# 1NC

## Off

### 1

#### The standard is maximizing expected well being – Prefer

#### [1] Actor specificity – state actors can only use util – outweighs since different actors have different obligations.

#### A – Aggregation – all policies benefit some and hurts others – only util can resolve these cuz it gives a clear weighing mechanism

#### B – Collectivism – States are composed of many actors who inevitably disagree about intent means they can only use consequentialism because they don’t have to agree

#### C – Bureaucrats aren’t philosophers – policymakers do not have experience with dense frameworks so they don’t understand how to apply them to specific instances but they do understand that pain is bad and pleasure is good because it’s intrinsic to existing.

#### [2] Extinction first –

#### a. Wager – if there is any chance of goodness existing, we ought to preserve our existence to maximize it.

#### b. Sequencing – if their framework is true, people dying is bad because it means those people can’t use their framework

#### c. Repugnance – if their framework cannot explain why people dying is bad – you should reject it because it cannot disavow of atrocities. You shouldn’t vote for a framework that can’t say the holocaust was a bad thing.

#### d. Performativity – us having a moral debate proves moral uncertainty because it means we are not certain about which framework is true - means we should preserve our ability to find the true framework

#### [3] TJFs

#### Weighability – only util allows for equal weighing and more accessible weighing, novices are taught magnitude and probability not perfect vs imperfect duties.

#### Topic Literature – authors assume pain and pleasure because it’s the most intuitive which means most if not all of the authors in the literature are writing under util

#### [4] Evaluate consequences through Hedonism

#### Accessibility – everyone feels pleasure or pain but not everyone has access to a priori information or specific information important for deontological theories

### 2

#### Asteroid mining is gaining traction with investment from Goldman Sachs – it’s our only chance since Trump gutted A.R.M.

Glester ‘18

Glester, Andrew. “The Asteroid Trillionaires.” Physics World, 11 June 2018, https://physicsworld.com/a/the-asteroid-trillionaires/. // DebateUS!

The race to the riches of asteroids is on, with several private companies vying for funding to become the first space miners. Andrew Glester digs into the issues involved in making money from asteroids

“I’ll make a prediction right now. The first trillionaire will be made in space.”

So said Texas senator Ted Cruz, shortly after a bill was signed to increase [NASA](https://www.nasa.gov/)’s [budget for 2018](https://www.nasa.gov/press-release/new-space-policy-directive-calls-for-human-expansion-across-solar-system). To untrained ears, his claim would have sounded extraordinary. It might even have stretched credulity for those familiar with the challenges of space. But on closer inspection, Cruz was not being that revolutionary. Peter Diamandis – founder of the [X Prize](https://www.xprize.org/) competition to encourage tech developments – made the same prediction back in 2008 and expanded on the theme in his 2015 book Bold. As for how those trillionaires will make their riches from space, both he and [Neil DeGrasse Tyson](http://www.haydenplanetarium.org/tyson/) – the US astrophysicist and TV host – reckon it will be done by mining asteroids.

Progress is already under way. The first asteroid company, [Planetary Resources](https://www.planetaryresources.com/), was founded in 2012 by Diamandis, Chris Lewicki and others in Washington. Within a year the US company [Deep Space Industries](http://deepspaceindustries.com/) was set up by Rick Tumlinson, Stephen Cover and a host of others. A handful more firms have since been established, and while some are admittedly are less serious than others, the race to the riches of space is on.

Despite the existence of such firms and Cruz’s declaration, however, Donald Trump’s 2018 NASA budget cancelled the [Asteroid Redirect Mission](https://www.nasa.gov/mission_pages/asteroids/initiative/index.html) (ARM), which planned to bring an asteroid into an orbit around Earth where it could be studied and mined a lot more easily than one in the asteroid belt. A NASA spokesperson told me the ARM team is ensuring that the key knowledge from the mission so far is not lost, but NASA pulling out has left the asteroid-mining community without a valuable learning tool and places asteroid mining firmly in the realm of the private space sector.

Nevertheless, the investment bank [Goldman Sachs](http://www.goldmansachs.com/index.html) has reassured its clients about the financial benefits of investing in asteroid-mining companies. “The psychological barrier to mining asteroids is high, the actual financial and technological barriers are far lower,” it said in a [report](http://uk.businessinsider.com/goldman-sachs-space-mining-asteroid-platinum-2017-4) published last year. A [Caltech](http://www.caltech.edu/) study put the cost of an asteroid-mining mission at $2.6bn – perhaps not surprisingly the same estimated cost of NASA’s erstwhile ARM. It might sound a lot, but a rare-earth-metal mine has comparable set-up costs of up to $1bn and a football-field-sized asteroid could contain as much as $50bn of platinum.

#### Asteroid mining creates less carbon emissions per kilogram of REMs

MIT Technology Review ‘20

“Asteroid Mining Might Actually Be Better for the Environment.” MIT Technology Review, MIT Technology Review, 2 Apr. 2020, https://www.technologyreview.com/2018/10/19/139664/asteroid-mining-might-actually-be-better-for-the-environment/. // Phoenix

Today, that changes thanks to the work of Andreas Hein and colleagues at the University of Paris-Saclay in France. These guys have calculated the greenhouse-gas emissions from asteroid-mining operations and compared them with the emissions from similar Earth-based activities. Their results provide some eyebrow-raising insights into the benefits that asteroid mining might provide.

The calculations are relatively straightforward. Rocket launches release significant amounts of greenhouse gases into the atmosphere. The fuel on board the first stage of a rocket burns in Earth’s atmosphere to form carbon dioxide. For kerosene-burning rockets, one kilogram of fuel creates three kilograms of CO2. (The second and third stages operate outside the Earth’s atmosphere and so can be ignored.)

Reentries are just as damaging. That’s because a significant mass of a re-entering vehicle ablates in the upper atmosphere, producing NOx such as nitrous oxide (N2O), a greenhouse gas that is about 300 times more potent than CO2. By one estimate, the space shuttle released about 20% of its mass in the form of N2O every time it returned to Earth.

Hein and co use these numbers to calculate that a kilogram of platinum mined from an asteroid would release some 150 kilograms of CO2 into Earth’s atmosphere. However, economies of scale from large asteroid-mining operations could lower this to about 60 kilograms of CO2 per kilogram of platinum.

That needs to be compared with the emission from Earth-based mining. Here, platinum mining generates significant greenhouse gases, mostly from the energy it takes to remove this stuff from the ground.

Indeed, the numbers are huge. The mining industry estimates that producing one kilogram of platinum on Earth releases around 40,000 kilograms of carbon dioxide. “The global warming effect of Earth-based mining is several orders of magnitude larger,” say Hein and co.

#### REMs are key for renewable growth – even the most extreme current models are not sufficient to prevent warming. We would need more than double the REMs we have now to even get close

Serpell ‘21

Serpell, Oscar, et al. “RARE EARTH ELEMENTS A RESOURCE CONSTRAINT OF THE ENERGY TRANSITION.” Kleinman Center for Energy Policy, May 2021, [https://kleinmanenergy.upenn.edu/wp-content/uploads/2021/05/KCEP-Rare-Earth-Elements.pdf. //](https://kleinmanenergy.upenn.edu/wp-content/uploads/2021/05/KCEP-Rare-Earth-Elements.pdf.%20//) Phoenix

* REEs = Rare Earth Elements (not too different than REMs – just a few things don’t fit both labels)

