# JF22 SBSP AC

#### I affirm: The appropriation of outer space by private entities via space-based solar power is unjust.

#### Yes private actor fiat – resolved in LD means statement of values

UPitt ND University Of Pittsburgh Communications Services Webteam, copyright 2015-21, "Basic Definitions," Department of Communication , <https://www.comm.pitt.edu/basic-definitions> CHO

Affirmative/Pro. The side that “affirms” the resolution (is “pro” the issue). For example, the affirmative side in a debate using the resolution of policy, Resolved: The United States federal government should implement a poverty reduction program for its citizens, would advocate for federal government implementation of a poverty reduction program. Argument. A statement, or claim, followed by a justification, or warrant. Justifications are responses to challenges, often linked by the word “because.” Example: The sun helps people, because the sun activates photosynthesis in plants, which produce oxygen so people can breathe. Constructive Speech. The first speeches in a debate, where the debaters “construct” their cases by presenting initial positions and arguments. Cross-examination. Question and answer sessions between debaters. Debate. A deliberative exercise characterized by formal procedures of argumentation, involving a set resolution to be debated, distinct times for debaters to speak, and a regulated order of speeches given. Evidence. Supporting materials for arguments. Standards for evidence are field-specific. Evidence can range from personal testimony, statistical evidence, research findings, to other published sources. Quotations drawn from journals, books, newspapers, and other audio-visuals sources are rather common. Negative/Con. The side that “negates” the resolution (is “con” the issue). For example, the negative side in a debate using the resolution of fact, Resolved: Global warming threatens agricultural production, would argue that global warming does not threaten agricultural production. Preparation Time. Debates often necessitate time between speeches for students to gather their thoughts and consider their opponent's arguments. This preparation is generally a set period of time and can be used at any time by either side at the conclusion of a speech. Rebuttal Speech. The last speeches in a debate, where debaters summarize arguments and draw conclusions about the debate. Resolution. A specific statement or question up for debate. Resolutions usually appear as statements of policy, fact or value. Statement of policy. Involves an actor (local, national, or global) with power to decide a course of action. For example, Resolved: The United States federal government should implement a poverty reduction program for its citizens. Statement of fact. Involves a dispute about empirical phenomenon. For example, Resolved: Global warming threatens agricultural production. Statement of value. Involves conflicting moral dilemmas. For example, Resolved: The death penalty is a justified method of punishment. Topic. A general issue to debate. Topics could be “The Civil War,” “genetic engineering,” or “Great Books.”

#### Is means is Definition of is (Entry 1 of 4) present tense third-person singular of BE dialectal present tense first-person and third-person singular of BE dialectal present tense plural of BE

Webster ND Definition of IS," Merriam Webster, <https://www.merriam-webster.com/dictionary/is> IS

#### Dialectical present tense means logical coherence which implies no implementation

Your Dictionary ND, "Dialectical Meaning," No Publication, <https://www.yourdictionary.com/dialectical> Cho

The definition of dialectical is a discussion that includes logical reasoning and dialogue, or something having the sounds, vocabulary and grammar of a specific way of speaking. An example of something dialectical is a Lincoln Douglass style of debate, where both parties argue a point in a logical order. Of, or pertaining to dialectic; logically reasoned through the exchange of opposing ideas.

#### “BE” is a linking verb, not an action verb so implementation is incoherent

Grammar Monster ND "Linking Verbs," Grammar Monster, <https://www.grammar-monster.com/glossary/linking_verbs.htm> CHO

What Are Linking Verbs? (with Examples) A linking verb is used to re-identify or to describe its subject. A linking verb is called a linking verb because it links the subject to a subject complement (see graphic below). Infographic Explaining Linking Verb A linking verb tells us what the subject is, not what the subject is doing. Easy Examples of Linking Verbs In each example, the linking verb is highlighted and the subject is bold. Alan is a vampire. (Here, the subject is re-identified as a vampire.) Alan is thirsty. (Here, the subject is described as thirsty.)

### Advantage—Microwaves

#### A Chinese solar station risks miscalc – shifts in solar panels misfire microwave beaming guns.

Chen, 21 (Stephen Chen, Stephen Chen investigates major research projects in China, a new power house of scientific and technological innovation. He has worked for the Post since 2006. He is an alumnus of Shantou University, the Hong Kong University of Science and Technology, and the Semester at Sea programme which he attended with a full scholarship from the Seawise Foundation., 8-17-2021, accessed on 1-28-2022, South China Morning Post, "China aims to use space-based solar energy station to harvest sun’s rays to help meet power needs", https://www.scmp.com/news/china/science/article/3145237/china-aims-use-space-based-solar-energy-station-harvest-suns)//phs st

An intensive energy beam would need to penetrate the cloud efficiently and hit a ground station directly and precisely. Researchers at the Bishan facility will work on these and other projects. A solar energy plant is not efficient because it only operates during the day, and the atmosphere reflects or absorbs nearly half the energy in the sunlight. Since the 1960s, some space scientists and engineers have been attracted to the idea of a solar station in space. From an altitude of 36,000km (22,400 miles) or above, a geo-stationary solar plant can avoid the Earth’s shadow and see the sun 24 hours a day. The energy loss in the atmosphere could also be reduced to the minimum (about 2 per cent) by sending the energy in the form of high-frequency microwaves. Over the last few decades, various forms of solar power stations have been proposed from around the world but they remained theoretical because of major technical challenges. At Bishan, Chinese researchers would first need to prove that wireless power transfer worked over a long distance. Although the engineer and inventor Nikola Tesla popularised the idea in the late 19th century, the technology has been limited to only a small number of short-range applications, such as the wireless charger for smartphones. Tesla failed in part because he made the electricity travel in the air like waves in all directions. To increase the effective range, the energy must be concentrated into a highly focused beam. The Chinese researchers received wireless energy emitted from a balloon 300 metres (980 feet) above the ground. When the Bishan facility is complete, they plan to increase the range to more than 20km with an airship collecting solar energy from the stratosphere, according to the China Science Daily. In Bishan, researchers will also experiment with some alternative applications of the technology, such as using the energy beam to power drones. The core experimental zone will be 2 hectares (4.9 acres) and surrounded by a clearance zone five times larger. Local residents are not allowed to enter the buffer zone for their own safety, according to the district government. The safety risk of a space solar plant is not negligible, according to some recent studies in China. When the huge solar panels turn to chase the sun, for instance, they could produce small but persistent vibrations in the microwave beaming gun that could cause a misfire. The “space farm” would therefore need an extremely sophisticated flight control system to maintain its aim at a tiny spot on Earth. Another hazard would be radiation. According to one calculation by a research team with Beijing Jiaotong University last year, residents could not live within a 5km range of the ground receiving station for the 1GW Chinese solar plant in space. Even a train more than 10km away could experience problems such as sudden loss of communication because the frequency of the energised microwave would affect Wi-Fi.

#### Chinese solar stations give China an excuse to develop HPM tech and put it into space.

Kania 1/20 [Elsa Kania is an analyst at the Long Term Strategy Group. Elsa is a graduate of Harvard College and was a 2014–2015 Boren Scholar in Beijing, China, The PLA’s Potential Breakthrough in High-Power Microwave Weapons, 1-20-2022,No Publication,https://thediplomat.com/2017/03/the-plas-potential-breakthrough-in-high-power-microwave-weapons/, 1-29-2022 amrita]

