonated high enough to cover, for example, the eastern United States. Safety relays and SCADAs (System Control And Data Acquisition) control everything, including the current flowing into big transformers that are indispensable to the power grid, and that currently would require years to be repaired or replaced.4 Dr. Butt himself provides anecdotal evidence illustrating the shocking fragility of the electric power grid, citing the August 2003 Northeast Blackout and the cascading failures that resulted when a high voltage power line was assaulted by a tree branch: The outage affected the Northeast US and parts of Canada and more than 200 power plants, including several nuclear plants, were shut down as a result of the electricity cutoff. Other effects included loss of water pressure, possible sewage contamination, gridlock, various other transportation problems (because of secondary effects on railways, airlines, and gas stations), and disruption of oil refineries’ operations. Phone service was stressed due to high call volume and several radio and television stations went off the air. It is estimated that the one-day blackout cost $7–10 billion in spoiled food, lost production, overtime wages, and other related expenses inflicted on more than one-seventh of the US population. All of this from a tree branch. It is not an isolated incident. The EMP Commission found many large-scale blackouts of the power grid that were started by a seemingly trivial local problem.4 A low-yield nuclear weapon detonated to place an EMP field over the entire eastern portion of the United States would certainly place more stress on the electric grid than a single tree branch, and multiply the above effects manifold by causing many local failures, that could cascade into a national catastrophe.

#### Economic collapse causes nuclear war---loose nukes and terrorists.

Mann ’14 [Eric; 2014; special agent with a United States federal agency, a special assistant for a U.S. Senator and served as a presidential appointee for the U.S. Congress, Graduate Degree in Homeland Security at Georgetown; “Austerity, Economic Decline, and Financial Weapons of War: A New Paradigm for Global Security,” https://jscholarship.library.jhu.edu/bitstream/handle/1774.2/37262/MANN-THESIS-2014.pdf]

The conclusions reached in this thesis demonstrate how economic considerations within states can figure prominently into the calculus for future conflicts. The findings also suggest that security issues with economic or financial underpinnings will transcend classical determinants of war and conflict, and change the manner by which rival states engage in hostile acts toward one another. The research shows that security concerns emanating from economic uncertainty and the inherent vulnerabilities within global financial markets will present new challenges for national security, and provide developing states new asymmetric options for balancing against stronger states.

The security areas, identified in the proceeding chapters, are likely to mature into global security threats in the immediate future. As the case study on South Korea suggest, the overlapping security issues associated with economic decline and reduced military spending by the United States will affect allied confidence in America’s security guarantees. The study shows that this outcome could cause regional instability or realignments of strategic partnerships in the Asia-pacific region with ramifications for U.S. national security. Rival states and non-state groups may also become emboldened to challenge America’s status in the unipolar international system.

The potential risks associated with stolen or loose WMD, resulting from poor security, can also pose a threat to U.S. national security. The case study on Pakistan, Syria and North Korea show how financial constraints affect weapons security making weapons vulnerable to theft, and how financial factors can influence WMD proliferation by contributing to the motivating factors behind a trusted insider’s decision to sell weapons technology. The inherent vulnerabilities within the global financial markets will provide terrorists’ organizations and other non-state groups, who object to the current international system or distribution of power, with opportunities to disrupt global finance and perhaps weaken America’s status. A more ominous threat originates from states intent on increasing diversification of foreign currency holdings, establishing alternatives to the dollar for international trade, or engaging financial warfare against the United States.

## 2AC---EMP D

### 2AC---No Delivery

#### No EMP delivery mechanism

Butt, 2010**,** Yousaf Butt is a staff scientist at the Center for Astrophysics at Harvard University, where he worked on NASA’s orbiting Chandra X-ray Observatory project from 1999–2004. He was a research fellow at the Union of Concerned Scientists’ Global Security Program from 2005–2007. He holds BSc degrees in physics and in mechanical engineering from MIT and a PhD in experimental nuclear astrophysics from Yale University. “The EMP threat: fact, fiction, and response (part 2),” <http://www.thespacereview.com/article/1553/2>

What appears to be of particular concern to the EMP commission is the scepter of terrorist groups or so-called “rogue” nations carrying out such an attack. As outlined by Dr. Pry, one of the commissioners, before a 2005 Senate Subcommittee on Terrorism, Technology and Homeland Security, “[a] nuclear missile concealed in the hold of a freighter would give Iran, or terrorists, the capability to perform an EMP attack against the United States homeland, without developing an ICBM, and with some prospect of remaining anonymous. Iran’s Shahab-3 medium-range missile… is a mobile missile, and small enough to be transported in the hold of a freighter.” However, as mentioned above, such missiles have a payload capacity of approximately 1,000 kilograms corresponding to a crude U-based warhead of ~1 kiloton yield [22]—if, and when, the Iranians eventually develop nuclear weapons. Even the North Koreans, who are much further along in their weapons program, have had great difficulty reaching even a ~5 kiloton yield from their Pu-based devices in carefully orchestrated ground-tests, and their 2009 test was likely a fizzle. Thus, it is not at all a simple matter, even for countries with considerable resources and focused decades-long effort, to build such weapons, let alone pair them to reliable delivery systems. As carefully argued by John Mueller in his new book, Atomic Obsession, it is virtually impossible for a terrorist cell to obtain the raw materials needed for a nuclear device and assemble it correctly themselves [Ref 22, p. 172–198]. Even a “crude” U-type device is not all that “crude” and requires the concerted effort of skilled scientists and engineers. Any weapon produced by a terrorist cell would likely be a one of a kind and would have to remain untested. For a terrorist group to then mate this weapon to a ballistic missile and successfully carry out an EMP strike beggars belief. As John Pike, director of GlobalSecurity.org has said, “It is just very difficult to imagine how terrorists are going to be able to lay hands on a nuclear-tipped missile, and launch it and reprogram it in such a way that it would be a high-altitude burst like that.”

### 2AC---No Probability

#### No impact or probability to EMP

Farley 9 – Robert Farley, assistant professor at the University of Kentucky’s Patterson School of Diplomacy and International Commerce, 10-22-09, “Neocons Salivating Over Their Next Great Exaggerated "Threat": Electromagnetic Pulse Attack” <http://www.alternet.org/media/143455/neocons_salivating_over_their_next_great_exaggerated_%22threat%22%3A_electromagnetic_pulse_attack/?page=entire>

Many weapons experts doubt that an EMP attack could cause lasting or irreversible damage. Stephen Younger, former senior fellow at Los Alamos National Lab and director at the Defense Threat Reduction Agency, argues that while an EMP might create problems in the short term, it is unlikely to cause long-term devastation. Similarly, observers have questioned the capacity of North Korea or Iran, much less a terrorist organization, to develop a warhead sophisticated enough to cause widespread EMP damage. Nick Schwellenbach, a former researcher at Project on Government Oversight, suggests that the idea of a small, EMP-optimized warhead is absurd: "You have a lot of points of failure in order to get to a warhead that is EMP optimized. … [Y]ou need specialized machine tools, you need capital, but to create a weapon that creates the secondary effect that you're talking about, that's something even we can't do right now.”