The history and present state of the REE supply chain exhibits the important role these materials already play in the world economy. Projections of a sharp increase in demand over the coming decades raise several questions about the future environmental impacts and supply risks to this industry. A 2012 MIT study by Alonso et al. thoroughly explores this question of future supply, and projects total global demand out to 2035 under five divergent scenarios. One of these scenarios uses the IEA Blue Map scenario to estimate future wind and automotive electrification (IEA 2010). This model only seeks to reduce global carbon emissions by 50% by 2050. Given our understanding of climate sensitivities in 2021, these projections should be considered far too limited to reach global emissions targets. They provide us with a conservative estimate of demand for the purpose of this analysis (IPCC 2018). Under this scenario the study projects that by 2035 global demand for REEs will reach close to 450,000 tons per year, compared to approximately 200,000 tons per year today (USGS 2021). This represents more than a doubling in the size of the industry in just 15 years, which is again overly conservative according to present day decarbonization targets. Furthermore, the rate of demand growth in Alonso et al. accelerates rapidly, as do projections of wind turbine and EV production out to 2050, indicating that this increase in industry demand is only the beginning of a pattern of accelerating growth that will likely last for decades (Larson et al., 2020). As technology advances and demand for clean energy solutions intensifies, overall production of REEs will have to scale to accommodate growing demand for only a small handful of elements needed for magnets— specifically neodymium (Nd) and dysprosium (Dy). Whereas Alonso et al. predicts that 2035 demand for yttrium (Y) and terbium (Tb) will only be approximately 250% of 2010 supply, 2035 demand for Dy will be over 2500% the supply of Dy in 2010. REEs are typically co-located in small concentrations, so global mine operations may need to produce a significant excess of many lesser-used elements to produce sufficient Dy. This effort to match production of elements to their relative demand is called mine yield balancing and promises to be a growing challenge in the REE industry. Industrial use of REEs is a relatively recent economic development and uses for these elements developed to accommodate their natural abundance and take advantage of low market prices. It is, therefore, uncertain how the global market will respond to the excess supply and lower prices of REEs not used for magnet production, since uses for many other REEs are still limited. Because production of these minerals is almost always complementary, market demand for each element is important to consider in investment and operational decision-making. If insufficient demand for these other elements emerges, it could significantly increase the long-term cost of critical elements such as neodymium and dysprosium. For emerging and sustainable energy solutions to effectively utilize rare earth elements, a higher premium for these materials will likely be necessary

#### REMs are essential for renewables – but are costly to mine – that independently turns case

Gupta ‘21

Gupta, Shourabh. “Rare Earth Metals Are Used Extensively in Clean Energy Technologies. but How Safe Are They?” Down To Earth, 18 Jan. 2021, https://www.downtoearth.org.in/blog/waste/rare-earth-metals-are-used-extensively-in-clean-energy-technologies-but-how-safe-are-they--75111. // Phoenix

Naturally abundant wind, geothermal, solar, tidal and electric energy are being hastened as the future of the planet's energy needs. And rare earth elements are used in a bevy of technologies to generate this cleaner, renewable energy.

These include wind turbine magnets, solar cells, smartphone components, cells used in electric vehicles, among others.

Also called rare earth metals, they comprise seventeen chemical elements — 15 lanthanides (anthanum, cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, and lutetium), scandium and yttrium.

Despite the name, rare earth elements are found abundantly in the Earth's crust. They are widely dispersed and found in low concentrations that are not economically exploitable.

Extraction and mining of rare earth metals involves similar land-use exploitation, environmental damage and ecological burden as any other mining operation. They are mined using extremely energy-intensive processes, spewing carbon emissions into the atmosphere and toxins into the ground.

Many of these metals, which include mercury, barium, lead, chromium and cadmium, are extremely damaging to the health of several ecosystems, including humans.

A [survey](https://ehs.unu.edu/news/news/unu-and-who-release-findings-from-first-ever-global-survey-on-e-wastes-impact-on-child-health.html) done by United Nations University (UNU) and the World Health Organisation (WHO) on the impact e-waste has on child health, raised concerns around chemical burns, cancer and stunted growth.

Eradicating these substances from discarded products is difficult and costly, which is why much of the e-waste exported to the developing world under the pretence of being reused or refurbished ends up being dumped.

Until 1948, India and Brazil were the world’s primary producers of rare earth metals. The countries with the most rare earth metals currently are China (the largest reserves in the world), the United States, Brazil, India, Vietnam, Australia, Russia, Myanmar, Indonesia.

#### Renewables are essential to combat warming – but terrestrial mining is costly

Miliken ‘21

Milliken, Lindsay. “Countering Climate Change with Renewable Energy Technologies.” Federation Of American Scientists, 8 July 2021, https://fas.org/blogs/sciencepolicy/countering-climate-change-with-renewable-energy-technologies/. // Phoenix

Renewable energy technologies, such as advanced biofuels for transportation, are key for U.S. efforts to mitigate climate change

Climate change is bringing about rising temperatures, which have significant negative impacts on humans and the environment, and transitioning to renewable energy sources, such as biofuels, can help meet this challenge. One consequence of higher global temperatures is the increasing frequency of extreme weather events that cause massive amounts of harm and damage. As depicted in Figure 1, six of the 10 costliest extreme weather events in the U.S. have [occurred](https://www.c2es.org/content/extreme-weather-and-climate-change/) in the last 10 years, amounting to over $411 billion in damages (in 2020 dollars and adjusted for inflation). The other four [occurred](https://www.c2es.org/content/extreme-weather-and-climate-change/) between 2004 and 2008, and the costs of future extreme weather events are expected to [keep climbing](https://www.americanprogress.org/issues/green/reports/2017/10/27/441382/extreme-weather-extreme-costs/).

Moreover, the World Health Organization [estimates](https://www.who.int/heli/risks/climate/climatechange/en/) that, globally, climate change is responsible for over 150,000 deaths per year. This is because in addition to extreme weather events, climate change contributes to the spread of diseases, reduced food production, and many other problems.

Transitioning to renewable energy, and reducing reliance on fossil fuels, is one way to help slow down the effects of climate change. While renewables used to be a more expensive option, new clean energy technologies are lowering costs and helping to move economies away from fossil fuels. For example, solar panel prices [decreased 75 to 80 percent](https://www.un.org/en/chronicle/article/how-renewable-energy-can-be-cost-competitive)between 2009 and 2015. Due to similar trends in other renewables like wind and hydropower, renewable energy generation technology accounts for [over half of all new power generation capacity](https://www.un.org/en/chronicle/article/how-renewable-energy-can-be-cost-competitive) brought online worldwide every year since 2011.

More must be done to ensure that renewable energy technologies are key contributors to the mitigation of climate change. As of 2018, solar and wind accounted for [less than 4%](https://www.pewresearch.org/fact-tank/2020/01/15/renewable-energy-is-growing-fast-in-the-u-s-but-fossil-fuels-still-dominate/) of all the energy used in the U.S. (Figure 2). The amount of energy generated by solar panels has increased almost 46-fold since 2008, but still only amounts to about [1%](https://www.pewresearch.org/fact-tank/2020/01/15/renewable-energy-is-growing-fast-in-the-u-s-but-fossil-fuels-still-dominate/) of the total energy generated in the country. Unfortunately, renewables currently provide only a small fraction of the total energy produced, and to counter climate change, this contribution must drastically increase.

#### Warming causes extinction and turns their impacts - death spirals make resilience impossible.

Beard et al. 21 [S.J. Beard, Lauren Holt, Asaf Tzachor, Luke Kemp, Shahar Avin, Phil Torres, and Haydn Belfield, \* Centre for the Study of Existential Risk, “Assessing climate change’s contribution to global catastrophic risk,” 2021, *Futures*, Vol. 127, https://doi.org/10.1016/j.futures.2020.102673, EA – Table 1 & Fig. 2 Omitted]

3.1. Climate change and planetary boundaries

While most of the impacts of climate change so far have fallen within the range of what was experienced during the Holocene, the rate of change is faster than in the Holocene and we are now beginning to see climate change push beyond these boundaries. In the latest edition of the planetary boundaries’ framework, climate change is placed in the zone of increasing risk, implying that while this boundary has been breached, there remains some potential for normal functioning and recovery (Steffen et al., 2015). It thus lies between what the authors identify as the ‘safe zone’ and other ‘high risk’ transgressions, such as disruption to the biochemical flows of nitrogen and phosphorus and loss of biosphere integrity.

As part of their discussion of BRIHN Baum and Handoh (2014) note that climate change is the planetary boundary for which the risk to humanity has received most meaningful consideration and they suggest that this attention is deserved. Yet little research attention has been paid to climate change’s extreme or catastrophic effects. Kareiva and Carranza (2018) argue that, despite currently falling outside of the area of high risk, climate change has the clear potential to push humanity across a threshold of irreversible loss by “changing major ocean circulation patterns, causing massive sea-level rise, and increasing the frequency and severity of extreme events… that displace people, and ruin economies.” Even if humanity was resilient to each of these individual impacts, a global catastrophe could occur if these impacts were to occur rapidly and simultaneously.