**Chinese scientists** have reportedly **achieved** unexpected **success in** their **development of** a high-power microwave (**HPM**) weapon. This promising form of directed energy weapon combines “soft” and “hard kill” capabilities through the disruption or even destruction of enemy electronics systems. Such **a** powerful **“new concept weapon” possesses unique advantages,** including its potential speed, range, accuracy, flexibility, and reusability. The PLA’s future HPM weapons could have multiple defensive and offensive functions that would enhance its combat capabilities. In the near term, the PLA’s probable employment of this HPM **could be** as **a ship-borne anti-missile system** or to reinforce China’s air defense systems. Potentially, such a weapon system **would undermine the efficacy o**f even the most **advanced U.S. missiles, such a**s the Long Range Anti-Ship Missile (**LRASM**) currently under development. **Its** likely **applications could** also include its **use as an anti-satellite** (ASAT) **we**apon or incorporation with missiles in order **to overcome enemy air defenses.** Once operationalized, this new weapon could thus contribute to China’s anti-access/area-denial (A2/AD) capabilities. The PLA’s apparent breakthrough in HPM weapons **reflects a track record of** consistent **progress** over the course of decades of concentrated efforts. Given the limitations of the available information, it is difficult to compare the extent of U.S. and Chinese progress in this domain. Until the past several years, the U.S. military’s 50 or so years of research on HPM weapons could be dismissed as an apparent dead end. Only recently, the U.S. Air Force Research Laboratory successfully developed and is preparing to field the Counter-electronics High-Powered Microwave Advanced Missile Project (CHAMP), which could target an enemy’s electronics from an aircraft or missile. While **the** full **extent of current U.S. efforts is unknown,** the PLA’s reported advance in **the development of HPM** weapons could **indicate that Chinese capabilities** may have the potential to **keep pace with** those of the **U**nited **S**tates in this disruptive technology. Reports of a Major Breakthrough In January, Huang Wenhua, deputy director of the Northwest Institute of Nuclear Technology, received a first prize National Science and Technology Progress Award for his research on directed energy. This prize was evidently awarded for his development of a HPM weapon, given his extensive research on the topic and accounts of his remarks at the time. According to Huang, the system in question was initially tested successfully in November 2010 in northwest China, in what he referred to as the Huahai exercise. By his characterization, the completion of the exercise, verification, and experimentation is a “pioneering” achievement, since comparable advances had yet to be achieved elsewhere in the world. Huang also highlighted that this “disruptive technology,” in which a “major breakthrough” has occurred, would increase China’s capabilities in future electronic information confrontation. Enjoying this article? Click here to subscribe for full access. Just $5 a month. At this point, the actual capabilities and current status of this weapon system remain unknown. In an operational context, its efficacy would depend on a number of factors, including its output power, effective range, firing rate, and power requirements. However, Huang’s frequent publications and patents indicate continuing progress. Based on his prior writings, this HPM weapon could be intended for initial employment as a ship-borne anti-missile system. For instance, in 2009, ahead of its initial test, Huang co-authored a paper focused on the utility of HPM weapons against anti-ship missiles. The authors noted that HPM weapons could be used to degrade and damage the electronics of an incoming missile, interfering with, for instance, its data link, GPS receivers, and other guidance mechanisms. Contextualizing Chinese Advances in HPM Weapons This reported breakthrough seemingly reflects the success of China’s long-term agenda for the research and development of HPM weapons. Since Chinese efforts to create directed energy weapons date back to the 1970s and have intensified since the 1990s, **this** apparent **advance reflects** the results of **long-term research** at a number of critical institutions and the consistent funding for their work. Throughout his career, over the course of nearly 20 years in this field, Huang Wenhua has been instrumental in research and development of HPM technology. Since the early 1990s, Huang has engaged in research related to HPM weapons, under the aegis of the Northwest Institute of Nuclear Technology’s Key Laboratory of High-Power Microwave Technology. The National High-Technology Research and Development Plan or “863 Plan” has provided extensive funding to this research agenda, including through a subsidiary fund focused on HPM technology, with the guidance of its X07 expert group, of which Huang served as the director. Future Prospects for the PLA’s HPM Weapons Evidently, the PLA’s pursuit of HPM weapons has remained a consistent priority that will likely continue to receive high-level support at the level of the Central Military Commission (CMC). Notably, Liu Guozhi, who recently became the director of the new CMC Science and Technology Commission, previously served as the commander of the PLA’s Nuclear Test Base in Xinjiang and the director of the Northwest Institute of Nuclear Technology. Liu himself has received multiple awards for his own research on HPM weapons and pulsed power, initially collaborating with Huang on this research agenda. As such, he will likely prove a pivotal figure in the PLA’s efforts to advance this technological dimension of military innovation. Looking forward, **the PLA** could continue to **achieve significant progress in** **HPM** weapons, along with multiple forms of directed energy weapons, seeking **to rival U.S. tech**nological advances. In response to the Third Offset, the PLA has only intensified its focus on these “new concept weapons,” while also developing countermeasures to U.S. directed energy weapons. Although it is difficult to evaluate their future trajectory and likely timeframe at this point, the eventual fielding of the PLA’s HPM weapons will serve as a critical force multiplier for its war-fighting capabilities.

#### High Power Microwave weapons destroy satellites. No “not a weapon”– HPM tech is dual use which makes its deployment unpredictable and impossible to enforce.

Larson 1/10 (Caleb Larson, Caleb Larson, a defense journalist based in Europe and holds a Master of Public Policy degree from the Willy Brandt School of Public Policy. He lives in Berlin and writes on U.S. and Russian foreign and defense policy, German politics and culture., 1-10-2022, accessed on 1-28-2022, 19FortyFive, "The US Navy Has Big Plans for High-Power Microwave Weapons", https://www.19fortyfive.com/2022/01/the-us-navy-has-big-plans-for-high-power-microwave-weapons/)//phs st

The U.S. Navy has announced the first test of its on-orbit power-beaming system on the U.S. Air Force's X-37B mini-space shuttle, just a day after the successful launch of that vehicle on its latest mission to space. These experiments could have game-changing implications for power generation on Earth, especially for facilities in remote areas and for unmanned aircraft, but they also underscore the potential applications of high-powered microwaves and other directed energy beams as weapons in space to jam, blind, or even destroy critical sensors and other components on opponents' satellites. The U.S. Naval Research Laboratory's (NRL) Photovoltaic Radio-frequency Antenna Module (PRAM) is one of a number of publicly disclosed payloads onboard the X-37B, which blasted off from Cape Canaveral Air Force Station in Florida on top of a United Launch Alliance Atlas V rocket on May 17, 2020. This is the reusable space plane's sixth trip into orbit since 2010 and it had just completed its fifth mission, which lasted a record-setting 780 days, in October 2019. Much about the craft and its missions remain highly classified. PRAM is a self-contained module that is a foot long, a foot wide, and around two inches tall. The system uses a solar panel on top to collect sunlight and then converts that into a microwave beam. In principle, a receiver on Earth could then take the beam and convert it back into energy that could be used to power traditional electric devices. You can read more about the history of this concept and the science behind it in this past War Zone piece. "PRAM converts sunlight for microwave power transmission. We could’ve also converted for optical power transmission," Chris Depuma, the PRAM program manager at NRL, said in a statement. "Converting to optical might make more sense for lunar applications because there’s no atmosphere on the Moon. The disadvantage of optical is you could lose a lot of energy through clouds and atmosphere." The Navy team plans to test how efficiently PRAM converts energy and its associated thermal performance in space, rather than in a terrestrial laboratory setting. NRL hopes these experiments will inform the development of future prototypes and could lead to a full system installed on a dedicated spacecraft. In principle, a constellation of solar-energy-collecting power-beaming satellites could provide near-limitless, clean power anywhere on Earth. This could completely transform how power is supplied for both military and civilian activities in the most remote areas. It could potentially power propulsion systems on long-endurance drones, allowing them to stay aloft indefinitely, something The War Zone has previously explored in detail. "To our knowledge, this experiment is the first test in orbit of hardware designed specifically for solar power satellites," Paul Jaffe, PRAM principal investigator at NRL, said in his own statement. This "could play a revolutionary role in our energy future." However, if a power-beaming system can take solar energy, convert it into a microwave beam, and direct that beam at a specific location, one has to wonder if that concept could not also be adapted into a space-based weapon. The idea of using high-powered microwaves to disrupt, or even destroy, electronic systems in space, as well as on Earth, is hardly new. The U.S. military alone has already explored various types of high-powered microwave weapons that can scramble or damage electronic systems and is evaluating new designs, right now. These include systems that can disrupt enemy computer networks, knock down small drones, and fry the electronics in incoming missiles to throw them off course, among others. A sufficiently powerful burst of microwave energy could cause enough damage to cause a mission kill on satellites. A 2019 report from the U.S. Defense Intelligence Agency (DIA) specifically highlighted ground and space-based high-powered microwaves, as well as other directed energy weapons, including lasers, as potential future threats to American assets in orbit. It also listed a slew of other possible dangers, including jamming and "killer satellites" capable of launching various types of kinetic and non-kinetic attacks. The Russians and the Chinese both already have various anti-satellite capabilities, including air-launched and ground-based kinetic interceptors, and are continuing to develop new capabilities given the traditional advantage that the United States has in space-based capabilities, including intelligence gathering, early warning, communications and data sharing, navigation, and more. The U.S. military itself has a number of other highly-classified counter-space capabilities and other countries, such as India, are also developing their own means to challenge opponents assets' in orbit. There is also renewed discussion about space-based weapons, mostly as a means to counter anti-satellite threats or for missile defense, in recent years. "Directed energy weapons (high energy lasers or particle beam) or space-based interceptors provide the best overall hope of a hard kill" to destroy future hypersonic weapons, according to a report the NATO Science & Technology Organization released in March. In 2019, France also notably announced plans to eventually deploy small laser-armed satellites to protect other space-based assets. As NRL's researchers noted with regards to PRAM, the vacuum of space removes many of the obstacles that deflect and diffuse directed energy beams on Earth. This means it could require less starting power to generate a beam with sufficient energy to disrupt or damage another target in space, even if it were shielded from common solar radiation. Many military-grade weapons and other systems are also hardened against electromagnetic radiation, but are still vulnerable to a suitably powerful microwave attack. Highly maneuverable satellites or other spacecraft – the X-37B would be an ideal platform itself – could also maneuver the system very close to its target. This could, in turn, reduce the power and range requirements for high-powered microwave or other directed energy weapons. A high-powered microwave also has the benefit of not needing to physically break up the target to destroy it, meaning that an attack would not cause a cloud of dangerous space debris that could threaten friendly assets in space.