#### Fear of retaliation solves

Butt 10**,** Yousaf Butt is a staff scientist at the Center for Astrophysics at Harvard University, where he worked on NASA’s orbiting Chandra X-ray Observatory project from 1999–2004. He was a research fellow at the Union of Concerned Scientists’ Global Security Program from 2005–2007. He holds BSc degrees in physics and in mechanical engineering from MIT and a PhD in experimental nuclear astrophysics from Yale University. “The EMP threat: fact, fiction, and response (part 2),” <http://www.thespacereview.com/article/1553/2>

A state would be highly unlikely to launch an EMP strike from their own territory because the rocket could be traced to the country of origin and would probably result in nuclear or massive conventional retaliation by the US. The EMP commission also considers adversarial nations carrying out a shipborne EMP attack that would be less traceable. However, even so, there would some small risk of trace-back that would give the leadership in such nations pause. While nuclear forensics are not well enough developed to assuredly ascribe the origin of a nuclear explosion, even their current state of development would, in some measure, dissuade the leaders of a nation from seriously contemplating such an attack. Furthermore, the US certainly has data, via its DSP satellites, on the infrared (IR) signatures of the rocket exhausts from the missiles of various countries. Though these signatures are probably virtually identical for the Scud/Shahab/No-dong family of missiles, the nations which may entertain such attacks do not necessarily know whether, e.g., the DSP data can discriminate between a NK Nodong versus an Iranian Shahabs, perhaps due to differences in fuel and/or subtle design idiosyncrasies. This is data only the US has, and it has an inherent deterrent value to nations thinking about launching an EMP strike via a ship-launched ballistic missile. This is almost certainly the case if, say, Iran were to use its solid rocket motor technology to launch such a strike—if and when Iran obtains nuclear weapons, of course. In such a case, the burn time-profile and solid-motor IR signatures could probably be used to tie the missile to a nation. Furthermore, the leaders of a nation contemplating such an attack would have to carefully consider what would happen in case the warhead was not delivered properly. If it fell short and/or did not explode, it may be possible for US engineers and scientists to ascribe a national origin given the forensic material. For the leadership of any nation to chance such an attack they must be almost suicidally optimistic: they would have to presume that everything would go perfectly. Even so, it may still be possible to identify the country of origin, which would invite massive US retribution.

#### No EMP attacks- China, Russia specific

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Though they possess the technological know-how to fabricate a powerful EMP device, the possibility of China or Russia carrying out such an attack is virtually nil. Not only for the regular military deterrent reasons but also, post-Cold War, our economies are intimately linked, which amounts to an inherent economic deterrent. The latter is likely the more relevant deterrent [Ref. 22, p. 65]. We owe China tremendous sums of money, they need us as a market, and both the US and China require Russian oil via intertwined world markets. Although the EMP commissioners have offered a Chinese-language PowerPoint presentation outlining the effects of EMP devices as evidence that China has an interest in such weapons, this presentation is actually of Taiwanese origin [“Electromagnetic Pulse Attack and Defense”, by Dr. Chien Chung], and it is not pertinent to any official Chinese military doctrine. More importantly, the DoD itself has weighed in on the issue in its “Militarily Critical Technologies List”. This is a detailed compendium of the technologies the DoD assesses as critical to maintaining superior United States military capabilities. Part II, “Weapons of Mass Destruction Technologies,” addresses those technologies required for development, integration, or employment of biological, chemical, or nuclear weapons and their means of delivery against the US. This document states that “HEMP can pose a serious threat to U.S. military systems when even a single high-altitude nuclear explosion occurs. In principle, even a new nuclear proliferator could execute such a strike. In practice, however, it seems unlikely that such a state would use one of its scarce warheads to inflict damage which must be considered secondary to the primary effects of blast, shock, and thermal pulse. Furthermore, a HEMP attack must use a relatively large warhead to be effective (perhaps on the order of one megaton), and new proliferators are unlikely to be able to construct such a device, much less make it small enough to be lofted to high altitude by a ballistic missile or space launcher.”

#### Won’t launch EMP attacks- most benefit in direct attacks

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If a terrorist cell miraculously built such a weapon, they are likely to explode their “crown jewel” in a simple spectacular ground-burst that will destroy a large part of a city, and not risk the complications—and likely failure—of a lofted EMP strike that will, if all goes according to their plan, cause casualties via unpredictable secondary effects upon a limited part of some of the nation’s infrastructure. The risk versus reward calculation for both terrorists cells and so-called “rogue” states would almost certainly force their hand to a spectacular and direct ground burst in preference to a unreliable and uncertain EMP strike. A weapon of mass destruction is preferable to a weapon of mass disruption.

### 2AC---Evidence indict

#### Their authors lie for political benefit

Farley 9 **–** Robert Farley, assistant professor at the University of Kentucky’s Patterson School of Diplomacy and International Commerce, 10-22-09, “Neocons Salivating Over Their Next Great Exaggerated "Threat": Electromagnetic Pulse Attack” <http://www.alternet.org/media/143455/neocons_salivating_over_their_next_great_exaggerated_%22threat%22%3A_electromagnetic_pulse_attack/?page=entire>

The central political purpose of the EMP awareness movement appears to be advancement of the cause of missile defense. The most extreme estimates of the effect of EMP restore the Cold War-era existential fears of nuclear war. Schwellenbach argues "what's driving it is the political global context—it gives the right an issue that allows them to justify hawkish behavior. It is almost a perfect solution to any argument against missile defense—North Korea and Iran.” The 90 percent casualty estimate advanced by EMP awareness advocates hypes the notion that the United States faces potential annihilation at the hands of its enemies, and goes a step farther: even the smallest nuclear power can destroy the United States with a small number of warheads. This, in turn, reaffirms the need for both a secure missile defense shield (including space-based interceptor weapons) and a grand strategy of preventive war against potential nuclear and ballistic missile proliferators. Almost all EMP awareness advocates—including Gaffney, Gingrich, and Huckabee—call for increased spending on missile defense. Gaffney and Gingrich have also called for a “robust” policy of preemptive war, including attacks on Iranian and North Korean missiles on their launching pads

#### Their reports are scare tactics

Farley 9 – Robert Farley, assistant professor at the University of Kentucky’s Patterson School of Diplomacy and International Commerce, 10-22-09, “Neocons Salivating Over Their Next Great Exaggerated "Threat": Electromagnetic Pulse Attack” <http://www.alternet.org/media/143455/neocons_salivating_over_their_next_great_exaggerated_%22threat%22%3A_electromagnetic_pulse_attack/?page=entire>

The fact that EMP is poorly researched and not well understood works in its favor as a scare tactic. Since evidence of EMP’s allegedly lasting impact is purely theoretical EMP awareness advocates can make outlandish claims regarding the threat that even the smallest nuclear arsenal poses. They can also point to allegations made by the official EMP Commission, ignoring the fact that many outside experts dispute its findings. The Niagara conference’s emphasis on strategic and policy considerations shows that alarmist predictions about EMP attacks serve as fodder for promotion of a larger nuclear weapons stockpile, for missile defense, and for preventive attacks.