One scenario that has received comparatively more attention is that of the global climate crossing a tipping point that would trigger environmental feedback loops (such as declining albedo from melting ice or the release of methane from clathrates) and cascading effects (such a shifting rainfall patterns that trigger desertification and soil erosion). After this point, anthropogenic activity may cease to be the main driver of climate change, making it accelerate and become harder to stop (King et al., 2015).

Other scenarios can be discerned from the numerous historical cases in which the modest, usually regional, climatic changes experienced during the Holocene have been implicated in the collapse of previous societies, including the Anasazi, the Tiwanaku, the Akkadians, the Western Roman Empire, the lowland Maya, and dozens of others (Diamond, 2005, Fagan, 2008). These provide a precedent for how a changing climate can trigger or contribute to societal breakdown. At present, our understanding of this phenomena is limited, and the IPCC has labelled its findings as “low confidence” due to a lack of understanding of cause and effect and restrictions in historical data (Klein et al., 2014). Further study and cooperation between archaeologists, historians, climate scientists and global catastrophic risk scholars could overcome some of these limitations by identifying how the impacts of climate change translate into social transformation and collapse, and hence what the impacts of more rapid and extreme climatic changes might be. There is also the potential for larger studies into how global climate variations have coincided with collapse and violence at the regional level (Zhang, Chiyung, Chusheng, Yuanqing, & Fung, 2005; Zhang et al., 2006). However, these need to be interpreted and generalized with care given the differences between pre-industrial and modern societies.

Societies also have a long history of adapting to, and recovering from, climate change induced collapses (McAnany and Yoffee, 2009). However, there are two reasons to be sceptical that such resilience can be easily extrapolated into the future. First, the relatively stable context of the Holocene, with well-functioning, resilient ecosystems, has greatly assisted recovery, while anthropogenic climate change is more rapid, pervasive, global, and severe. Large-scale states did not emerge until the onset of the Holocene (Richerson, Boyd, & Bettinger, 2001), and societies have since remained in a surprisingly narrow climatic niche of roughly 15 mean annual average temperature (Xu, Kohler, Lenton, Svenning, & Scheffer, 2020). A return to agrarian or hunter-gatherer lifestyles could thus have more devastating and long-lasting effects in a world of rapid climate change and ecological disruption (Gowdy, 2020).7 Second, modern human societies may have developed hidden fragilities that amplify the shocks posed by climate change (Mannheim 2020) and the complex, tightly-coupled and interdependent nature of our socio-economic systems makes it more likely that the failure of a few key states or industries due to climate change could cascade into a global collapse (Kemp, 2019).

A third set of plausible scenarios stem from climate change’s broader environmental impacts. Apart from being a planetary boundary of its own, Steffen et al. (2015) point out that climate change is intimately connected with other planetary boundaries (see Table 1). Climate change is thus identified by the authors as one of two ‘core’ boundaries with the potential “to drive the Earth system into a new state should they be substantially and persistently transgressed.” This transformative potential was elaborated on in subsequent work exploring how the world could be pushed towards a ‘Hothouse Earth’ state, even with anthropogenic temperature rises as low as 2 °C (Steffen et al., 2018).

The connection between climate change and biosphere integrity (the survival of complex adaptive ecosystems supporting diverse forms of life) is particularly strong. The IPCC is highly confident that climate change is adversely impacting terrestrial ecosystems, contributing to desertification and land degradation in many areas and changing the range, abundance and seasonality of many plant and animal species (Arneth et al., 2019). Similarly, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) has reported that climate change is restricting the range of nearly half the world’s threatened mammal species and a quarter of threatened birds, with marine, coastal, and arctic ecosystems worst affected (Diaz et al., 2019). According to one estimate, climate change could cause 15–37 % of all species to become ‘committed to extinction’ by mid-century (Thomas et al., 2004).

Disruption to biosphere integrity can have profound economic and social repercussions, ranging from loss of ecosystem services and natural resources to the destruction of traditional knowledge and livelihoods. For instance, desertification, which threatens a quarter of Earth’s land area and a fifth of the population, is already estimated to cost developing nations 4–8 % of their GDP (United Nations, 2011). Many other rapid regime shifts involving loss of biosphere integrity have been observed, including shifts in arid vegetation, freshwater eutrophication, and the collapse of fish populations (Amano et al. 2020). There is a theoretical possibility of still more profound regime shifts at the global level (Rocha, Peterson, Bodin, & Levin, 2018). However, the contribution of loss of biosphere integrity to GCR is yet to be assessed. Kareiva and Carranza (2018) argue that it is unlikely to threaten human civilization, due both to a lack of plausible mechanisms for this threat and the fact that “local and regional biodiversity is often staying the same because species from elsewhere replace local losses.” However, in their classification of GCRs, Avin et al. (2018) suggest the potential for ecological collapse to threaten the safety boundaries of multiple critical systems with diverse spread mechanisms at a range of scales, from the biogeochemical and anatomical to the ecological and sociotechnological. Note that both these studies were conducted for largely conceptual purposes and should not be taken as rigorous analyses of this risk, this topic warrants further investigation.

3.2. Classifying climate change’s contributions to global catastrophic risk

Climate change’s contribution to GCR goes well beyond its impact on the earth system. Taking Avin et al.’s list of critical systems, we note that previous studies have mostly focused on the effects of climate change on physical and biogeochemical systems (e.g. global temperature and sea-level rise) or the lower-level critical systems that are most directly related to human health and survival (e.g. Heath Stress). However, these represent a very limited assessment of risk as it only accounts for climate change as a direct hazard/ threat and our "ontological" vulnerabilities to it. A more comprehensive risk assessment must consider the higher-order critical systems threatened by climate change passively (through a lack of alternatives) and actively (through intentional design).

The probability of a global catastrophe is higher when sociotechnological and environmental systems are tightly coupled, creating a potential for reinforcing feedback loops. If environmental change produces social changes that perpetuate further environmental change, then this could actively work against our efforts at adaptation. When this change has the potential to produce significant harm, via human vulnerabilities and exposure, we describe such loops as ‘global systems death spirals.’ These spirals could produce self-perpetuating catastrophes, whereby the energy and resources required to reverse or adapt to collapse are beyond the means of dwindling human societies. Feedback loops like this could thus create tipping points beyond which returning to anything like present conditions would become extremely difficult. Global systems would shift to very different states in which the prospects for humanity would likely be bleaker.

In the rest of this section, we explore just one potential spiral, between an ecological system (the biosphere) and two sociotechnological systems (the human food and global political systems). We explore each system and its interactions. Fig. 2 illustrates our model of this spiral.

3.2.1. The human food system

Climate change’s impact on biosphere integrity (discussed in the previous section) could harm the human food system due to loss of ecosystem services, disruption of the cycles of water, nitrogen and phosphates, and changes in the dynamics of plant and animal health (B´elanger & Pilling, 2019). Crossing this planetary boundary is already having severe implications for global food security, including loss of soil fertility and insect-mediated pollination (Diaz et al., 2019).

Systems for the production and allocation of food are already enduring significant stress. The sources of stress include climate change, soil erosion, water scarcity, and phosphorus depletion. The natural resource base, arable land and freshwater upon which food production rely are being degraded. While global food productivity and production has increased dramatically over the past century to meet rising demand from an expanding global population and rising standard of living, these constraints and risks are increasing the vulnerability of our global food supply to rapid and global disruptions that could constitute global catastrophes (Baum, Denkenberger, Pearce, Robock, & Winkler, 2015).