#### Miscalc – downed satellites causes miscalc and goes nuclear.

Blatt 20 [Talia, joint concentration in Social Studies and Integrative Biology at Harvard, specialization in East Asian geopolitics and security issues] “Anti-Satellite Weapons and the Emerging Space Arms Race,” Harvard International Review, May 26, 2020, <https://hir.harvard.edu/anti-satellite-weapons-and-the-emerging-space-arms-race/> TG //rct phs st

Despite their deterrent functions, ASATs are more likely to provoke or exacerbate conflicts than dampen them, especially given the risk they [pose](https://thebulletin.org/2019/06/arms-control-in-outer-space-the-russian-angle-and-a-possible-way-forward/) to early warning satellites. These satellites are a crucial element of US ballistic missile defense, capable of [detecting missiles](https://www.globalsecurity.org/space/world/japan/warning.htm) immediately after launch and tracking their paths. Suppose a US early warning satellite goes dark, or is shut down. Going dark could signal a glitch, but in a world in which other countries have ASATs, it could also signal the beginning of an attack. Without early warning satellites, the United States is much more susceptible to nuclear missiles. Given the strategy of counterforcing—[targeting](https://www.belfercenter.org/sites/default/files/files/publication/isec_a_00273_LieberPress.pdf) nuclear silos rather than populous cities to prevent a nuclear counterattack—the Americans might believe their nuclear weapons are imminently at risk. It could be [twelve hours](https://books.google.com/books?id=ET8lDwAAQBAJ&pg=PA1&lpg=PA1&dq=%22Protecting+Space+Assets%22+johnson-freese&source=bl&ots=6Oq0IdeBjw&sig=ACfU3U1G6Hj8QdP4JlCRNxA6i5XplZwHyg&hl=en&sa=X&ved=2ahUKEwj1n-jT2YzpAhUugnIEHUuMCu4Q6AEwA3oECAkQAQ#v=onepage&q=%22Protecting%20Space%20Assets%22%20johnson-freese&f=false) before the United States regains satellite function, which is too long to wait to put together a nuclear counterattack. The United States, therefore, might move to mobilize a nuclear attack against Russia or China over what might just be a piece of debris shutting off a satellite. Additionally, accidental warfare, or strategic miscalculation, is uniquely likely in space. It is [much easier](https://books.google.com/books?id=VyXTDwAAQBAJ&pg=PA339&lpg=PA339&dq=space+offense+dominant&source=bl&ots=Mw0bgJ51qf&sig=ACfU3U3DeZiEHpr9nfszlCbJZIoyyssIpg&hl=en&sa=X&ved=2ahUKEwjrs-WD3IzpAhVulHIEHbL0AE4Q6AEwCXoECAoQAQ#v=onepage&q=space%20offense%20dominant&f=false) to hold an adversary’s space systems in jeopardy with destructive ASATs than it is to [sustainably defend](https://www.cnas.org/publications/commentary/the-us-military-should-not-be-doubling-down-on-space) a system, which is expensive and in some cases not technologically feasible because of limitations on satellite movement. Space is therefore [considered](https://books.google.com/books?id=VyXTDwAAQBAJ&pg=PA339&lpg=PA339&dq=space+offense+dominant&source=bl&ots=Mw0bgJ51qf&sig=ACfU3U3DeZiEHpr9nfszlCbJZIoyyssIpg&hl=en&sa=X&ved=2ahUKEwjrs-WD3IzpAhVulHIEHbL0AE4Q6AEwCXoECAoQAQ#v=onepage&q=space%20offense%20dominant&f=false) offense-dominant; offensive tactics like weapons development are prioritized over defensive measures, such as [improving GPS](https://www.politico.com/story/2018/04/06/outer-space-war-defense-russia-china-463067) or making satellites more resistant to jamming. As a result, countries are left with poorly defended space systems and rely on offensive posturing, which increases the risk that their actions are perceived as aggressive and incentivizes rapid, risky counterattacks because militaries cannot rely on their spaced-based systems after first strikes. There are several hotspots in which ASATs and offensive-dominant systems are particularly relevant. Early warning satellites [play](https://www.politico.com/story/2018/04/06/outer-space-war-defense-russia-china-463067) a central role in US readiness in the event of a conflict involving North Korea. News of North Korean missile launches comes from these satellites. Given North Korea’s [history](https://www.bbc.com/news/world-asia-pacific-11813699) of nuclear provocations, unflinchingly hostile rhetoric towards the United States and South Korea, and diplomatic opacity, North Korea is always a threatening, unknowable adversary, but recent developments have magnified the risk. With the health of Kim Jong-un [potentially in jeopardy](https://apnews.com/f5d302ae65b03838173e40848223b771), a succession battle or even civil war on the peninsula [raises the chances](https://www.express.co.uk/news/world/1273890/Kim-Jong-un-dead-North-Korea-nuclear-weapon-news-latest-death-US) of loose nukes. If the regime is terminal, traditional MAD risk calculus will become moot; with nothing to lose, North Korea would have no reason to hold back its nuclear arsenal. Or China [might decide](https://foreignpolicy.com/2020/04/28/kim-jong-un-china-north-korea/) to seize military assets and infrastructure of the regime. If the US does not have its early warning satellites because they have been taken out in an ASAT attack, the US, South Korea, and Japan are all in imminent nuclear peril, while China could be in a position to fundamentally reshape East Asian geopolitics. The South China Sea is another hotspot in which ASATs could risk escalation. China [is developing](https://missiledefenseadvocacy.org/missile-threat-and-proliferation/todays-missile-threat/china-anti-access-area-denial-coming-soon/) Anti-Access Area Denial (A2/AD) in the South China Sea, a combination of long range radar with air and maritime defense meant to deny US freedom of navigation in the region. Given the disputed nature of territory in the South China Sea, the United States and its allies do not want China to successfully close off the region.

#### Nuke war causes extinction – Ice Age, famines, and war won’t stay limited

Edwards 17 [Paul N. Edwards, CISAC’s William J. Perry Fellow in International Security at Stanford’s Freeman Spogli Institute for International Studies. Being interviewed by EarthSky. How nuclear war would affect Earth’s climate. September 8, 2017. earthsky.org/human-world/how-nuclear-war-would-affect-earths-climate] Note, we are only reading parts of the interview that are directly from Paul Edwards – MMG //rct phs st

In the nuclear conversation, what are we not talking about that we should be?