#### Their authors fabricate the threat for BMD funding

Crowley 9 **-** Michael Crowley, senior correspondent and deputy Washington bureau chief for Time magazine, 6-3-09, “The Newt Bomb” The New Republic, <http://www.tnr.com/article/the-newt-bomb>

The EMP commission actually had a point. There is a scientific basis for fears about widespread electric outages, and there is evidence that other countries, possibly including Iran, have studied the technique. "EMP is real," agrees Joe Cirincione, a nuclear weapons expert who now runs a pro-disarmament think tank, the Ploughshares Fund. But, as Cirincione notes, few analysts take the threat very seriously. The odds that Iran or North Korea would prefer a technologically untested Rube Goldberg scheme to merely nuking us seem slim. And any terrorist group able to execute such a plan was probably capable enough to get us one way or another anyhow. Those realities argue overwhelmingly for prudent but unsexy infrastructure protections, not preemptive attacks or advanced technology. "It's horror theater," says Cirincione, "trying to scare Americans into doing something which a rational analysis would stop them from doing." Charles Ferguson, a nuclear engineer at the Council on Foreign Relations, agrees. "[T]here are some important things we can be doing that won't cost much, but that can serve as a vital backup," he says. For instance, Ferguson has advised the New York City Fire Department to keep some backup communications equipment and extra ignition switches for its trucks in electromagnetic pulse-resistant steel cages. The hawkish right, however, has much bigger things in mind. Although Bartlett himself seems to lack a sub-rosa strategic agenda, he has found common cause among national-security conservatives, about whom the same can't be said. Take, for instance, the spin of Frank Gaffney, perhaps the right's main missile-defense zealot: "[T]he United States must now make a redoubled effort to deploy effective, comprehensive defenses against ballistic missiles that might be used for EMP and other attacks," Gaffney wrote in a 2006 National Review article. Republican Senator Jon Kyl, a key missile-defense champion on Capitol Hill, has held hearings and published a Washington Post op-ed on the EMP threat. The like-minded Wall Street Journal opinion pages have repeatedly flogged the EMP commission's findings. "The only solution to this [EMP] problem," Brian T. Kennedy of the Claremont Institute wrote in an op-ed in the pages last November, "is a robust, multilayered missile-defense system."

### 2AC---No Impact

#### No impact to EMP

Schwellenbach 5**,** Nick, AlterNet, cites individuals on the Council of Foreign Relations, “The Next Fake Threat,” <http://www.alternet.org/story/25738/>

Perhaps the most controversial of the EMP Commission's claims is their insistence that a Hiroshima-sized nuclear detonation (10-20 kilotons) could produce enough EMP to fry circuits across a continent. The EMP Commission points to one of the few case studies available -- the Starfish Prime atmospheric nuclear test of 1962. A 1.4 megaton thermonuclear weapon detonated 250 miles above Johnston Island in the Pacific affected street lamps, circuit breakers, cars and radio stations in Hawaiian, 800 miles to the north. Still, even there the effect was far from comprehensive. Los Alamos National Laboratory physicist Michael P. Bernardin said that "the 30 strings of failed streetlights [from Starfish Prime's EMP] represented only about one percent of the streetlamps on Oahu at the time." And noted physicist Richard Garwin said the Starfish detonation "had barely noticeable effects on military systems." But Starfish Prime was a thermonuclear device with a yield over a hundred times that of the bomb dropped on Hiroshima. Experts including Garwin and Philip Coyle, former Pentagon director of operational test and evaluation, have expressed skepticism about the EMP Commission's claim that a 10-20 kiloton nuclear device could produce EMP on par with that of a thermonuclear weapon. Both have extensive experience studying EMP.

### 2AC---No Mindset Shift

#### No mindset shift

Bhar '20 [Soumyajit; 4/21/20; PhD scholar from the Ashoka Trust for Research in Ecology and the Environment, research fellow at LEAD at Krea University; "Degrowth and COVID-19: Are we drawing a simplistic connection?" https://india.mongabay.com/2020/04/commentary-degrowth-and-covid-19-are-we-drawing-a-simplistic-connection/]

COVID-19 economic pause: Can we equate with degrowth?

Many scholars are comparing the current state of the economy with the state of degrowth. However, I argue this comparison is not only conceptually incorrect but also simplistic. At first, we need to acknowledge that the pandemic is an external, independent factor that is inducing such a drastic downshift in the economy. There is no change happening at the systemic level to ensure the sustainability of such a shift.

Such a pandemic is denoted as an upshot of climate crisis and disruption in the ecological balance. In the coming future, with resorting to business as usual, such external events are likely to be frequent and intense. However, once we manage to find our way around such an external factor, even if temporarily, the economy is waiting to bounce back to its normal. Moreover, as observed in the post-world war II economic boom, the economy is likely to reach a higher throughput than the initial after the lockdown.

To sustain the drastic downshift of the economy that resembles degrowth, consumers have a major role to play in the realisation of such a massive economic shift as the current capitalist economy is entirely fueled by consumer desires. In our lives, we consciously or at times unconsciously uphold a notion of a good life. This amicable notion guides us continuously in making decisions, be it life-changing ones or concerning everyday affairs.

My research, as well as several anthropological studies, show how the prevailing notions of the good life have slowly turned into being materialistic. It means now we use material goods to earn status, construct identities, and mark success and value them over intangible things like relationships.

Our life stories are now stitched around material possessions that we carefully choose. These notions are socio-culturally constructed. One’s social upbringing and conditioning enable the seeping of certain notions of good life over others. These socio-culturally construed notions are influenced by the economic climate to give rise to insatiable desires or false needs among consumers.

Upshots of COVID-19- a welcome push towards practising degrowth

To achieve a sustained state of degrowth, we as consumers need to realize the intricate interconnection between our constructed notions of a good life and our consumption decision. A realisation of how we as consumers are turned into this driving force, that is running the entire economic juggernaut by discounting ecological balance and a consequent conscious decision to move away from it, would be the first step to degrowth.