Climate change will further reduce food security in at least three interconnected ways. First, it will affect growing conditions, including direct threats to agricultural yields from heat, humidity, and precipitation in many regions; although initially improving conditions in some (Lott, Christidis, & Stott, 2013). Second, it will increase the range of agricultural pests and diseases (Harvell et al., 2002). Third, it will increase the occurrence of extreme weather events that impair the integrity of food production and distribution networks, from production to harvest, post-harvest, transport, storage, and distribution, thereby increasing our vulnerability and exposure to supply shocks (Bailey et al., 2015). The IPCC estimates, with medium confidence, that at around 2 °C of global warming the risk from permafrost degradation and food supply instabilities will be ‘very high’, while at around 3 °C of global warming the risk from vegetation loss, wildfire damage, and dryland water scarcity will also be very high (Arneth et al., 2019). Very few studies have considered the impacts of 4 °C of global warming or more; however, the IPCC highlighted one study finding that any potential agricultural gains from climate change will be lost by this point and there could be a decrease of 19 % in maize yields and 68 % in bean yields in Africa, an 8 % reduction in yields in South Asia, and a substantial negative impact on fisheries by 2050 (Porter et al., 2014). Furthermore, multiple extreme weather events could disrupt food distribution networks (Bailey and Wellesley, 2017).

While there are opportunities to adapt, disruption to the entire global food system cannot be resolved via food aid alone. Indeed, there is the potential for isolationist or heavy-handed responses that would do more harm than good. Given the high degree of interconnectivity and feedback within the global food system, our initial research suggests that any one of these climate change effects could trigger scenarios that would critically undermine the global food system’s ability to meet the minimum nutrition for well-being; making food security for all an unachievable goal, let alone rise to the challenge of continuing to grow (A. Tzachor, 2019, 2020); this would constitute what Kuhlemann (2019) terms a ‘threshold of significance.’

3.2.2. The global political system

Disrupting the global food system can create and exacerbate conflict and state failure (Brinkman & Hendrix, 2011). However, once again, this needs to be seen against the backdrop of a global political system under stress, with climate change as a significant contributing factor. Climate change influences political systems in many ways, from being a locus of activism and a stimulus for reform to driving rising inequality and population displacement (Arneth et al., 2019; Diffenbaugh & Burke, 2019). This is not a new phenomenon, changes in the climate are believed to have contributed to conflict between people and states throughout human history, driven by resource scarcity, population displacement, and inequality (Lee, 2009; Mach et al., 2019). As part of a comprehensive risk assessment of climate change, King et al. (2015) conducted an extensive literature review on climate change and conflict and used this to inform a series of international wargaming exercises. These found that climate change is expected to increase international conflict while highlighting the role that population displacement, state failure, and water and food insecurity would play in this (see also Mach et al., 2019; Natalini, Jones, & Bravo, 2015).

Quantitative studies of the impact of climate change on violence and conflict have provided more mixed results. A survey of empirical studies by Detges (2017) found that there may be multiple differing trends: extreme weather events appear to have more significant effects on violence than do long-term climate trends, while levels of small-scale conflict and interpersonal violence appear to be more affected than large-scale conflicts and international war. Empirical studies also highlight how climate change’s impact on conflict is predominantly as a risk multiplier and intensifier. Thus, climate change may contribute more by increasing our vulnerability to other conflict-inducing factors, such as loss of livelihood, forced migration, environmental change, and food insecurity, than by acting as a direct cause of conflict (Abel, Brottrager, Cuaresma, & Muttarak, 2019; Hsiang, Burke, & Miguel, 2013; Schubert et al., 2008).8

Of particular relevance to GCR is the effect of climate change on the risk of nuclear war (Parthemore, Femia, & Werrell, 2018). However, to our knowledge, this has never been rigorously assessed, although the potential is certainly there. One recent model of the risk of nuclear war highlighted how varied, and common, incidents with the potential to trigger a nuclear exchange are (Baum, de Neufville, & Barrett, 2018). It outlined 14 different causal pathways to an exchange, including the escalation of conventional wars and international crises, human error, and the emergence of new non-state actors. For all but two of these, they identify historical examples of potentially precipitating incidents, with 60 incidents in total (i.e. a little less than one a year). This suggests that the absence of nuclear war was less due to a lack of potential causes, tan the global political system’s ability to defuse them. Thus, the real significance of climate change may be its capacity to undermine this system: the combination of social, political, and environmental disruption, a lingering sense of global injustice, and rising food, water, and energy insecurity could increase the probability that crises escalate or that false alarms are mistaken for genuine emergencies. This topic needs further research.

3.3. The emergence of a global systems death spiral

Yet, we should not conclude that a nuclear exchange is the only, or even most likely, scenario in which political instability might produce a global catastrophe. Conflict and political instability, even of moderate severity, are themselves two of the most significant drivers of biodiversity loss due to breakdowns in monitoring, governance, and (public and private) property rights (Baynham-Herd, Amano, Sutherland, & Donald, 2018). This closes a potentially reinforcing feedback loop between loss of biosphere integrity, food insecurity and political breakdown.

The mechanisms by which these cascading failures might spread include many of the natural, anthropogenic, and replicator effects identified by Avin et al. (2018), making them harder to contain. At the natural level, climate change involves changes to the global atmospheric and biogeochemical systems and poses other naturally spreading harms, like global ecological collapse. At the anthropogenic level, the global interconnectedness of sociotechnological systems means that while small shocks are easier to recover from, larger shocks can be harder to contain and control. Finally, biological and informational replication can also spread the negative impacts of climate change, from vector-borne diseases and invasive species to climate fatalism and dangerous geoengineering technologies.

Given these numerous spread mechanisms, critical system failures could precipitate global catastrophes. Furthermore, the spiral we have explored is unlikely to be the only set of interlinked systemic disruptions that climate change could initiate (other death spirals could involve bio-insecurity and disease), nor are these the only causal connections between these three systems. Until we understand the nature of such death spirals better, we must act cautiously. We now turn to consider what this would mean.

## On

### Framing

#### The role of the ballot is to vote for the better debater determined by the best offense under a normative framework within the debate round. Prefer

#### Engagement – anything else is arbitrary and self-serving creating insular debates that lack deep engagement that only comes from a predictable stasis and nuanced pre-round prep. That outweighs because it creates good subjects from rigorous contestation.

#### Dogmatism – arbitrary debates create dogmatic ideology that can’t and won’t be contested

#### Competition – Competition is the wrong forum for method-testing since debaters are incentivized to always find something wrong even if there isn’t anything wrong so they can win the round. That means genuinely good methods are pushed away in turn for competitive rewards.

#### Normative frameworks solve their offense – they still get to read their offense but it has to be under a normative framework that also allows for other offense that’s predictable so we can effectively engage the aff – like util.

[LBL]

#### Your Heron ev makes no mentions of a unified horizon towards FALC, ctrl+F – that means their evidence is generic and “dialectical attunement to already existing infrastructures and practices whose form can be read against their content” is word garble – make them explain what that means and what it does for FALC

#### Memes fail – WSB proves a collective subjectivity that failed to stop capitalism and only supported

#### Your Levin 21 ev is in context of space socialists wanting to be optimistic – which is completely distinct from anti-capitslist narratives

### Method Fails

#### Their aff is incredibly shifty about what their method actually is – err neg on method indicts if you can’t explain their method without using polysyllables and their own terms – that’s a primer for presumption flowing negative

#### Imaginings within debate fail -

#### 1 – Empirically disproven – debaters have read anti capitalist literature in bigger debates with bigger audiences and nothing happened – imaginations do nothing

#### 2- Competition – only means debaters will prep more because they are in a competition rather than a discussion we are forced to disagree so we can’t help imagine Fugitive Science

#### 3- Backfires – anti-capitalist practices get massive backlash from capitalists such as the United States and the mega corporations around the world – the only way to get around getting shot in your sleep is to work within the state. It’s a rigged game but it’s the only chance we have.