We are not talking enough about the climatic effects of nuclear war. The “nuclear winter” theory of the mid-1980s played a significant role in the arms reductions of that period. But with the collapse of the Soviet Union and the reduction of U.S. and Russian nuclear arsenals, this aspect of nuclear war has faded from view. That’s not good. In the mid-2000s, climate scientists such as Alan Robock (Rutgers) took another look at nuclear winter theory. This time around, they used much-improved and much more detailed climate models than those available 20 years earlier. They also tested the potential effects of smaller nuclear exchanges. The result: an exchange involving just 50 nuclear weapons — the kind of thing we might see in an India-Pakistan war, for example — could loft 5 billion kilograms of smoke, soot and dust high into the stratosphere. That’s enough to cool the entire planet by about 2 degrees Fahrenheit (1.25 degrees Celsius) — about where we were during the Little Ice Age of the 17th century. Growing seasons could be shortened enough to create really significant food shortages. So the climatic effects of even a relatively small nuclear war would be planet-wide. What about a larger-scale conflict? A U.S.-Russia war currently seems unlikely, but if it were to occur, hundreds or even thousands of nuclear weapons might be launched. The climatic consequences would be catastrophic: global average temperatures would drop as much as 12 degrees Fahrenheit (7 degrees Celsius) for up to several years — temperatures last seen during the great ice ages. Meanwhile, smoke and dust circulating in the stratosphere would darken the atmosphere enough to inhibit photosynthesis, causing disastrous crop failures, widespread famine and massive ecological disruption. The effect would be similar to that of the giant meteor believed to be responsible for the extinction of the dinosaurs. This time, we would be the dinosaurs. Many people are concerned about North Korea’s advancing missile capabilities. Is nuclear war likely in your opinion? At this writing, I think we are closer to a nuclear war than we have been since the early 1960s. In the North Korea case, both Kim Jong-un and President Trump are bullies inclined to escalate confrontations. President Trump lacks impulse control, and there are precious few checks on his ability to initiate a nuclear strike. We have to hope that our generals, both inside and outside the White House, can rein him in. North Korea would most certainly “lose” a nuclear war with the United States. But many millions would die, including hundreds of thousands of Americans currently living in South Korea and Japan (probable North Korean targets). Such vast damage would be wrought in Korea, Japan and Pacific island territories (such as Guam) that any “victory” wouldn’t deserve the name. Not only would that region be left with horrible suffering amongst the survivors; it would also immediately face famine and rampant disease. Radioactive fallout from such a war would spread around the world, including to the U.S. It has been more than 70 years since the last time a nuclear bomb was used in warfare. What would be the effects on the environment and on human health today? To my knowledge, most of the changes in nuclear weapons technology since the 1950s have focused on making them smaller and lighter, and making delivery systems more accurate, rather than on changing their effects on the environment or on human health. So-called “battlefield” weapons with lower explosive yields are part of some arsenals now — but it’s quite unlikely that any exchange between two nuclear powers would stay limited to these smaller, less destructive bombs.

#### SBSP capabilities are capped by debris

Anzaldua et al 14, (Al Anzaldua has an educational background in science and international studies with a Master’s degree in Latin American Studites, David Dunlop is a writer at The Space Review, Brad Blair is a General Partner with NewSpace Analytics and a professional consultant on advanced mining technology, “Are solar power satellites sitting ducks for orbital debris?”), 9-22-14, The Space Review, https://www.thespacereview.com/article/2602/1 Accessed 1-13-21 // MNHS NL

The risk to future developments Worse yet, future space technologies and missions are threatened. For example, Solar Power Satellites (SPS) for terrestrial use, an energy technology with enormous potential to improve lives, is also at stake. In 2009, retired astrophysicist Donald Kessler, who started NASA’s work on orbital debris more than 30 years ago, stated, “large structures such as those considered… for building solar power stations in Earth orbit could set up a situation where a single satellite failure could lead to cascading failures of many satellites.”9 Solar power satellites are not the only future spacecraft that will be threatened. Bigelow Aerospace plans to have its BA 330 habitats serve as crew habitats in orbit starting as early as 2016.10 Add to this the untold satellites and other spacecraft scheduled to go into Earth orbits well into the future. Risk reduction strategies But would a hyper-modular system, such as proposed by John C. Mankins, also be vulnerable? Mankins admits that micrometeoroids and orbital debris might impact the SPS and cause damage, but then he argues, “Fortunately, with a hyper-modular architecture such as SPS-ALPHA11 there are no ‘single’ points of failure. Impacts will cause damage, but it will be mostly inconsequential and will only occasionally require repairs.”12 This statement bears skeptical examination. Much shrapnel debris exists below current detection limits, so quantification of risk remains problematic. Further studies of risk and greater detection capacity are needed to reduce uncertainty and to encourage potential investors that the risks to capital invested in solar power satellites (SPS) are acceptable. Admittedly, the hyper-modularity of the SPS-ALPHA system would mitigate damage from orbital debris. But Mankins proposes multiple SPS-ALPHAs to solve our energy concerns, each measuring approximately three by five kilometers.13 These structures would be very large targets—“sitting ducks,” in the case of a Kessler-type runaway debris growth in GEO—and the damage would likely go beyond “inconsequential.” Even if the satellite remained structurally intact, maintenance costs would sharply rise. Keep in mind also that to build such a large SPS in the first place, many SPS module-carrying spacecraft would have first to pass through shrapnel-cluttered LEO bands before carrying modules to GEO for construction by telerobotically operated spacecraft.14 Perhaps SPS-ALPHAs require, not only hyper-modularity, but hyper-permeability, such that the modular elements can each separately move to avoid debris. Ideally, the modules would describe an array of SPS-ALPHA elements flying in precise formation and with the ability to self-adjust to avoid danger, reminiscent of a school of fish avoiding the lunge of a predator. Large debris collisions make spacecraft-killing shrapnel Large debris, i.e. larger than ten centimeters in diameter and one kilogram in mass, can range in size all the way up to nine-ton rocket bodies and five-ton satellites. These multi-ton bodies make up much of the mass of approximately 6,300 tons of orbital debris, with approximately 2,200 tons in Low Earth Orbit (LEO) alone, and collisions among them are the source of millions of shrapnel fragments.15 For example, China in 2007 intentionally destroyed its Fengyun-1C weather satellite, and in 2009 the non-functioning Russian Cosmos 2251 satellite collided with the American Iridium 33 satellite. One-third of all orbital shrapnel can be traced to just these two collisions.16 Worse yet, orbital shrapnel smaller than ten centimeters and one kilogram is currently untrackable, and because of the high collisional velocities, even shrapnel as small as *five millimeters* can take out a spacecraft.

#### SBSP is ineffective – launch costs, solar shading, and other costs.

Murphy, 20 (Tom Murphy, Tom Murphy is a professor of physics at the University of California, San Diego, and completed is PhD in astrophysics at Caltech, “Space-Based Solar Power”, 12-3-2020, accessed on 4-9-2022, Dothemath.ucsd, "Space-Based Solar Power | Do the Math", https://dothemath.ucsd.edu/2012/03/space-based-solar-power/) //phs st

Launch Costs This brings us to the tremendous cost of launching stuff into space. Today’s cost for putting stuff into geosynchronous orbit is about $20,000 per kilogram of launched material. We have a history of hope and optimism that launch costs will plummet in the future. So far, that has not really happened, and rising energy prices are not going to help drive costs ever-lower. Meanwhile, the U.S. space program appears to be scaling back. In 1999, NASA initiated a $22 million study investigating the feasibility of space-based solar power. Among their conclusions was that launch costs would need to come down to $100–200 per kg to make space-based solar power economically competitive. It is hard to imagine accomplishing a factor-of-100 reduction in launch costs. Let’s do our own quick analysis. A standard rooftop panel delivers about 10 W per kilogram of mass (slightly better than this, but I will stick to round numbers). Let’s say a light-weighted version for space achieves an impressive factor-of-100 improvement: same power for 1% the mass. This gives 1 kW/kg. I might be grossly over-optimistic in this estimate, but we’ll see where it takes us. Ignoring other infrastructure overhead (wiring, propulsion systems, structural support, microwave transmission antenna, communications, etc.), we end up with a launch cost of $40 per delivered Watt, accounting for 50% delivery efficiency—and this is just the launch cost. I’ll bet the space-qualified ultralight PV panels are not as cheap as the knock-about panels we put on our roofs for $2/W. So maybe the cost of the space hardware, launch of all systems, and build-out of expansive ground systems will cost upwards of $60/W—becoming $400/W if we don’t manage the 100× weight reduction per Watt, settling for 10× instead. Granted, the constant illumination provides a factor of three in favor of space, so we can give it a 3× discount for its full-time contribution. But still, compared to typical ground installation costs at $5/W, we find that the solar approach is at least four times more expensive. You can even throw in batteries in the ground system without exceeding the space cost, and all the reasons for going to space have melted away. Energy Return on Energy Invested My initial reaction to the notion of flinging solar panels in space was that the energy needed to launch panels to geosynchronous orbit might totally undermine the energy delivered by such a system. Let’s take a quick look with approximate numbers. First, today’s silicon solar panels return their investment of energy after 3–4 years of deployment. Stick them in the sun for 30–40 years, and you have an EROEI of 10:1. Specially light-weighted space panels will likely require more energy to make per kilowatt, but will spend a much greater fraction of their time in space soaking up energy. Let’s just guess that the payback would be 5 years if the space panel were deployed on the ground. But in space, the panel works five times longer per day than the panels for which the 3–4 year payback is calculated. So let’s call it an even one year for manufacture payback in space. Panels in space will be subjected to a much harsher cosmic ray (and damaging debris) environment than those on the ground, so we should reduce the lifetime to, say, 20 years. Still, that’s a 20:1 EROEI for the manufacturing piece alone. But then there’s the launch. A study of gross weight of rockets compared to payload delivered to geosynchronous orbit reveals a roughly 100:1 ratio. This intuitively makes sense to me given the logarithmic rocket equation: much of the fuel is spent lifting the fuel that must be spent to lift more fuel, etc. (see the appendix of the stranded resources post for my explanation of this). There is a nice rule of thumb—highly approximate—that the embodied energy in products is about the same as that of the equivalent mass of gasoline, at about 40 MJ/kg. Aluminum production requires more, at 220 MJ/kg, but many materials are surprisingly close to this value (and fuel will be right on the mark). A rocket will use a lot of aluminum, but much more fuel. So we might go with a round number like 50 MJ per kg. If I take my ultra-lightweight panel producing 1 kW/kg, I must launch 100 kg of rocket, at a cost of 5 GJ. A 1 kW panel will deliver 0.5 kW to the end-user, after transmission/conversion losses are considered. The 5 GJ launch price tag is then paid off in 107 seconds, or about one third of a year. Add the embodied energy of the other components in space and on the ground, and I could easily believe we get to a year payback—now bringing the total (manufacture plus launch) to two years and an EROEI around 10:1. If my 100× light-weighting proves to be unrealistic, and we can only realize a factor of ten improvement over our rooftop panels, the solar panel launch cost climbs to three years, so that adding other components results in perhaps a 4:1 EROEI. In the end, the EROEI is not as prohibitive as I imagined: it’s not a net energy drain as I might have feared. But it’s not obviously better than conventional solar either.