As the second step, we need to ensure that the wealth produced in degrowth or controlled growth of the economy should entirely be diverted to ensuring a good life for the socio-economically underprivileged ones, which requires a certain amount of sacrifice from the privileged sections of the society. However, this would not appear as a sacrifice if we can adopt alternative notions of a good life that value the current state of the environment and social justice over a world obsessed with material possessions and growth.

A sustained change in the economic system can only come if the main internal driving force of the system – consumers – starts valuing things that the current system cannot simply offer. It is going to be a slow socio-cultural shift, but that seems to be the only way to realise a sustained change.

## 2AC---Specific Scenarios D

### 2AC---AT: Warming

#### Their own card says to could have the OPPOSITE effect---Insert yelow

**1NC** [**Miller-McDonald**](https://www.the-trouble.com/content?author=5b60aea3575d1f4e6b9fa9d2) **19**, 1-4-2019, Samuel Miller McDonald is a writer and geography PhD student at University of Oxford studying the intersection of grassroots movements and energy transition. "Deathly Salvation — THE TROUBLE.," <https://www.the-trouble.com/content/2019/1/4/deathly-salvation---Parks> \*edited for ableist language

The global economy is hurtling humanity toward extinction. Greenhouse gas emissions are on track to warm the planet by six degrees Celsius above preindustrial averages. A six-degree increase risks killing most life on earth, as global warming did during the Late Permian when volcanoes burned a bunch of fossilized carbon (e.g., coal, oil, and gas). Called the [Great Dying](http://nymag.com/daily/intelligencer/2017/07/climate-change-earth-too-hot-for-humans.html), that event was, according to New York Magazine, “The most notorious [extinction event…]; it began when carbon warmed the planet by five degrees, accelerated when that warming triggered the release of methane in the Arctic, and ended with 97 percent of all life on Earth dead.”

Mainstream science [suggests](https://www.theguardian.com/environment/2018/oct/08/global-warming-must-not-exceed-15c-warns-landmark-un-report) that we’re on our way there. During the winter of 2017, the Arctic grew warmer than Europe, sending snow to the Mediterranean and Sahara. The planet may have already passed irreversible thresholds that could accelerate further feedback loops like permafrost melt and loss of polar ice. Patches of permafrost [aren’t freezing](https://www.cnbc.com/2018/08/22/scientists-surprised-arctic-ground-may-not-be-freezingeven-in-winter.html) even during winter, necessitating a rename (may I suggest ‘nevafrost’?). In the summer of 2018, forests north of the Arctic Circle broke 90 degrees Fahrenheit and [burned](https://www.cnn.com/2018/07/19/europe/sweden-forest-fires-wxc-intl/index.html) in vast wildfires. We’re reaching milestones far faster than scientists have even recently predicted. As Guardian columnist George Monbiot [noted](https://twitter.com/GeorgeMonbiot/status/968740684114092032), “The Arctic meltdown […] is the kind of event scientists warned we could face by 2050. Not by 2018.” Mass marine death that rapidly emits uncontrollable greenhouse gasses is another feedback loop that seems ready to strike. The ocean is now [more acidic](https://phys.org/news/2018-07-ocean-acidification-million-years.html) than any time in the last 14 million years, killing everything from snails to whales. It’s growing rapidly more acidic. Meanwhile, from the global South to wealthier industrialized countries, people are already dying and being displaced from the impacts of extreme climate change via extreme droughts, floods, wildfires, storms, and conflicts like the Syrian civil war. Authoritarianism is [on the rise](https://newrepublic.com/article/148861/climate-change-authoritarian-leaders) due directly to these climate emergencies and migrations.

The IPCC has recently alerted the world that we have about a decade to dramatically cut emissions before collapse becomes inevitable. We could prevent human extinction if we act immediately. But the world is unanimously ignoring climate change. Nations will almost certainly fail to avert biosphere collapse. That is because doing so will require a rapid decarbonization of the global economy.

But why does decarbonization--an innocuous enough term--seem so implausible? Well, let’s put it this way: a sufficient transition to non-carbon energy would require all the trains, buses, planes, cars, and ships in the world to almost immediately stop and be replaced with newly manufactured vehicles to run on non-carbon fuel, like hydrogen cells, renewable electricity, or some carbon-neutral biofuel. All this new manufacturing will have to be done with low-carbon techniques, many of which don’t exist yet and may be impossible to achieve at scale. This means all the complex supply chains that move most of the world’s food, water, medicine, basically all consumer goods, construction materials, clothing, and everything else billions of people depend on to survive will have to be fundamentally reformed, in virtually every way, immediately.

It also means that all the electric grids and indoor heating and cooling systems in the world must be rapidly transformed from centralized coal and gas power plants to a mixture of solar, wind, and nuclear—both distributed and centralized—dispersed through newly built micro-grids and smart-grids, and stored in new battery infrastructure. These new solar panels, batteries, and nuclear plants will somehow have to be built using little carbon energy, again something that may be impossible to achieve at a global scale.

The cost of this transition is impossible to know, but surely reaches the tens of trillions of dollars. It needs to happen in just about every industrialized nation on the planet and needs to happen now—not in 2050, as the Paris Agreement dictates, or the 2030s, as reflected in many governments’ decarbonization goals. The engineering and administrative obstacles are immense; disentangling century-old, haphazard electric grid systems, for example, poses an almost unimaginable cascade of institutional and logistical hurdles. Imagine the difficulty of persuading millions of municipalities around the world to do anything simultaneously; now, imagine convincing them all to fundamentally shift the resource infrastructure on which their material existence depends immediately.

Perhaps even more daunting are the political obstacles, with diverse financial interests woven together in a tapestry of inertia and self-interest. Virtually all retirement funds, for instance, are invested in fossil fuel companies. Former and current fossil fuel industry managers sit on all manner of institutional committees in which energy and investment decisions are made: trustee boards of universities, regulatory commissions, city councils, congressional committees, philanthropic boards, federal agencies, the Oval Office couch. Lots of people make lots of money from fossil fuels. Will they sacrifice deeply vested interests to prevent collapse? They certainly have not shown signs of doing so yet, when the stakes are as dire as they’ve ever been; most have instead ruthlessly obstructed meaningful action. Will enough people be willing to do what it takes to forcibly remove them from the most powerful institutions in the world? That also seems unlikely, given meager public involvement in this issue so far.

This is the obstacle of collective action: everyone has to sacrifice, but no one wants to start. Who will assent to giving up their steady returns from fossil fuels if everyone else refuses? When people are living so precariously as it is (43% of American can’t afford basic necessities), how can we ask them to undertake energy transition? The US drags its feet on decarbonizing and justifies it by arguing that China has not made strong enough commitments. Which country will voluntarily give up access to strategic fossil fuel reserves? Much of our geopolitical dynamics and wars have revolved around access to mineral resources like oil. Is the US going to put itself in a disadvantaged position for the climate? Shell withdraws research funding for renewables because ExxonMobil goes full steam ahead on oil, and, hey, they must compete. Fossil fuel funded politicians of both parties certainly will not aid transition.