#### 4- Abstraction – they create an endless feedback loop of YouTube videos of FALC imagination that can’t spillover to shape material conditions

Bryant ‘12

Levi Bryant 12, currently a Professor of Philosophy at Collin College. In addition to working as a professor, Bryant has also served as a Lacanian psychoanalyst. He received his Ph.D. from Loyola University in Chicago, Illinois, where he originally studied 'disclosedness' with the Heidegger scholar Thomas Sheehan. Bryant later changed his dissertation topic to the transcendental empiricism of Gilles Deleuze, "Critique of the Academic Left", <http://larvalsubjects.wordpress.com/2012/11/11/underpants-gnomes-a-critique-of-the-academic-left/> rc // Phoenix

Unfortunately, the academic left falls prey to its own form of abstraction. It’s good at carrying out critiques that denounce various social formations, yet very poor at proposing any sort of realistic constructions of alternatives. This because it thinks abstractly in its own way, ignoring how networks, assemblages, structures, or regimes of attraction would have to be remade to create a workable alternative. Here I’m reminded by the “underpants gnomes” depicted in South Park: The underpants gnomes have a plan for achieving profit that goes like this: Phase 1: Collect Underpants Phase 2: ? Phase 3: Profit! They even have a catchy song to go with their work: Phase 1: Ultra-Radical Critique Phase 2: ? Phase 3: Revolution and complete social transformation! Our problem is that we seem perpetually stuck at phase 1 without ever explaining what is to be done at phase 2. Often the critiques articulated at phase 1 are right, but there are nonetheless all sorts of problems with those critiques nonetheless. In order to reach phase 3, we have to produce new collectives. In order for new collectives to be produced, people need to be able to hear and understand the critiques developed at phase 1. Yet this is where everything begins to fall apart. Even though these critiques are often right, we express them in ways that only an academic with a PhD in critical theory and post-structural theory can understand. How exactly is Adorno to produce an effect in the world if only PhD’s in the humanities can understand him? Who are these things for? We seem to always ignore these things and then look down our noses with disdain at the Naomi Kleins and David Graebers of the world. To make matters worse, we publish our work in expensive academic journals that only universities can afford, with presses that don’t have a wide distribution, and give our talks at expensive hotels at academic conferences attended only by other academics. Again, who are these things for? Is it an accident that so many activists look away from these things with contempt, thinking their more about an academic industry and tenure, than producing change in the world? If a tree falls in a forest and no one is there to hear it, it doesn’t make a sound! Seriously dudes and dudettes, what are you doing? But finally, and worst of all, us Marxists and anarchists all too often act like assholes. We denounce others, we condemn them, we berate them for not engaging with the questions we want to engage with, and we vilify them when they don’t embrace every bit of the doxa that we endorse. We are every bit as off-putting and unpleasant as the fundamentalist minister or the priest of the inquisition (have people yet understood that Deleuze and Guattari’s Anti-Oedipus was a critique of the French communist party system and the Stalinist party system, and the horrific passions that arise out of parties and identifications in general?). This type of “revolutionary” is the greatest friend of the reactionary and capitalist because they do more to drive people into the embrace of reigning ideology than to undermine reigning ideology. These are the people that keep Rush Limbaugh in business. Well done! But this isn’t where our most serious shortcomings lie. Our most serious shortcomings are to be found at phase 2. We almost never make concrete proposals for how things ought to be restructured, for what new material infrastructures and semiotic fields need to be produced, and when we do, our critique-intoxicated cynics and skeptics immediately jump in with an analysis of all the ways in which these things contain dirty secrets, ugly motives, and are doomed to fail. How, I wonder, are we to do anything at all when we have no concrete proposals? We live on a planet of 6 billion people. These 6 billion people are dependent on a certain network of production and distribution to meet the needs of their consumption. That network of production and distribution does involve the extraction of resources, the production of food, the maintenance of paths of transit and communication, the disposal of waste, the building of shelters, the distribution of medicines, etc., etc., etc. What are your proposals? How will you meet these problems? How will you navigate the existing mediations or semiotic and material features of infrastructure? Marx and Lenin had proposals. Do you? Have you even explored the cartography of the problem? Today we are so intellectually bankrupt on these points that we even have theorists speaking of events and acts and talking about a return to the old socialist party systems, ignoring the horror they generated, their failures, and not even proposing ways of avoiding the repetition of these horrors in a new system of organization. Who among our critical theorists is thinking seriously about how to build a distribution and production system that is responsive to the needs of global consumption, avoiding the problems of planned economy, ie., who is doing this in a way that gets notice in our circles? Who is addressing the problems of micro-fascism that arise with party systems (there’s a reason that it was the Negri & Hardt contingent, not the Badiou contingent that has been the heart of the occupy movement). At least the ecologists are thinking about these things in these terms because, well, they think ecologically. Sadly we need something more, a melding of the ecologists, the Marxists, and the anarchists. We’re not getting it yet though, as far as I can tell. Indeed, folks seem attracted to yet another critical paradigm, Laruelle. I would love, just for a moment, to hear a radical environmentalist talk about his ideal high school that would be academically sound. How would he provide for the energy needs of that school? How would he meet building codes in an environmentally sound way? How would she provide food for the students? What would be her plan for waste disposal? And most importantly, how would she navigate the school board, the state legislature, the federal government, and all the families of these students? What is your plan? What is your alternative? I think there are alternatives. I saw one that approached an alternative in Rotterdam. If you want to make a truly revolutionary contribution, this is where you should start. Why should anyone even bother listening to you if you aren’t proposing real plans? But we haven’t even gotten to that point. Instead we’re like underpants gnomes, saying “revolution is the answer!” without addressing any of the infrastructural questions of just how revolution is to be produced, what alternatives it would offer, and how we would concretely go about building those alternatives. Masturbation. “Underpants gnome” deserves to be a category in critical theory; a sort of synonym for self-congratulatory masturbation. We need less critique not because critique isn’t important or necessary– it is –but because we know the critiques, we know the problems. We’re intoxicated with critique because it’s easy and safe. We best every opponent with critique. We occupy a position of moral superiority with critique. But do we really do anything with critique? What we need today, more than ever, is composition or carpentry. Everyone knows something is wrong. Everyone knows this system is destructive and stacked against them. Even the Tea Party knows something is wrong with the economic system, despite having the wrong economic theory. None of us, however, are proposing alternatives. Instead we prefer to shout and denounce. Good luck with that.

#### Socialism DA – the shift to socialized space stays and does not progress any further because capitalism is actually net better with state intervention, which means all original communist progress dies off

### Adv

#### FALC fails –

#### Space socialism does not = communism

#### The aff is inherent in stopping space capitalism – we turn Bastani 4 because the only way to support earth is by space capitalism

#### Cede the Political DA – the communists will have trouble to overcome hegemonic structures in the world that will supplant space capitalism

#### Gupta 21 turns Bastani 3 – rehighlighting proves – we read green

1AC Bastani, A. (2019). *Fully automated luxury communism*. Verso Books.