#### SBSP is inefficient – its way cheaper to just build more solar panels

Murphy 12, (Tom Murphy is a professor of physics at the University of California, San Diego, and completed is PhD in astrophysics at Caltech, “Space-Based Solar Power”), 3-20-12, Do the Math, <https://dothemath.ucsd.edu/2012/03/space-based-solar-power/> Accessed 1-12-21 // MNHS NL

First, let’s understand the ground-based alternative well enough to know what space buys us. But in comparing ground-based solar to space-based solar, I will depart from what I think may be the most practical/economic path for ground-based solar. I do this because space-based solar adds so much expense and complexity that we gain a large margin for upping the expense and complexity on the ground as well. For example, transmission of power from space-based solar installations would likely be by microwave link to the ground. If we’re talking about sending power 36,000 km from geosynchronous orbit, I presume we would not balk about transporting it a few thousand kilometers across the surface of the Earth. This allows us to put solar collectors in hotspots, like the Desert Southwest of the U.S. or Northern Africa to supply Europe. A flat panel tilted south at latitude in the Mojave Desert of California would gather an annual average of 6.6 full-sun-equivalent hours per day across the year, varying from 5.2 to 7.4 across the months of the year, according to the NREL redbook study. Next, surely we would allow our fancy ground-based panels to articulate and track the sun through the sky. One-axis tracking about a north-south axis tilted to the site latitude improves our Mojave site to an annual average of 9.1 hours per day, ranging from 6.3 to 11.2 throughout the year. A step up in complexity, two-axis tracking moves the yearly average to 9.4 hours per day, ranging from 6.8 to 12.0 hours. We only gain a few percent in going from one to two axes, because the one-axis tracker is always pointing within 23.5° of the direction to the sun, and the cosine projection of this angle is never less than 92%. In other words, it is useful to know that a simple one-axis tracker does almost as well as a more sophisticated two-axis tracker. Nonetheless, we will use the full-up two-axis performance against which to benchmark the space gain. On a yearly basis, then, getting continuous 24-hour solar illumination beats the California desert by a factor of 2.6 averaged over the year, ranging from 2.0 in the summer to 3.5 in the winter. One of my points will be that launching into space is a heck of a lot of work and expense to gain a factor of three in exposure. It seems a good bet that it’s cheaper to build three times as many panels and stick them on the ground. It’s not rocket science. For technical accuracy, we would also want to correct for the atmosphere, which takes a 21% hit for the energy available to a silicon photovoltaic (PV) on the ground vs. space, using the 1.5 airmass standard. Even though the 1347 W/m² solar constant in space is 35% larger than that on the ground, much of the atmospheric absorption is at infrared wavelengths, where silicon PV is ineffective. But taking the 21% hit into account, we’ll just put the space gain at a factor of three and call it close enough. What follows can apply to straight-up PV panels as collectors, or to concentrated reflectors so that less photovoltaic material is used. Once we are comparing to two-axis tracking on the ground, concentration is on the table.

#### Even if perfect, SBSP only represents 20% of total energy requirement, meaning no solvency

Rhodes 10-- Rhodes, Christopher J [Managing Director at Fresh-lands Environmental Actions, Caversham, United Kingdom]. "Solar energy: principles and possibilities." Science progress 93.1 (2010): 37-112. (AG DebateDrills)

Solar energy is a complex and multifarious topic and one that is of pressing attention as the problems of providing energy for the world become more acute. There are some very extravagant schemes proposed, for example Desertec, which require the scale-up of tested technology, and others like space-based solar power production (SBSP) which are entirely untested in all respects. At a more prosaic level, solar energy is likely to become very useful in providing for more localised communities, as civilization will devolve to being as fossil fuels, most notably crude oil become more expensive and per se more scarce. It is debatable just how much time we have left in the free bestowal of fossil energy, oil, gas and coal, and indeed uranium for nuclear power, in order to supplant them by new and alternative technologies, including solar energy. Whatever time there is remaining must be judged against the likely scale of resources, of metals and energy and time that will prove necessary to bring in this brave new world. Even if solar can provide all the world’s electricity demand, only 20% of our total energy requirement is met; the remaining 80% is used as thermal energy, and 40% of the grand energy total comes in the form of oil, used mainly to run our globalised world and its transport. Without a wholesale establishment of transportation via an electrified system, rather than the present one one which is underpinned almost exclusively by oil, it is the arrival of peak oil3 and the loss of cheap and freely available liquid fuels on the world markets that will change the face of the world, from the global to the local, and all that will entail. Surveying future energy prospects, in a way, the production of electricity is the least of our troubles.

## FW

#### The introspective connection between pain and pleasure and phenomenal conceptions of intrinsic value and disvalue is irrefutable – everything else regresses – robust neuroscience proves.

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**Pleasure** is not only one of the three primary reward functions but it also **defines reward.** As homeostasis explains the functions of only a limited number of rewards, the principal reason why particular stimuli, objects, events, situations, and activities are rewarding may be due to pleasure. This applies first of all to sex and to the primary homeostatic rewards of food and liquid and extends to money, taste, beauty, social encounters and nonmaterial, internally set, and intrinsic rewards. Pleasure, as the primary effect of rewards, drives the prime reward functions of learning, approach behavior, and decision making and provides the **basis for hedonic theories** of reward function. We are attracted by most rewards and exert intense efforts to obtain them, just because they are enjoyable [10].

Pleasure is a passive reaction that derives from the experience or prediction of reward and may lead to a long-lasting state of happiness. The word happiness is difficult to define. In fact, just obtaining physical pleasure may not be enough. One key to happiness involves a network of good friends. However, it is not obvious how the higher forms of satisfaction and pleasure are related to an ice cream cone, or to your team winning a sporting event. Recent multidisciplinary research, using both humans and detailed invasive brain analysis of animals has discovered some critical ways that the brain processes pleasure [14].

Pleasure as a hallmark of reward is sufficient for defining a reward, but it may not be necessary. A reward may generate positive learning and approach behavior simply because it contains substances that are essential for body function. When we are hungry, we may eat bad and unpleasant meals. A monkey who receives hundreds of small drops of water every morning in the laboratory is unlikely to feel a rush of pleasure every time it gets the 0.1 ml. Nevertheless, with these precautions in mind, we may define any stimulus, object, event, activity, or situation that has the potential to produce pleasure as a reward. In the context of reward deficiency or for disorders of addiction, homeostasis pursues pharmacological treatments: drugs to treat drug addiction, obesity, and other compulsive behaviors. The theory of allostasis suggests broader approaches - such as re-expanding the range of possible pleasures and providing opportunities to expend effort in their pursuit. [15]. It is noteworthy, the first animal studies eliciting approach behavior by electrical brain stimulation interpreted their findings as a discovery of the brain’s pleasure centers [16] which were later partly associated with midbrain dopamine neurons [17–19] despite the notorious difficulties of identifying emotions in animals.

Evolutionary theories of pleasure: The love connection BO:D

Charles Darwin and other biological scientists that have examined the biological evolution and its basic principles found various mechanisms that steer behavior and biological development. Besides their theory on natural selection, it was particularly the sexual selection process that gained significance in the latter context over the last century, especially when it comes to the question of what makes us “what we are,” i.e., human. However, the capacity to sexually select and evolve is not at all a human accomplishment alone or a sign of our uniqueness; yet, we humans, as it seems, are ingenious in fooling ourselves and others–when we are in love or desperately search for it.