If untangling the webs of influence, interests, and engineering preventing decarbonization weren’t daunting enough, the world will also have to suck billions of tons of greenhouse gases out of the atmosphere that have already been emitted. Keeping the planet to even a deadly 1.5 degrees Celsius increase of warming depends on it.

This sounds simpler than it is, as if a big vacuum cleaner could siphon particulates from the sky. But no one really knows how to extract and sequester carbon at the scale necessary to prevent catastrophic climate change. Engineers have thrown out a lot of ideas—some [more plausible](https://www.the-trouble.com/content/2018/10/18/avoiding-climate-imperialism-a-leftist-vision-of-geoengineering) than others—but most scientists who have looked at proposals generally agree that it’s wishful thinking. As Huffington Post [quotes](http://www.huffingtonpost.co.uk/adnan-aldaini/global-warming-delusions-_b_3175118.html) Clive Hamilton, “In order to capture just a quarter of the emissions from the world's coal-fired power plants we would need a system of pipelines that would transport a volume of fluid twice the size of the global crude-oil industry.” Of course, manufacturing, shipping, and constructing those pipelines would require immense carbon energy inputs and emissions. And that’s just to capture the emissions from coal!

Like energy transition, carbon capture and sequestration requires governments to act collectively to invest trillions of dollars in risky, experimental, and probably mostly ineffectual sequestration technologies. Again, it’s a collective action problem: nobody wants to be the one to sacrifice while no one else is putting themselves on the line. And the miniscule likelihood that energy transition will occur under a Trump-Digs-Coal presidency—and the Trumpian nationalists [winning elections](https://www.bbc.co.uk/news/world-europe-36130006) across the [world](https://www.theguardian.com/world/2018/nov/01/bolsonaro-environment-agriculture-ministries-amazon)—casts further doubt on the possibility of rapid decarbonization. The administration’s energy department has [projected](https://insideclimatenews.org/news/06022018/eia-trump-greenhouse-gas-emissions-rise-climate-change-natural-gas-wind-solar-energy) that, “The carbon footprint of the United States will barely go down at all for the foreseeable future and will be slightly higher in 2050,” as InsideClimateNews notes. The world, today, is still setting records for carbon emissions and there’s no sign that will change anytime soon.

The only period in US history the nation has undertaken anything near the magnitude of collective action necessary for mitigation was during the Second World War and the rebuilding effort in its aftermath. But even those projects involved a fraction of the capital and coordination that will be necessary for sufficient energy transition and carbon sequestration. More importantly, today’s collective action will have to be politically justified without the motivation of defeating a personified enemy—a Hitler, if you will. Today, with interpersonal alienation running rampant and extremely consolidated wealth and power, industrial economies seem infinitely far from a cultural, political atmosphere in which collective action policies are even close to possible. To the contrary, wealthy countries are all still slashing public goods, passing austerity budgets, and investing heavily in fossil fuel infrastructure. Even most elected Democrats are dragging their feet on passing climate policy. The world is going in the exact opposite direction from one in which humans can live.

We’ve tied ourselves in a perfect Gordian knot.

The global economy is a vast machine, operating beyond the control of even the most powerful individuals, and it has a will of its own to consume and pollute. It’s hard to believe that this massive metal beast will be peacefully undone by the people who survive by it, and we all survive by it in some way, often against our wills; it bribes and entraps us all in ways large and small.

But a wrench could clog the gears, and maybe only a wrench can stop it. One wrench that could slow climate disruption may be a large-scale conflict that halts the global economy, destroys fossil fuel infrastructure, and throws particulates in the air. At this point, with ~~insane~~ people like Trump, Putin, Xi, May, and Macron leading the world’s biggest nuclear powers, large-scale conflagration between them would probably lead to a nuclear exchange. Nobody wants nuclear war. Rather, ~~nobody sane and prosocial wants nuclear war~~. It is an absolute horror that would burn and maim millions of living beings, despoil millions of hectares, and scar the skin of the earth and dome of the sky for centuries, maybe millennia. With proxy conflict brewing between the US and Russia in the Middle East and the [Thucydides trap](http://foreignpolicy.com/2017/06/09/the-thucydides-trap/) ready to ensnare us with an ascendant China, nuclear war looks like a more realistic possibility than it has since the 1980s.

A devastating fact of climate collapse is that there may be a silver lining to the mushroom cloud. First, it should be noted that a nuclear exchange does not inevitably result in apocalyptic loss of life. Nuclear winter—the idea that firestorms would make the earth uninhabitable—is based on shaky science. There’s no reliable model that can determine how many megatons would decimate agriculture or make humans extinct. Nations have already detonated 2,476 nuclear devices.

An exchange that shuts down the global economy but stops short of human extinction may be the only blade realistically likely to cut the carbon knot we’re trapped within. It would decimate existing infrastructures, providing an opportunity to build new energy infrastructure and intervene in the current investments and subsidies keeping fossil fuels alive.

In the near term, emissions would almost certainly rise as militaries are some of the world’s [largest emitters](https://www.nytimes.com/interactive/2017/06/01/climate/us-biggest-carbon-polluter-in-history-will-it-walk-away-from-the-paris-climate-deal.html). Given what we know of human history, though, conflict may be the only way to build the mass social cohesion necessary for undertaking the kind of huge, collective action needed for global sequestration and energy transition. Like the 20th century’s world wars, a nuclear exchange could serve as an economic leveler. It could provide justification for nationalizing energy industries with the interest of shuttering fossil fuel plants and transitioning to renewables and, uh, nuclear energy. It could shock us into reimagining a less suicidal civilization, one that dethrones the death-cult zealots who are currently in power. And it may toss particulates into the atmosphere sufficient to block out some of the solar heat helping to drive global warming. Or it may have the opposite effects. Who knows?

What we do know is that humans can survive and recover from war, probably even a nuclear one. Humans cannot recover from runaway climate change. Nuclear war is not an inevitable extinction event; six degrees of warming is.

Given that mostly violent, psychopathic individuals manage the governments and industries of the world, it may only be possible for anti-social collective action—that is, war—to halt, or at least slow, our inexorable march toward oblivion. A courageous, benevolent ruler might compel vast numbers of people to collective action. But we have too few of those, and the legal, political, and military barriers preventing them from rising are immense. Our current crop of villainous presidents, prime ministers, and CEOs, whether lusting for chaos or pursuing their own petty ends, may inadvertently conspire to break the machine now preventing our future. When so bereft of heroes, we may need to rely on humanity’s antagonists and their petty incompetence to accidentally save the day. It is a stark reflection of how homicidal our economy is—and our collective adherence to its whims—that nuclear war could be a rational course of action.