Populism is a politics that refuses to recognise the prevailing common sense in managing the economy. Consequently a portion of its critics, those most seduced by capitalist realism, attack it from the incorrect assumption that there is no alternative to neoliberalism. As the status quo is imperilled by the five crises, as well as the long fallout from 2008, such defences will increasingly take place through appeals to anti-utopianism rather than anything positive or propositional. Thus even standard-bearers for the establishment might concede that living standards are getting worse, or that society is going backwards by many measures, but at least, they will respond, we aren’t in 1990s Rwanda and aren’t medieval serfs. Such a position signifies the death of the very idea of the future, with enlightenment and progress – formerly ideological pillars of liberal capitalism – exchanged for a vision of the good society where decline is marginally slower than it might otherwise be. Others, who may agree about the scale and even urgent necessity of change, will contend that such a radical path should only be pursued by a narrow technocratic elite. Such an impulse is understandable if not excusable; or the suspicion that democracy unleashes ‘the mob’ is as old as the idea itself. What is more, a superficial changing of the guard exclusively at the level of policy-making is easier to envisage than building a mass political movement – and far simpler to execute as a strategy. Yet the truth is any social settlement imposed without mass consent, particularly given the turbulent energies unleashed by the Third Disruption, simply won’t endure. Which is why for the kind of change required, and for it to last in a world increasingly at odds with the received wisdom of the past, a populist politics is necessary. One that blends culture and government with ideas of personal and social renewal. One that, to borrow a term, invents the future. Anything less will fall short. A populist politics is one that calls upon, and claims to represent, ‘the people’. While this category does not exist as a permanent and immutable entity, what does prevail are parameters that elevate certain kinds of assembly, social trait or capacity. That is why the transition to renewable energy offers a bridge to energy abundance – permitting more prosperous societies than previously possible under the petty limits of fossil fuels. A green politics of ecology without a red politics of shared wealth will fail to command popular support. Conversely, the promise of red plenty based on fossil fuels and resource scarcity will fall victim to climate breakdown, leaving the world’s poor exposed to devastation like never before. Which is why the only politics fit to fight climate change is the demand for FALC – driven by the impulse to lead fuller, expanded lives, not diminished ones. To the green movement of the twentieth century this is heretical. Yet it is they who, for too long, unwisely echoed the claim that ‘small is beautiful’ and that the only way to save our planet was to retreat from modernity itself. FALC rallies against that command, distinguishing consumption under fossil capitalism – with its commuting, ubiquitous advertising, bullshit jobs and built-in obsolescence – from pursuing the good life under conditions of extreme supply. Under FALC we will see more of the world than ever before, eat varieties of food we have never heard of, and lead lives equivalent – if we so wish – to those of today’s billionaires. Luxury will pervade everything as society based on waged work becomes as much a relic of history as the feudal peasant and medieval knight. More than the vacuous nihilism of today’s ultra-rich, whose ascent beyond scarcity finds its pathetic expression in conspicuous consumption, the process of building FALC will not only bequeath us the resources needed to make us happy, but also a sense of common purpose. What is more, luxury populism rejects the folk politics of ethical consumption and the sphere of ‘the local’ as inherently virtuous. The extent of the solutions needed to address the five crises are planetary, and while action will often be close to home – as the following chapters make clear – acknowledging the historic and global scale of any response is critical. Our ambitions must be Promethean because our technology is already making us gods – so we might as well get good at it. Nevertheless, **space must remain for ‘grassroots’ campaigns which advance the post-scarcity alternative while attacking a broken status quo**. Campaigns around divestment from fossil fuels offer one example of how that will work. Rather than calling for climate justice through appeals to turn down the volume on modernity here, criticism of fossil fuels is situated within the broader frame that they are an obstacle to yet higher standards of living. **In comparison to solar and wind, hydrocarbons are as unsuitable to the needs of our century as burning whale fat for light was for the last. Digging up and burning mineral deposits for energy is so last century**. The same approach is needed in resisting extraction of shale gas, the most glaring example of the myopia of ‘scarcism’ amid the final embers of the Second Disruption. While one part of that is to continue pursuing outright bans, like those already in place in France, Germany and New York, this must be done alongside the demand for something better. Here advocates must clamour for the alternative with and alongside communities targeted for fracking, demanding indigenous rights, local democracy and radical land reform along with calls for an end to drilling. In this respect movements in Alaska, Canada and Australia already serve as stunning examples, not to mention the case of Balcombe, a tiny village in Sussex, where a coalition of campaigners and local residents opposed plans for fracking while demanding the alternative of community-owned solar power. The call for clean energy must become synonymous not only with the expectation of permanently falling costs but also common ownership. Prosperity, democracy and the commons as not only connected, but mutually constitutive. As well as advancing a red–green politics which revives ideals of progress and common plenty, this new populism will also be one of luxury. FALC, unlike the world of actually existing neoliberalism, will not demand constant sacrifices on the altar of profit and growth. Whether it’s ‘paying down the debt for future generations’, as our politicians are so keen to repeat, or growth and rising wages always coming ‘next year’, it’s becoming ever clearer that the good times aren’t coming back. What remains absent, however, is a language able to articulate that which is both accessible and emotionally resonant. Because behind such entreaties – whether from Erdoğan, Trump, Theresa May or the European Central Bank – is an esoteric caste of administrators that nobody else can quite understand. Their language of mathematical economics resembles the high Latin of Europe’s priests as they explained the nature of things to illiterate peasants who could never hope to understand. To the Ten Commandments all they add is that economic growth – of any kind – is good, while the pious many must uphold the faith by working harder and spending more than ever. This demand for constant offerings from taxpayers, hardworking families or ‘strivers’, all while living standards stagnate, means we are now experiencing what Eastern Bloc socialism endured after the 1970s. Two conspicuous hallmarks of that era similarly characterise our present: falling economic growth and crumbling ideological hegemony. The words of the priests increasingly fall on deaf ears, meaning many now turn to other – often older – faiths to make sense of the seemingly absurd. Thus the return of ‘the people’ as the main political actor is inevitable, whether as the rabble who patrician elites defend from their own desires, the Volk grounded in land, blood and soil, as witnessed in the revival of the far right, or the masses as a potentially transformative subject which makes history. Many increasingly grasp that the problems we face are large and unprecedented, and they intuitively understand the necessary solutions must be of a similar scale. So given the possibilities of the Third Disruption, promise them what they deserve – promise everything. Everything against the emptiness of a system in breakdown, with its call to toil for even less than you already have. Everything against the farce of identities which no longer make sense or were myths of little initial purpose. Everything, that is, except the demand of luxury for all. The offer to be who you want, rather than your life being shaped by forces beyond your control. When we have scaled that summit and surpassed scarcity, having turned the dividend of the Third Disruption to the needs of us all, even the least compassionate will reflect on today’s world with regret and pity. Regret at so much lost potential, all the stories never written and lives which might have been so much more. And pity, particularly for those who believed a regime of enforced scarcity made them better than anyone else. This Is Not 1917 FALC is not the communism of the early twentieth century, nor will it be delivered by storming the Winter Palace. The reason why is that, until the opening decades of the Third Disruption, communism was as impossible as surplus before the First Disruption or electricity before the Second. Instead it was socialism, still defined by scarcity and jobs, which became the North Star for hope across the world. The technologies needed to deliver a post-scarcity, post-work society – centred around renewable energy, automation and information – were absent in the Russian Empire, or indeed anywhere else until the late 1960s. Indeed, amid efforts to catch up with the more advanced capitalist economies of Europe and America, the Bolsheviks became students of the Taylorist science of productivity, applying themselves to the task of subordinating human time to economic production with ever-greater efficiency. In truth, they had little alternative. It turns out that Marx’s early suspicion that the countries set to lead the revolution would be those at the cutting edge of capitalist modernity was right. Only now we know that means technology as much as politics, the Third Disruption as necessary a precursor as class consciousness and collective struggle. Creating communism before the Third Disruption is like creating a flying machine before the Second. You could conceive of it – and indeed no less a genius than Leonardo Da Vinci did precisely that – but you could not create it. This was not a failure of will or of intellect, but simply an inevitability of history. What is more, the means by which the revolution of 1917 was won and defended, through an anti-liberal coup then subject to military invasion by every major power, further limited the possibility for social transformation. Inevitably, this shaped a regime which became supremely hierarchical. Given the odds it faced, both within and beyond its borders, its seven-decade survival remains one of the great political achievements of the last century. Regardless of history’s ‘what ifs’, FALC is different. Instead it recognises the centrality of human rights, most importantly the right of personal happiness, and seeks to build a society where everyone can access the necessary resources to further that end. This is a politics centred around the recognition, as Franklin Roosevelt once put it, that necessitous people are not free people. In the absence of access to such resources – housing, education, transport, healthcare, information – freedom as self-authorship cannot be said to meaningfully exist. Liberal ends, specifically the individual being uniquely placed to determine their path in life, are impossible without communist means. The possibility of most people finding happiness and meaning is impossible as long as these things are commodities – subject to profit rather than need. We must understand that appropriate forms of political organisation, just like the utopias we construct, are contingent on the times in which we live. Just as FALC is appropriate for a world where technology leaves us on the cusp of previously unthinkable abundance, the party-form which emerged in response to closed, under-developed societies makes increasingly little sense. The same is true for forms of worker organising, radical or reformist, which are erroneously premised on the society of work enduring forever. That society will not endure, nor should that be our political ambition. The role of the labour movement is to liberate the working class, and therefore all of society, not save a broken system which is passing away. The vehicles for political transformation change, just like the worlds we reach for. Now we must build a workers’ party against work – one whose politics are populist, democratic and open, all while fighting the establishment which, through its power over civil society and the state, won’t rest in ensuring FALC never comes to pass.