It is well established that modern biological theory conjectures that **organisms are** the **result of evolutionary competition.** In fact, Richard Dawkins stresses gene survival and propagation as the basic mechanism of life [20]. Only genes that lead to the fittest phenotype will make it. It is noteworthy that the phenotype is selected based on behavior that maximizes gene propagation. To do so, the phenotype must survive and generate offspring, and be better at it than its competitors. Thus, the ultimate, distal function of rewards is to increase evolutionary fitness by ensuring the survival of the organism and reproduction. It is agreed that learning, approach, economic decisions, and positive emotions are the proximal functions through which phenotypes obtain other necessary nutrients for survival, mating, and care for offspring.

Behavioral reward functions have evolved to help individuals to survive and propagate their genes. Apparently, people need to live well and long enough to reproduce. Most would agree that homo-sapiens do so by ingesting the substances that make their bodies function properly. For this reason, foods and drinks are rewards. Additional rewards, including those used for economic exchanges, ensure sufficient palatable food and drink supply. Mating and gene propagation is supported by powerful sexual attraction. Additional properties, like body form, augment the chance to mate and nourish and defend offspring and are therefore also rewards. Care for offspring until they can reproduce themselves helps gene propagation and is rewarding; otherwise, many believe mating is useless. According to David E Comings, as any small edge will ultimately result in evolutionary advantage [21], additional reward mechanisms like novelty seeking and exploration widen the spectrum of available rewards and thus enhance the chance for survival, reproduction, and ultimate gene propagation. These functions may help us to obtain the benefits of distant rewards that are determined by our own interests and not immediately available in the environment. Thus the distal reward function in gene propagation and evolutionary fitness defines the proximal reward functions that we see in everyday behavior. That is why foods, drinks, mates, and offspring are rewarding.

There have been theories linking pleasure as a required component of health benefits salutogenesis, (salugenesis). In essence, under these terms, pleasure is described as a state or feeling of happiness and satisfaction resulting from an experience that one enjoys. Regarding pleasure, it is a double-edged sword, on the one hand, it promotes positive feelings (like mindfulness) and even better cognition, possibly through the release of dopamine [22]. But on the other hand, pleasure simultaneously encourages addiction and other negative behaviors, i.e., motivational toxicity. It is a complex neurobiological phenomenon, relying on reward circuitry or limbic activity. It is important to realize that through the “Brain Reward Cascade” (BRC) endorphin and endogenous morphinergic mechanisms may play a role [23]. While natural rewards are essential for survival and appetitive motivation leading to beneficial biological behaviors like eating, sex, and reproduction, crucial social interactions seem to further facilitate the positive effects exerted by pleasurable experiences. Indeed, experimentation with addictive drugs is capable of directly acting on reward pathways and causing deterioration of these systems promoting hypodopaminergia [24]. Most would agree that pleasurable activities can stimulate personal growth and may help to induce healthy behavioral changes, including stress management [25]. The work of Esch and Stefano [26] concerning the link between compassion and love implicate the brain reward system, and pleasure induction suggests that social contact in general, i.e., love, attachment, and compassion, can be highly effective in stress reduction, survival, and overall health.

Understanding the role of neurotransmission and pleasurable states both positive and negative have been adequately studied over many decades [26–37], but comparative anatomical and neurobiological function between animals and homo sapiens appear to be required and seem to be in an infancy stage.

Finding happiness is different between apes and humans

As stated earlier in this expert opinion one key to happiness involves a network of good friends [38]. However, it is not entirely clear exactly how the higher forms of satisfaction and pleasure are related to a sugar rush, winning a sports event or even sky diving, all of which augment dopamine release at the reward brain site. Recent multidisciplinary research, using both humans and detailed invasive brain analysis of animals has discovered some critical ways that the brain processes pleasure.

Remarkably, there are pathways for ordinary liking and pleasure, which are limited in scope as described above in this commentary. However, there are **many brain regions**, often termed hot and cold spots, that significantly **modulate** (increase or decrease) our **pleasure or** even produce **the opposite** of pleasure— that is disgust and fear [39]. One specific region of the nucleus accumbens is organized like a computer keyboard, with particular stimulus triggers in rows— producing an increase and decrease of pleasure and disgust. Moreover, the cortex has unique roles in the cognitive evaluation of our feelings of pleasure [40]. Importantly, the interplay of these multiple triggers and the higher brain centers in the prefrontal cortex are very intricate and are just being uncovered.

Desire and reward centers

It is surprising that many different sources of pleasure activate the same circuits between the mesocorticolimbic regions (Figure 1). Reward and desire are two aspects pleasure induction and have a very widespread, large circuit. Some part of this circuit distinguishes between desire and dread. The so-called pleasure circuitry called “REWARD” involves a well-known dopamine pathway in the mesolimbic system that can influence both pleasure and motivation.

In simplest terms, the well-established mesolimbic system is a dopamine circuit for reward. It starts in the ventral tegmental area (VTA) of the midbrain and travels to the nucleus accumbens (Figure 2). It is the cornerstone target to all addictions. The VTA is encompassed with neurons using glutamate, GABA, and dopamine. The nucleus accumbens (NAc) is located within the ventral striatum and is divided into two sub-regions—the motor and limbic regions associated with its core and shell, respectively. The NAc has spiny neurons that receive dopamine from the VTA and glutamate (a dopamine driver) from the hippocampus, amygdala and medial prefrontal cortex. Subsequently, the NAc projects GABA signals to an area termed the ventral pallidum (VP). The region is a relay station in the limbic loop of the basal ganglia, critical for motivation, behavior, emotions and the “Feel Good” response. This defined system of the brain is involved in all addictions –substance, and non –substance related. In 1995, our laboratory coined the term “Reward Deficiency Syndrome” (RDS) to describe genetic and epigenetic induced hypodopaminergia in the “Brain Reward Cascade” that contribute to addiction and compulsive behaviors [3,6,41].

Furthermore, ordinary “liking” of something, or pure pleasure, is represented by small regions mainly in the limbic system (old reptilian part of the brain). These may be part of larger neural circuits. In Latin, hedus is the term for “sweet”; and in Greek, hodone is the term for “pleasure.” Thus, the word Hedonic is now referring to various subcomponents of pleasure: some associated with purely sensory and others with more complex emotions involving morals, aesthetics, and social interactions. The capacity to have pleasure is part of being healthy and may even extend life, especially if linked to optimism as a dopaminergic response [42].

Psychiatric illness often includes symptoms of an abnormal inability to experience pleasure, referred to as anhedonia. A negative feeling state is called dysphoria, which can consist of many emotions such as pain, depression, anxiety, fear, and disgust. Previously many scientists used animal research to uncover the complex mechanisms of pleasure, liking, motivation and even emotions like panic and fear, as discussed above [43]. However, as a significant amount of related research about the specific brain regions of pleasure/reward circuitry has been derived from invasive studies of animals, these cannot be directly compared with subjective states experienced by humans.

In an attempt to resolve the controversy regarding the causal contributions of mesolimbic dopamine systems to reward, we have previously evaluated the three-main competing explanatory categories: “liking,” “learning,” and “wanting” [3]. That is, dopamine may mediate (a) liking: the hedonic impact of reward, (b) learning: learned predictions about rewarding effects, or (c) wanting: the pursuit of rewards by attributing incentive salience to reward-related stimuli [44]. We have evaluated these hypotheses, especially as they relate to the RDS, and we find that the incentive salience or “wanting” hypothesis of dopaminergic functioning is supported by a majority of the scientific evidence. Various neuroimaging studies have shown that anticipated behaviors such as sex and gaming, delicious foods and drugs of abuse all affect brain regions associated with reward networks, and may not be unidirectional. Drugs of abuse enhance dopamine signaling which sensitizes mesolimbic brain mechanisms that apparently evolved explicitly to attribute incentive salience to various rewards [45].