#### Growth and innovation solve warming.

Ogutonye, 21—Policy Lead, Science & Innovation Unit, Tony Blair Institute for Global Change (Olamide, “Should Tech Make Us Optimistic About Climate Change?,” <https://institute.global/policy/should-tech-make-us-optimistic-about-climate-change>, dml)

In the middle of a climate emergency, it is challenging to stay upbeat. Yet the good news is that investment in climate technology has continued to grow since the early 2010s. US-listed companies involved with providing technology solutions that support global decarbonisation have consistently outperformed the average since 2019 (Figure 7). Venture capital (VC) investment in the sector grew tenfold between 2013 and 2018, representing five times the growth rate of the overall VC market. By comparison, the growth rate of VC investment in Artificial Intelligence was a third of climate tech between 2013 and 2018 although AI is renowned for its uptick within the same timeframe. Beyond VC, public investment in climate technology research has continued to grow too. In 2019, government research and development funding for energy technologies alone stood at $30 billion, with around 80 per cent of it aimed at low-carbon solutions.

In addition to the positive role of technology, political leaders are increasingly showing a willingness to make ambitious commitments on climate. The Paris Agreement is a case in point. The international treaty was adopted in 2015 and ratified internationally within a year – a much quicker pace than its predecessor, the Kyoto Protocol, which took eight years. The Paris deal grew into a political snowball, galvanising further commitment from most of the world’s leading emitters and arguably becoming the most symbolic climate event of the 21st century. The US withdrawal from the Paris Agreement in 2019 dealt a political blow to the global pact although the decision, since reversed by President Biden, did not resonate or last long enough to have any major impact.

The Biden-Harris administration has already indicated that it will not sit on the fence but will instead revive the country’s leadership on climate action. In the UK and elsewhere, similar efforts can be observed as more countries commit to some form of net zero target. More than 100 countries have pledged a commitment towards net zero, with estimates suggesting that over 70 per cent of global GDP and 55 per cent of CO2 emissions are now covered by a similar target. A Climate Action Tracker Report indicates that the cumulative effect of countries’ pledges to the Paris Agreement – if kept and fully achieved – could keep global temperature rise below 2.1°C by 2100, putting the stated goal of 1.5°C within striking distance.

As explored in our recent Institute paper, there are also important insights for politicians in terms of applying lessons from the Covid-19 pandemic to the climate emergency. Although the pandemic is different in scale, complexity and timeline, it offers an immediate window into how policy leaders can adapt and make decisions in order to better support climate innovation. Countries can also apply the “recovering better together” principles outlined by the UN, which calls for a commitment to climate-related actions as economies recover from the Covid-19 slowdown. More than 60 countries, including high emitters, are already making an explicit promise to link their nationally determined contributions (NDC) to Covid-19 recovery, supported by the United Nations Development Programme’s Climate Promise programme. Countries in the Global South are equally aligning their climate mission with international support for various NDC support programmes. A green recovery can cut the level of 2030 emissions to 25 per cent lower than projections based on pre-Covid commitments and put the world close to a 2°C pathway. The pandemic has also highlighted the significance of tech innovation, not least in record-breaking vaccine delivery but also in the suite of digital solutions developed for contact tracing, compliance monitoring and management of health-care records.

The global financial landscape is evolving to become more responsive to climate innovation. Since they were first issued in 2007, green bonds have grown into what is now estimated to become a $1 trillion market. Analysts expect as much as $500 billion of green bonds this year as the EU raises capital for its Covid recovery fund. From target-linked to transition bonds, innovations in this green market are being used to bring projects in energy, transport, buildings and other economic sectors to life. Investor-led initiatives such as Climate Action 100+, whose members control over $50 trillion of assets, are actively using funds to ensure the world’s largest corporate greenhouse gas emitters commit to climate action. Other investor networks are pursuing a similar agenda, including Europe’s Institutional Investors Group on Climate Change (IIGCC) and Australia and New Zealand’s Investor Group on Climate Change (IGCC). Humanity’s competence in technology and innovation will be central to the race in mitigating and tackling climate change.

#### The overall environment is resilient---‘existential’ threats are false

Ronald Bailey 20, Science Correspondent at Reason, Member of the Society of Environmental Journalists and the American Society for Bioethics and Humanities, “The Global Environmental Apocalypse Has Been Canceled”, Reason Magazine, 8/1/2020, <https://reason.com/2020/08/01/the-global-environmental-apocalypse-has-been-canceled/> [grammar edit]

According to these activists and politicians, humanity is beset on all sides by catastrophes that could kill off civilization, and maybe even our species. Are they right?

Absolutely not, answers the longtime environmental activist Michael Shellenberger in an engaging new book, Apocalypse Never: Why Environmental Alarmism Hurts Us All. "Much of what people are being told about the environment, including the climate, is wrong, and we desperately need to get it right," he writes. "I decided to write Apocalypse Never after getting fed up with the exaggeration, alarmism, and extremism that are the enemy of positive, humanistic, and rational environmentalism." While fully acknowledging that significant global environmental problems exist, Shellenberger argues that they do not constitute inexorable existential threats. Economic growth and technological progress, he says, can ameliorate them.

Shellenberger's analysis relies on largely uncontroversial mainstream science, including reports from the Intergovernmental Panel on Climate Change (IPCC) and the Food and Agriculture Organization. And as a longstanding activist, Shellenberger is in a good position to parse the motives behind the purveyors of doom.

Shellenberger's activism is the real deal. To raise a donation to the Rainforest Action Network, he charged his friends $5 to attend his 16th birthday party. At 17 he went to Nicaragua to experience the Sandinista revolution. In the 1990s he worked with the Landless Workers' Movement in Brazil.

In 2003, Shellenberger and allies launched the New Apollo Project to jumpstart a no-carbon energy revolution over the next 10 years. In 2008, Time named him "A Hero of the Environment." He co-founded the ecomodernist Breakthrough Institute, which advocates the use of advanced technologies such as nuclear power and agricultural biotechnology to decouple the economy from the ecology, allowing both humanity and the natural world to flourish. More recently, he founded Environmental Progress, which campaigns for, among other things, the deployment of clean modern nuclear power. He is an invited expert reviewer of the Intergovernmental Panel on Climate Change's next assessment report.

Ohio Passes Controversial Conscience Clause for Doctors

So what does he say about climate change? "On behalf of environmentalists everywhere, I would like to formally apologize for the climate scare we created over the last 30 years," he wrote in an essay to promote his new book. "Climate change is happening. It's just not the end of the world. It's not even our most serious environmental problem." Needless to say, there are environmentalists everywhere who do not believe they have anything to apologize for. A group of six researchers assembled by the widely respected Climate Feedback fact-checking consortium rated his article as having low scientific credibility.