### Turn

#### Space capitalism is good –

#### 1] Solves asteroid deflection – preventing extinction

Nelson 18 [Peter Lothian Nelson and Walter E. Block, \*\* Harold E. Wirth Endowed Chair and Professor of Economics, College of Business, Loyola University New Orleans, “Space Capitalism: How Humans will Colonize Planets, Moons, and Asteroids,” 2018, Springer, pp. 106-108, EA]

What of the danger of a comet impacting with the third planet from the Sun? The movie Armageddon depicted just that scenario. In it, our heroes saved the Earth, of course. But which occurrence is more likely? That this protection could be achieved by government, or the private sector of the economy? Most neo-classical economists would choose the former, due to the so-called public goods “market failure.”28 This is the “free-rider” challenge: each entrepreneur will presumably wait for someone else to undertake the costs of an action that will benefit all (saving the Earth from the comet in this case) and no one will actually do it.29 This “let George do it” philosophy presumably creates a “market failure.” But mainstream economists cannot hide behind this mischievous doctrine, since precisely the same phenomenon will afflict nations in the present scenario. In other words, the United States will wait for China, Russia, Europe, Japan, Israel, to deal with the comet,30 while that expectation will afflict all the others with inaction. That is, China, Russia, etc., each country capable of dealing with such an eventuality, will attempt to “free ride” on the efforts of anyone foolish enough to undertake it. As in the case of Buridan’s Ass (Rothbard 2010) that perished from a similar inaction, so will the human population.

Such a scenario is unlikely in the extreme. There are all sorts of reasons to expect that the “externality will become internalized.” That is, that private firms, more likely than the state apparatus, will prove flexible enough to overcome this impasse. Private railroad companies, not governments, created standard gauge, so that cargo no longer had to be loaded and unloaded each time it passed onto the property of a different firm. This benefitted all of them, and yet, somehow,31 they could overcome the tendency toward inaction. In like manner, the railroad firms also got together32 and created the now-familiar time zones. Not only did they themselves gain by being better able to coordinate with each other, but these vast benefits “spilled over” into society as a whole. We cannot rule out of consideration such cooperation on the part of governments on praxeological grounds,33 but it seems more probable that space companies could sort out a comet aimed at the Earth than a bunch of statist politicians and bureaucrats.

#### 2] Space colonization

Zarkadakis 19 [George; December 26; Ph.D. in Artificial Intelligence; George Zardakis, “Abandoning the metropolis: space colonisation as the new imperative,” <https://georgezarkadakis.com/2019/12/26/abandoning-the-metropolis-space-colonisation-as-the-new-imperative/>]

Space colonization is not only the subject of fiction but of serious science too. The late physicist Stephen Hawking argued that unless colonies were established in space the human race would become extinct. There are several natural phenomena beyond our control that could spell our obliteration. Over a long enough period of time our planet is vulnerable to catastrophic meteorite strikes, or getting exposed to the deadly radiation of a nearby supernova explosion. As our Sun burns its fuel it will start to expand and, in a few million years, will scorch Earth. We can also self-destruct by waging nuclear war, or by tilting our planet’s climate towards a runaway greenhouse effect. Space colonization is therefore the ultimate insurance policy of long-term human survival[4].

#### Space colonization brings immeasurable expected value – o/ws inequality

Baum 16 – Executive Director of the Global Catastrophic Risk Institute [Seth D. Baum, “The Ethics of Outer Space: A Consequentialist Perspective,” 2016, Springer, pp. 115-116, EA]

Space colonization is notable because it may be able to bring utterly immense increases in intrinsic value. Early colonies might start small, given that other planets and moons have inhospitable environments. However, it may be possible to build large indoor colonies or create more hospitable outdoor environments (i.e., terraforming). Even just on other planets and moons in the Solar System, space colonies could multiply the total area available for human habitation. And there are many more planets around other stars, as ongoing research on exoplanets is now learning. One recent study estimates 22 % of Sun-like stars have Earth-like exoplanets (Petigura et al. 2013), implying billions to tens of billions of potentially habitable planets across the galaxy.

Opportunities at any given star may also be quite a bit greater than those available only on planets. Earth only receives about one two-billionth of the Sun’s radiation. To collect all the Sun’s radiation, humanity would need a Dyson swarm (named after Dyson 1960), which is a series of structures that surrounds a star, collecting its radiation to power a civilization. A Dyson swarm around the Sun could potentially enable a civilization a billion times larger than is possible on Earth. Likewise, Dyson swarms around one billion stars would bring humanity approximately 1018 (one billion–billion) times more energy per unit time.

Space colonies could also increase the amount of time available for human civilization. Earth will remain habitable for a few billion more years (O’Malley-James et al. 2014). Stars will continue shining for about 1014 more years (Adams 2008). That gives us an additional 105 times more energy, for a total of 1023 times more energy than is available on Earth. After the stars fade, other energy sources may be available. And even if our current universe eventually becomes uninhabitable, it may be possible to move to other universes (Kaku 2005). The physics here is speculative, but it cannot be ruled out, and hence there is a nonzero chance of a literally infinite opportunity for space colonization (Baum 2010a).

Whether the opportunity is infinite or merely, say, 1023 times larger than what can be done on Earth, the opportunity is clearly immense. As long as space colonization is an improvement (Sect. 8.3.1), then it would seem that the consequentialist should prioritize space colonization. The sooner space colonization begins, the more of its immense opportunity can be gained. Indeed, Ćirković (2002) estimates 5 × 1046 human lifetimes are lost for every century in which space colonization is delayed.

There can also be large value for space colonization under ecocentric intrinsic value. It is sometimes argued that Earth would be better off without humans. For example, the Voluntary Human Extinction Movement states that “Phasing out the human race by voluntarily ceasing to breed will allow Earth’s biosphere to return to good health” (http://vhemt.org, accessed 25 October 2015). However, this makes sense only if extraterrestrial locations are not intrinsically valued. Otherwise, exterminating humanity ruins the opportunity for humans to bring flourishing ecosystems into outer space. Terraforming other planets or bringing ecosystems into Dyson swarms could bring immense amounts of ecosystem flourishing.

#### 3] Solves sustainability

Robin G. Andrews 19, doctor of experimental volcanology, freelance science journalist, 9/6/19, “Can Spaceflight Save the Planet?” https://www.scientificamerican.com/article/can-spaceflight-save-the-planet/

The planet is warming, the oceans are acidifying, the Amazon is burning down, and plastic is snowing on the Arctic. Humanity’s environmental devastation is so severe, experts say, that a global-scale ecological catastrophe is already underway. Even those holding sunnier views would be hard-pressed to deny that our global footprint is presently less a light touch and more a boot stamping on Earth’s face. Against this dark background, one might ask if spending lavish sums to send humans to other worlds is a foolhardy distraction—or a cynical hedge against life’s downward spiral on this one.

Spaceflight, however, has the potential to be more than just a planetary escape hatch for eccentric billionaires. Whether in today’s Earth-orbiting spacecraft or the outposts that may someday be built on the moon and Mars, to exist beyond Earth, we must somehow replicate all of our planet’s life-giving essentials off-world. Technologies that recycle practically everything—that make water, air and food as renewable and self-sustaining as possible—are essential for current and future human spaceflight.

Then again, we already know how we are jeopardizing the planet and what needs to be done about it. “We have almost all of the tools we need to live sustainably right here, right now,” says Kate Marvel, a climate scientist at Columbia University and NASA. “Our failure to address climate change is not just because we’re interested in space.” Similarly, spaceflight alone cannot save Earth, but that does not mean it solely aids and abets naive dreams of leaving our planet behind.

TIN CAN AGRICULTURE

Astronauts need technological innovations to survive in space, but in the past, those solutions have been somewhat temporary—think of NASA’s crewed Apollo missions to the moon, which maxed out at just more than 12 days in duration. Change is afoot: the Trump administration now wants boots on the moon by 2024. Luke Roberson, senior principal investigator for flight research at NASA’s Kennedy Space Center, says the agency is pursuing sustainable architecture on the lunar surface as early as 2028—the sort requiring technology to provide long-term, regenerating caches of food, air and water.

Some of this tech may not remain in space. After all, a surprising number of inventions funded or designed by space agencies have been transferred to the commercial sector. These include several ecology-focused projects, including one to make sustainable oil and another that uses LED color combinations, or “light recipes,” to trigger different styles of crop growth.