Addictive substances are voluntarily self-administered, and they enhance (directly or indirectly) dopaminergic synaptic function in the NAc. This activation of the brain reward networks (producing the ecstatic “high” that users seek). Although these circuits were initially thought to encode a set point of hedonic tone, it is now being considered to be far more complicated in function, also encoding attention, reward expectancy, disconfirmation of reward expectancy, and incentive motivation [46]. The argument about addiction as a disease may be confused with a predisposition to substance and nonsubstance rewards relative to the extreme effect of drugs of abuse on brain neurochemistry. The former sets up an individual to be at high risk through both genetic polymorphisms in reward genes as well as harmful epigenetic insult. Some Psychologists, even with all the data, still infer that addiction is not a disease [47]. Elevated stress levels, together with polymorphisms (genetic variations) of various dopaminergic genes and the genes related to other neurotransmitters (and their genetic variants), and may have an additive effect on vulnerability to various addictions [48]. In this regard, Vanyukov, et al. [48] suggested based on review that whereas the gateway hypothesis does not specify mechanistic connections between “stages,” and does not extend to the risks for addictions the concept of common liability to addictions may be more parsimonious. The latter theory is grounded in genetic theory and supported by data identifying common sources of variation in the risk for specific addictions (e.g., RDS). This commonality has identifiable neurobiological substrate and plausible evolutionary explanations.

Over many years the controversy of dopamine involvement in especially “pleasure” has led to confusion concerning separating motivation from actual pleasure (wanting versus liking) [49]. We take the position that animal studies cannot provide real clinical information as described by self-reports in humans. As mentioned earlier and in the abstract, on November 23rd, 2017, evidence for our concerns was discovered [50]

In essence, although nonhuman primate brains are similar to our own, the disparity between other primates and those of human cognitive abilities tells us that surface similarity is not the whole story. Sousa et al. [50] small case found various differentially expressed genes, to associate with pleasure related systems. Furthermore, the dopaminergic interneurons located in the human neocortex were absent from the neocortex of nonhuman African apes. Such differences in neuronal transcriptional programs may underlie a variety of neurodevelopmental disorders.

In simpler terms, the system controls the production of dopamine, a chemical messenger that plays a significant role in pleasure and rewards. The senior author, Dr. Nenad Sestan from Yale, stated: “Humans have evolved a dopamine system that is different than the one in chimpanzees.” This may explain why the behavior of humans is so unique from that of non-human primates, even though our brains are so surprisingly similar, Sestan said: “It might also shed light on why people are vulnerable to mental disorders such as autism (possibly even addiction).” Remarkably, this research finding emerged from an extensive, multicenter collaboration to compare the brains across several species. These researchers examined 247 specimens of neural tissue from six humans, five chimpanzees, and five macaque monkeys. Moreover, these investigators analyzed which genes were turned on or off in 16 regions of the brain. While the differences among species were subtle, **there was** a **remarkable contrast in** the **neocortices**, specifically in an area of the brain that is much more developed in humans than in chimpanzees. In fact, these researchers found that a gene called tyrosine hydroxylase (TH) for the enzyme, responsible for the production of dopamine, was expressed in the neocortex of humans, but not chimpanzees. As discussed earlier, dopamine is best known for its essential role within the brain’s reward system; the very system that responds to everything from sex, to gambling, to food, and to addictive drugs. However, dopamine also assists in regulating emotional responses, memory, and movement. Notably, abnormal dopamine levels have been linked to disorders including Parkinson’s, schizophrenia and spectrum disorders such as autism and addiction or RDS.

Nora Volkow, the director of NIDA, pointed out that one alluring possibility is that the neurotransmitter dopamine plays a substantial role in humans’ ability to pursue various rewards that are perhaps months or even years away in the future. This same idea has been suggested by Dr. Robert Sapolsky, a professor of biology and neurology at Stanford University. Dr. Sapolsky cited evidence that dopamine levels rise dramatically in humans when we anticipate potential rewards that are uncertain and even far off in our futures, such as retirement or even the possible alterlife. This may explain what often motivates people to work for things that have no apparent short-term benefit [51]. In similar work, Volkow and Bale [52] proposed a model in which dopamine can favor NOW processes through phasic signaling in reward circuits or LATER processes through tonic signaling in control circuits. Specifically, they suggest that through its modulation of the orbitofrontal cortex, which processes salience attribution, dopamine also enables shilting from NOW to LATER, while its modulation of the insula, which processes interoceptive information, influences the probability of selecting NOW versus LATER actions based on an individual’s physiological state. This hypothesis further supports the concept that disruptions along these circuits contribute to diverse pathologies, including obesity and addiction or RDS.

#### Evolution proves the reliability of phenomenal introspection – when we introspect on data from our eyes or ears, such as whether one sees or smells food or a predator, we use the same part of the brain that introspects on hedonic tones and identifies their moral relevance.

#### Extinction comes first!

**Pummer 15** [Theron, Junior Research Fellow in Philosophy at St. Anne's College, University of Oxford. “Moral Agreement on Saving the World” Practical Ethics, University of Oxford. May 18, 2015] AT

**There appears to be lot of disagreement in moral philosophy. Whether these many apparent disagreements are deep and irresolvable, I believe there is at least one thing it is reasonable to agree on right now**, whatever general moral view we adopt**: that it is very important to reduce the risk that all intelligent beings on this planet are eliminated by an enormous catastrophe, such as a nuclear war.** How we might in fact try to reduce such existential risks is discussed elsewhere. My claim here is only that **we – whether we’re consequentialists, deontologists, or virtue ethicists – should all agree that we should try to save the world.** According to consequentialism, we should maximize the good, where this is taken to be the goodness, from an impartial perspective, of outcomes. **Clearly one thing that makes an outcome good is that the people in it are doing well. There is little disagreement here.** If the happiness or well-being of possible future people is just as important as that of people who already exist, and if they would have good lives, it is not hard to see how **reducing existential risk is easily the most important thing in the whole world. This is for the familiar reason that there are so many people who could exist in the future – there are trillions upon trillions… upon trillions. There are so many possible future people that reducing existential risk is arguably the most important thing in the world, even if the well-being of these possible people were given only 0.001% as much weight as that of existing people.** Even on a wholly person-affecting view – according to which there’s nothing (apart from effects on existing people) to be said in favor of creating happy people – the case for reducing existential risk is very strong. As noted in this seminal paper, **this case is strengthened by the fact that there’s a good chance that many existing people will, with the aid of life-extension technology, live very long and very high quality lives. You might think what I have just argued applies to consequentialists only. There is a tendency to assume that, if an argument appeals to consequentialist considerations (the goodness of outcomes), it is irrelevant to non-consequentialists. But that is a huge mistake.** **Non-consequentialism is the view that there’s more that determines rightness than the goodness of consequences or outcomes; it is not the view that the latter don’t matter.** Even John Rawls wrote, “**All ethical doctrines worth our attention take consequences into account in judging rightness. One which did not would simply be irrational, crazy.**” **Minimally plausible versions of deontology and virtue ethics must be concerned in part with promoting the good, from an impartial point of view.** **They’d thus imply very strong reasons to reduce existential risk**, at least when this doesn’t significantly involve doing harm to others or damaging one’s character. What’s even more surprising, perhaps, is that even if our own good (or that of those near and dear to us) has much greater weight than goodness from the impartial “point of view of the universe,” indeed even if the latter is entirely morally irrelevant, we may nonetheless have very strong reasons to reduce existential risk. **Even egoism, the view that each agent should maximize her own good, might imply strong reasons to reduce existential risk.** It will depend, among other things, on what one’s own good consists in. If well-being consisted in pleasure only, it is somewhat harder to argue that egoism would imply strong reasons to reduce existential risk – perhaps we could argue that one would maximize her expected hedonic well-being by funding life extension technology or by having herself cryogenically frozen at the time of her bodily death as well as giving money to reduce existential risk (so that there is a world for her to live in!). I am not sure, however, how strong the reasons to do this would be. But views which imply that, if I don’t care about other people, I have no or very little reason to help them are not even minimally plausible views (in addition to hedonistic egoism, I here have in mind views that imply that one has no reason to perform an act unless one actually desires to do that act). **To be minimally plausible, egoism will need to be paired with a more sophisticated account of well-being.** To see this, it is enough to consider, as Plato did, the possibility of a ring of invisibility – **suppose that, while wearing it, Ayn could derive some pleasure by helping the poor, but instead could derive just a bit more by severely harming them. Hedonistic egoism would absurdly imply she should do the latter. To avoid this implication, egoists would need to build something like the meaningfulness of a life into well-being**, in some robust way, where this would to a significant extent be a function of other-regarding concerns (see chapter 12 of this classic intro to ethics). But **once these elements are included, we can (roughly, as above) argue that this sort of egoism will imply strong reasons to reduce existential risk.** Add to all of this Samuel Scheffler’s recent intriguing arguments (quick podcast version available here) that most of what makes our lives go well would be undermined if there were no future generations of intelligent persons. On his view, my life would contain vastly less well-being if (say) a year after my death the world came to an end. So obviously if Scheffler were right I’d have very strong reason to reduce existential risk. **We should also take into account moral uncertainty.** **What is it reasonable for one to do, when one is uncertain not (only) about the empirical facts, but also about the moral facts?** I’ve just argued that **there’s agreement among minimally plausible ethical views that we have strong reason to reduce existential risk – not only consequentialists, but also deontologists, virtue ethicists, and sophisticated egoists should agree.** But **even those (hedonistic egoists) who disagree should have a significant level of confidence that they are mistaken, and that one of the above views is correct. Even if they were 90% sure that their view is the correct one** (and 10% sure that one of these other ones is correct), **they would have pretty strong reason, from the standpoint of moral uncertainty, to reduce existential risk.** Perhaps most disturbingly still, **even if we are only 1% sure that the well-being of possible future people matters, it is at least arguable that, from the standpoint of moral uncertainty, reducing existential risk is the most important thing in the world.** Again, this is largely for the reason that there are so many people who could exist in the future – there are trillions upon trillions… upon trillions. (For more on this and other related issues, see this excellent dissertation). Of course, it is uncertain whether these untold trillions would, in general, have good lives. It’s possible they’ll be miserable. **It is enough for my claim that there is moral agreement in the relevant sense if**, at least given certain empirical claims about what future lives would most likely be like, **all minimally plausible moral views would converge on the conclusion that we should try to save the world.** While there are some non-crazy **views that place significantly greater moral weight on avoiding suffering than on promoting happiness**, for reasons others have offered (and for independent reasons I won’t get into here unless requested to), they nonetheless **seem to be fairly implausible views.** And **even if things did not go well for our ancestors, I am optimistic that they will overall go fantastically well for our descendants, if we allow them to. I suspect that most of us alive today – at least those of us not suffering from extreme illness or poverty – have lives that are well worth living, and that things will continue to improve.** Derek Parfit, whose work has emphasized future generations as well as agreement in ethics, described our situation clearly and accurately: “We live during the hinge of history. **Given the scientific and technological discoveries of the last two centuries, the world has never changed as fast.** We shall soon have even greater powers to transform, not only our surroundings, but ourselves and our successors. **If we act wisely in the next few centuries, humanity will survive its most dangerous and decisive period.** Our descendants could, if necessary, go elsewhere, spreading through this galaxy…. **Our descendants might, I believe, make the further future very good. But that good future may also depend in part on us. If our selfish recklessness ends human history, we would be acting very wrongly.**” (From chapter 36 of On What Matters)