Shellenberger doesn't devote much of Apocalypse Never to the science behind man-made climate change. He basically accepts the consensus that it's a significant problem and instead focuses on various claims about the harms it is supposedly already causing. In that promotional essay, he argues that (1) human[s] being are not causing a "sixth mass extinction," (2) the Amazon rainforests are not the "lungs of the world," (3) climate change is not making natural disasters worse, and (4) fires have declined 25 percent around the world since 2003.

Shellenberger isn't denying the reality of man-made climate change. He's arguing that humanity is already adapting to the ways climate change has been making weather patterns evolve, and that we will continue to adapt successfully in the future. His book is ultimately a sustained argument that poverty is world's most important environmental problem, and that rising prosperity and increasing technological prowess will ameliorate or reverse most deleterious environmental trends.

### 2AC---AT: AI

#### AI won’t cause extinction

Shermer ’17 [Michael; April; Publisher of Skeptic magazine, a monthly columnist for Scientific American, and a Presidential Fellow at Chapman University; “Why Artificial Intelligence Is Not an Existential Threat,” Skeptic, vol. 22, no. 2, pp. 29–35]

Why AI is not an Existential Threat First, most AI doomsday prophecies are grounded in the false analogy between human nature and computer nature, or natural intelligence and artificial intelligence. We are thinking machines, but natural selection also designed into us emotions to shortcut the thinking process because natural intelligences are limited in speed and capacity by the number of neurons that can be crammed into a skull that has to pass through a pelvic opening at birth, whereas artificial intelligence need not be so restricted. We don't need to compute the caloric value of foods, for example, we just feel hungry. We don't need to calculate the waist-to-hip ratio of women or the shoulder-to-waist ratio of men in our quest for genetically healthy potential mates; we just feel attracted to someone and mate with them. We don't need to work out the genetic cost of raising someone else's offspring if our mate is unfaithful; we just feel jealous. We don't need to figure the damage of an unfair or non-reciprocal exchange with someone else; we just feel injustice and desire revenge. Emotions are proxies for getting us to act in ways that lead to an increase in reproductive success, particularly in response to threats faced by our Paleolithic ancestors. Anger leads us to strike out, fight back, and defend ourselves against danger. Fear causes us to pull back, retreat, and escape from risks. Disgust directs us to push out, eject, and expel that which is bad for us. Computing the odds of danger in any given situation takes too long. We need to react instantly. Emotions shortcut the information processing power needed by brains that would otherwise become bogged down with all the computations necessary for survival. Their purpose, in an ultimate causal sense, is to drive behaviors toward goals selected by evolution to enhance survival and reproduction. AIs -- even AGIs and ASIs -- will have no need of such emotions and so there would be no reason to program them in unless, say, terrorists chose to do so for their own evil purposes. But that's a human nature problem, not a computer nature issue. To believe that an ASI would be "evil" in any emotional sense is to assume a computer cognition that includes such psychological traits as acquisitiveness, competitiveness, vengeance, and bellicosity, which seem to be projections coming from the mostly male writers who concoct such dystopias, not features any programmer would bother including, assuming that it could even be done. What would it mean to program an emotion into a computer? When IBM's Deep Blue defeated chess master Garry Kasparov in 1997, did it feel triumphant, vengeful, or bellicose? Of course not. It wasn't even "aware" -- in the human sense of self-conscious knowledge -- that it was playing chess, much less feeling nervous about possibly losing to the reigning world champion (which it did in the first tournament played in 1996). In fact, toward the end of the first game of the second tournament, on the 44th move, Deep Blue made a legal but incomprehensible move of pushing its rook all the way to the last row of the opposition side. It accomplished nothing offensively or defensively, leading Kasparov to puzzle over it out of concern that he was missing something in the computer's strategy. It turned out to be an error in Deep Blue's programming that led to this fail-safe default move. It was a bug that Kasparov mistook as a feature, and as a result some chess experts contend it led him to be less confident in his strategizing and to second-guess his responses in the subsequent games. It even led him to suspect foul play and human intervention behind Deep Blue, and this paranoia ultimately cost him the tournamentt.[ 13] Computers don't get paranoid, the HAL 9000 computer in 2001 notwithstanding. Or consider Watson, the IBM computer built by David Ferrucci and his team of IBM research scientists tasked with designing an AI that could rival human champions at the game of Jeopardy! This was a far more formidable challenge than Deep Blue faced because of the prerequisite to understand language and the often multiple meanings of words, not to mention needing an encyclopedic knowledge of trivia (Watson had access to Wikipedia for this). After beating the all-time greatest Jeopardy! champions Ken Jennings and Brad Rutter in 2011, did Watson feel flushed with pride after its victory? Did Watson even know that it won Jeopardy!? I put the question to none other than Ferrucci himself at a dinner party in New York in conjunction with the 2011 Singularity Summit. His answer surprised me: "Yes, Watson knows it won Jeopardy!" I was skeptical. How could that be, since such self-awareness is not yet possible in computers? "Because I told it that it won," he replied with a wry smile. Sure, and you could even program Watson or Deep Blue to vocalize a Howard Dean-like victory scream when it wins, but that is still a far cry from a computer feeling triumphant. This brings to mind the "hard problem" of consciousness -- if we don't understand how this happens in humans, how could we program it into computers? As Steven Pinker elucidated in his answer to the 2015 Edge Question on what to think about machines that think, "AI dystopias project a parochial alpha-male psychology onto the concept of intelligence. They assume that superhumanly intelligent robots would develop goals like deposing their masters or taking over the world." It is equally possible, Pinker suggests, that "artificial intelligence will naturally develop along female lines: fully capable of solving problems, but with no desire to annihilate innocents or dominate the civilization."[ 14] So the fear that computers will become emotionally evil are unfounded, because without the suite of these evolved emotions it will never occur to AIs to take such actions against us. What about an ASI inadvertently causing our extinction by turning us into paperclips, or tiling the entire Earth's surface with solar panels? Such scenarios imply yet another emotion -- the feeling of valuing or wanting something. As the science writer Michael Chorost adroitly notes, when humans resist an AI from undertaking any form of global tiling, it "will have to be able to imagine counteractions and want to carry them out." Yet, "until an AI has feelings, it's going to be unable to want to do anything at all, let alone act counter to humanity's interests and fight off human resistance." Further, Chorost notes, "the minute an A.I. wants anything, it will live in a universe with rewards and punishments -- including punishments from us for behaving badly. In order to survive in a world dominated by humans, a nascent A.I. will have to develop a humanlike moral sense that certain things are right and others are wrong. By the time it's in a position to imagine tiling the Earth with solar panels, it'll know that it would be morally wrong to do so."[ 15] From here Chorost builds on an argument made by Peter Singer in The Expanding Circle (and Steven Pinker in The Better Angels of Our Nature[ 16] that I also developed in The Moral Arc[ 17] and Robert Wright explored in Nonzero[ 18]), and that is the propensity for natural intelligence to evolve moral emotions that include reciprocity, cooperativeness, and even altruism. Natural intelligences such as ours also includes the capacity to reason, and once you are on Singer's metaphor of the "escalator of reason" it can carry you upward to genuine morality and concerns about harming others. "Reasoning is inherently expansionist. It seeks universal application," Singer notes.[ 19] Chorost draws the implication: "AIs will have to step on the escalator of reason just like humans have, because they will need to bargain for goods in a human-dominated economy and they will face human resistance to bad behavior."[ 20] Finally, for an AI to get around this problem it would need to evolve emotions on its own, but the only way for this to happen in a world dominated by the natural intelligence called humans would be for us to allow it to happen, which we wouldn't because there's time enough to see it coming. Bostrom's "treacherous turn" will come with road signs ahead warning us that there's a sharp bend in the highway with enough time for us to grab the wheel. Incremental progress is what we see in most technologies, including and especially AI, which will continue to serve us in the manner we desire and need. Instead of Great Leap Forward or Giant Fall Backward, think Small Steps Upward. As I proposed in The Moral Arc, instead of Utopia or dystopia, think protopia, a term coined by the futurist Kevin Kelly, who described it in an Edge conversation this way: "I call myself a protopian, not a Utopian. I believe in progress in an incremental way where every year it's better than the year before but not by very much -- just a micro amount."[ 21] Almost all progress in science and technology, including computers and AI, is of a protopian nature. Rarely, if ever, do technologies lead to either Utopian or dystopian societies. Pinker agrees that there is plenty of time to plan for all conceivable contingencies and build safeguards into our AI systems. "They would not need any ponderous 'rules of robotics' or some newfangled moral philosophy to do this, just the same common sense that went into the design of food processors, table saws, space heaters, and automobiles." Sure, an ASI would be many orders of magnitude smarter than these machines, but Pinker reminds us of the AI hyperbole we've been fed for decades: "The worry that an AI system would be so clever at attaining one of the goals programmed into it (like commandeering energy) that it would run roughshod over the others (like human safety) assumes that AI will descend upon us faster than we can design fail-safe precautions. The reality is that progress in AI is hype-defyingly slow, and there will be plenty of time for feedback from incremental implementations, with humans wielding the screwdriver at every stage."[ 22] Former Google CEO Eric Schmidt agrees, responding to the fears expressed by Hawking and Musk this way: "Don't you think the humans would notice this, and start turning off the computers?" He also noted the irony in the fact that Musk has invested $1 billion into a company called OpenAI that is "promoting precisely AI of the kind we are describing."[ 23] Google's own DeepMind has developed the concept of an AI off-switch, playfully described as a "big red button" to be pushed in the event of an attempted AI takeover. "We have proposed a framework to allow a human operator to repeatedly safely interrupt a reinforcement learning agent while making sure the agent will not learn to prevent or induce these interruptions," write the authors Laurent Orseau from DeepMind and Stuart Armstrong from the Future of Humanity Institute, in a paper titled "Safely Interruptible Agents." They even suggest a precautionary scheduled shutdown every night at 2 AM for an hour so that both humans and AI are accustomed to the idea. "Safe interruptibility can be useful to take control of a robot that is misbehaving and may lead to irreversible consequences, or to take it out of a delicate situation, or even to temporarily use it to achieve a task it did not learn to perform or would not normally receive rewards for this."[ 24] As well, it is good to keep in mind that artificial intelligence is not the same as artificial consciousness. Thinking machines may not be sentient machines. Finally, Andrew Ng of Baidu responded to Elon Musk's ASI concerns by noting (in a jab at the entrepreneur's ambitions for colonizing the red planet) it would be "like worrying about overpopulation on Mars when we have not even set foot on the planet yet."[ 25] Both Utopian and dystopian visions of AI are based on a projection of the future quite unlike anything history has given us. Yet, even Ray Kurzweil's "law of accelerating returns," as remarkable as it has been has nevertheless advanced at a pace that has allowed for considerable ethical deliberation with appropriate checks and balances applied to various technologies along the way. With time, even if an unforeseen motive somehow began to emerge in an AI we would have the time to reprogram it before it got out of control. That is also the judgment of Alan Winfield, an engineering professor and co-author of the Principles of Robotics, a list of rules for regulating robots in the real world that goes far beyond Isaac Asimov's famous three laws of robotics (which were, in any case, designed to fail as plot devices for science fictional narratives).26 Winfield points out that all of these doomsday scenarios depend on a long sequence of big ifs to unroll sequentially: "If we succeed in building human equivalent AI and if that AI acquires a full understanding of how it works, and if it then succeeds in improving itself to produce super-intelligent AI, and if that super-AI, accidentally or maliciously, starts to consume resources, and if we fail to pull the plug, then, yes, we may well have a problem. The risk, while not impossible, is improbable."[ 27

### 2AC---AT: Nanotech

#### Nanotech takes decades to develop – usage will be low-level.

Nasu ‘15 (Hitoshi Nasu; Lecturer, The Australian National University College of Law, Australia “Nanotechnology and the Future of the Law of Weaponry,” 2015, http://stockton.usnwc.edu/cgi/viewcontent.cgi?article=1408&context=ils, accessed 10/25/16)

In order to avoid unnecessary academic discussion of unlikely hypotheticals for the purpose of pure academic interest, this article proceeds with two important limitations on the premise upon which the analysis is developed: technological feasibility (at least in a foreseeable future) and practical utility. There are many wild speculations about what nanotechnology may enable us to produce—such as autonomous, self-replicating “nano-bots” (nano-scale machines) and micro-fusion nuclear weapons— however, it is doubtful whether these are technologically feasible within the period addressed in this article. 9 Scientists are indeed working towards miniaturization of unmanned aerial vehicles, as demonstrated by the United States’ Defense Advanced Research Project Agency’s “nano air vehicles” program,10 yet further miniaturization to micro- or nano-sized robots is at least a few decades away. The development of artificial intelligence is making parallel progress, yet it will take decades before autonomous weapon systems will be capable of compliance with targeting law requirements,11 and even longer for it to be miniaturized to a size that is sufficiently small to be installed on “nano-bots” to enable their autonomous operation Even if these were technologically feasible options, the actual employment of those weapons in the way that commentators are speculating may not be practically viable. For example, weaponization of artificial intelligence with the capacity to operate beyond pre-programmed parameters through autonomous learning now appears to be feasible. 12 However, employing autonomous weapon systems that independently operate beyond pre-programmed parameters may not practically serve the interest of the commanders, who would rather use them to gather high fidelity information in order to permit reassessment of constantly changing situations, and in a manner that ensures they operate exactly as commanders direct to support the achievement of specific military objectives.