#### Apocalyptic images challenge dominant power structures – they contest the implausibility of inequitable structures producing catastrophe and generate imagination of futures of social justice outside of current narratives

Jessica Hurley 17, Assistant Professor in the Humanities at the University of Chicago, “Impossible Futures: Fictions of Risk in the Longue Durée”, Duke University Press, <https://read.dukeupress.edu/american-literature/article/89/4/761/132823/Impossible-Futures-Fictions-of-Risk-in-the-Longue>

* Squo power structures (i.e. what the K criticizes) paint themselves as stable/inevitable to project their power and maintain dominance
* Questioning that stability thru extinction narratives questions squo world orders bc it calls into ques the idea of squo world stability which allows us to envision alternative worlds/future i.e. one where it fails and causes extinction
* Justifies extinction focus and preventing extinction in the name of changing those squo structures

If contemporary ecocriticism has a shared premise about environmental risk it is that genre is the key to both perceiving and, possibly, correcting ecological crisis. Frederick Buell’s 2003 From Apocalypse to Way of Life: Environmental Crisis in the American Century has established one of the most central oppositions of this paradigm. As his title suggests, Buell tells the story of a discourse that began in the apocalyptic mode in the 1960s and 70s, when discussions of “the immanent end of nature” most commonly took the form of “prophecy, revelation, climax, and extermination” before turning away from apocalypse when the prophesied ends failed to arrive (112, 78). Buell offers his suggestion for the appropriate literary mode for life lived within a crisis that is both unceasing and inescapable: new voices, “if wise enough….will abandon apocalypse for a sadder realism that looks closely at social and environmental changes in process and recognizes crisis as a place where people dwell” (202-3). In a world of threat, Buell demands a realism that might help us see risks more clearly and aid our survival.¶ Buell’s argument has become a broadly held view in contemporary risk theory and ecocriticism, overlapping fields in the social sciences and humanities that address the foundational question of second modernity: “how do you live when you are at such risk?” (Woodward 2009, 205).1 Such an assertion, however, assumes both that realism is a neutral descriptive practice and that apocalypse is not something that is happening now in places that we might not see, or cannot hear. This essay argues for the continuing importance of apocalyptic narrative forms in representations of environmental risk to disrupt conservative realisms that maintain the statusquo. Taking the ecological disaster of nuclear waste as my case study, I examine two fictional treatments of nuclear waste dumps that create different temporal structures within which the colonial history of the United States plays out. The first, a set of Department of Energy documents that use statistical modeling and fictional description to predict a set of realistic futures for the site of the Waste Isolation Pilot Plant in New Mexico (1991), creates a present that is fully knowable and a future that is fully predictable. Such an approach, I suggest, perpetuates the state logics of implausibility that have long undergirded settler colonialism in the United States. In contrast, Leslie Marmon Silko’s contemporaneous novel Almanac of the Dead (1991) uses its apocalyptic form to deconstruct the claims to verisimilitude that undergird state realism, transforming nuclear waste into a prophecy of the end of the United States rather than a means for imagining its continuation. In Almanac of the Dead, the presence of nuclear waste introjects a deep-time perspective into contemporary America, transforming the present into a speculative space where environmental catastrophe produces not only unevenly distributed damage but also revolutionary forms of social justice that insist on a truth that probability modeling cannot contain: that the future will be unimaginably different from the present, while the present, too, might yet be utterly different from the real that we think we know.¶ Nuclear waste is rarely treated in ecocriticism or risk theory, for several reasons: it is too manmade to be ecological; its catastrophes are ongoing, intentionally produced situations rather than sudden disasters; and it does not support the narrative that subtends ecocritical accounts of risk perception in which the nuclear threat gives rise to an awareness of other kinds of threat before reaching the end of its relevance at the end of the Cold War.2 In what follows, I argue that the failure of nuclear waste to fit into the critical frames created by ecocriticism and risk theory to date offers an opportunity to expand those frames and overcome some of their limitations, especially the impulse towards a paranoid, totalizing realism that Peter van Wyck (2005) has described as central to ecocriticism in the risk society. Nuclear waste has durational forms that dwarf the human. It therefore dwells less in the economy of risk as it is currently conceptualized and more in the blown-out realm of deep time. Inhabiting the temporal scale that has recently been christened the Anthropocene, the geological era defined by the impact of human activities on the world’s geology and climate, nuclear waste unsettles any attempt at realist description, unveiling the limits of human imagination at every turn.3 By analyzing risk society through a heuristic of nuclear waste, this essay offers a critique of nuclear colonialism and environmental racism. At the same time, it shows how the apocalyptic mode in deep time allows narratives of environmental harm and danger to move beyond the paranoid logic of risk. In the world of deep time, all that might come to pass will come to pass, sooner or later. The endless maybes of risk become certainties. The impossibilities of our own deaths and the deaths of everything else will come. But so too will other impossibilities: talking macaws and alien visitors; the end of the colonial occupation of North America, perhaps, or a sudden human determination to let the world live. The end of capitalism may yet become more thinkable than the end of the world. Just wait long enough. Stranger things will happen.¶

## Underview

#### 1] Speccing a type of appropriation is good—a) all appropriation is a bad model since the neg won’t be able to read specific escalation offense since each type is different- leads to non-specific debates and no good ground. B) stable advocacy—their interp means aff can shift definition of appropriation ie whether satellites are appropriation c) apply generics to spec affs helps you think on your feet and adapt which is key to real world skills in new situations

#### 2] 1AR theory – a) AFF gets it because otherwise the neg can engage in infinite abuse, making debate impossible, b) reject the debater – the 1AR is too short for theory and substance so ballot implications are key to check abuse, c) no RVIs – they can stick me with 6min of answers to a short arg and make the 2AR impossible, d) competing interps – 1AR interps aren’t bidirectional and the neg should have to defend their norm since they have more time, e) voters – fairness because debate’s a game that needs rules to evaluate it and education since it gives us portable skills for life like research and thinking.

#### 3] Aff RVIs—A] Topic ed – it deters friv violations and forces negs to think twice before skewing the 1AR since they know each shell is another split in the 2N – o/w on reversibility since every shell crowds out substance that we can’t get back, B] Reciprocity – T is a unique avenue to the ballot that the aff can’t access – makes T structurally unfair without the RVI