Growing crops in space is anything but trivial. But, says Gioia Massa, a plant scientist at NASA, technologies such as specialized lighting and advanced sensors are of vital importance onboard the International Space Station (ISS), where experiments such as the Veggie system showcase energy-efficient food production. The system’s use of LEDs for plant growth was a concept conceived by NASA-funded research in the 1980s. That tech, Massa says, is now saving a lot of energy for indoor agriculture.

NASA has also worked with Florikan, a company that developed a fertilizer whose polymer coating allows for a controlled, slow release of nutrients. It is designed to reduce the runoff of fertilizer into the environment, which can cause ecological havoc. This fertilizer is being used in space, Massa says, and it has demonstrated its ability to enhance plant growth on the ISS. These products, tweaked for continued use in space, are also being marketed to commercial greenhouse owners.

Some eco-friendly innovations result from NASA simply trying to be environmentally responsible, says Daniel Lockney, who oversees the agency’s technology transfer efforts. Building spacefaring equipment on Earth is a dirty business, with fuels, paints, solvents and other toxic materials threatening to infiltrate the natural environment. That is why NASA has developed emulsified zero-valent iron (EZVI), a material that adheres to chlorinated solvents in groundwater. When dirty launchpads are scrubbed with potent chemicals, EZVI helps clean them up afterward. Beyond the launchpad, the compound has entered routine use at chemical-manufacturing plants and severely polluted Superfund sites across the country.

A supply of potable water is also paramount for both spacefarers and surface dwellers. And water pollution happens to contribute to the deaths of millions every year, so any tech that could help nix that tragedy would be welcome.

Lockney points to the microbial check valve as a solid example of how NASA can assuage this issue. Originally developed for the agency’s fleet of space shuttles, a more advanced version of the system now passively stops harmful microbes in wastewater from swimming back into potable-water reservoirs onboard the ISS. Other versions are at work right here on Earth, keeping water clean with minimal energy in areas with dirty water and without electricity access, as well as in dentists’ offices. (Remember the liquid you swish around in your mouth after a dental examination? That water is often purified by the very same valve to minimize the risk of oral infections.)

Roberson and Melanie Pickett, a postdoctoral research fellow at NASA, both work on water-purification systems for spaceflight, including on the ISS. Wastewater there is typically broken down with chemical concoctions. “But that chemistry isn’t sustainable,” Roberson says, because it requires regular refills via resupply missions from Earth. He and Pickett are now designing systems harnessing plants and microbes to recycle waste more sustainably, and these approaches may eventually help redesign toilets and septic tanks on Earth.

As is the case for water, it is far from easy to make breathable air a limitless resource in space. Up on the ISS, oxygen is traditionally extracted from water that has to be brought from Earth, which is costly and wasteful. As of 2018, the European Space Agency (ESA) is changing that status quo with its new Advanced Closed Loop System, which scrubs the Space Station’s environs of carbon dioxide and, in the process, siphons out oxygen to replenish supplies of breathable air while saving water at the same time.

Although on a far larger scale and with somewhat different operational requirements, carbon-capture systems are probably needed on Earth as part of a larger mix to slow down the pace of climate change. Technology developed for use in orbit may inform plans to do the same on our planet.

SERENDIPITOUS SPIN-OFFS

Not leaving anything to waste is the underlying principle of many of these innovations. In space, Massa says, waste must be seen as a resource, not something to mindlessly discard. That is part and parcel of so-called closed-loop systems: if such a system is perfect, all its components are recycled, and nothing is ejected from it as waste. Just think of sealed terraria, in which miniature plant ecosystems thrive by themselves for decades with no outside intervention.

The Micro Ecological Life Support System Alternative (MELiSSA) project strongly abides by that ideal. Featuring a constantly tweaked “pilot plant” test facility in Barcelona, the target of this ESA-led endeavor is to create a self-sustaining, biologically driven closed-loop life-support system.

The pilot plant, whose compartments attempt to degrade waste and use photosynthesis to clean the air, provide oxygen and produce food, employs a cohort of rats as astronaut stand-ins to see how effective the system could be at sustaining a crew for months at a time. Several generations of rats have been used, and so far, there have been zero casualties. Some MELiSSA-derived experiments, such as the photosynthesis-powered oxygen- and edible-biomass-making ARTEMISS, are being flown up to the ISS to see how they fare.

The project, started in 1989, is intended to mature into a system capable of sustaining a human crew on a long-duration interplanetary voyage by the mid-2020s. In the meantime, its spin-offs are already showing promise, says Christophe Lasseur, head of MELiSSA at ESA. For instance, its urine-recycling tech could eventually be deployed in remote places and disaster sites to provide potable water in a cost-effective manner, with minimal environmental impact, obviating the need for porting in supplies of clean water from far afield.

Lofty ideals are one thing, but the proof, as always, is in the pudding. Not all innovative ideas may become a reality, and for those that do, their development and transference from space to Earth hardly happen overnight. Roberson explains that his own inventions take, on average, seven to 10 years to be commercialized. MELiSSA is considered to be a 50-year effort.

Patience is certainly a virtue. “There’s a serendipity to it,” Lockney says. “Just like we know that water is wet, we know that investment in these new missions will yield inventions that are of benefit to all of humankind.”

If anything, these innovations underline why investment in basic R&D can be so worthwhile. “The really cool thing about science is that you really don’t know what’s going to come out of it,” Marvel says. After all, no one thought the World Wide Web would come out of the same journey that led to the Large Hadron Collider.

Lengthy engineering timescales and unpredictability aside, spaceflight has already resulted in a range of effective (if not game-changing) eco-friendly by-products for consumers. So why do they remain so relatively unknown? Chad Anderson, CEO of venture capitalist group Space Angels, suspects that it partially comes down to poor marketing.

Technology transfer from space-related R&D, Anderson says, has sparked significant innovations not only in eco-friendly products but also in the broader fields of transportation, health care and communications. The problem is that space agencies are not effectively communicating such success stories to the general public. “Space companies are notoriously bad at talking about what they are doing,” Anderson says.

#### 4] Profit motive is key – even if they win FG is key

Cobb 21 [Wendy N. Whitman Cobb, Associate Professor of Strategy and Security Studies at the School of Advanced Air and Space Studies, “Privatizing Peace: How Commerce Can Reduce Conflict in Space,” 2021, Routledge, EA]

Admittedly, demonstrating that government investment in space technology impacts the general economy is not the same as demonstrating the government has an interest directly in the economy. However, spending on space is routinely justified by government officials precisely because it is a net positive to the economy.27 In the United States, this justification began early. In April 1963, in response to a request from President John F. Kennedy to review NASA’s budget, Vice President Lyndon B. Johnson justified the spending on space largely in economic terms, writing,

It cannot be questioned that billions of dollars directed into research and development in an orderly and thoughtful manner will have significant effect upon our national economy. No formula has been found which attributes specific dollar values to each of these areas of anticipated developments, however, the “multiplier” of space research and development will augment our economic strength, our peaceful posture, and our standard of living.28

More recently, in a March 2019 announcement tasking NASA to return to the moon by 2024, Vice President Mike Pence invoked economic rationales several times to justify the project:

The United States must remain first in space, in this century as in the last, not just to propel our economy and secure our nation, but above all because the rules and values of space, like every great frontier, will be written by those who have the courage to get there first and the commitment to stay.29

This justification of space development in terms of its economic potential is not limited to the United States. Both Russia and China have concerned themselves with the economic and commercial potentials of their space programs.30 The Chinese government in particular has emphasized the commercial applications of its launch systems since it entered the global launch market in the 1980s. For China, space development is not just a means of enhancing their economy but also of connecting their disparate population centers with outlying areas and of further supporting space development.31 If politicians are supporting space funding, even in part, because they believe it benefits the economy, then this first premise, that states are interested in a successful economy, is more than plausible.

#### 5] Only profit motive solves debris.

Nelson & Block 18 [Peter Lothian Nelson and Walter E. Block, \*\* Harold E. Wirth Endowed Chair and Professor of Economics, College of Business, Loyola University New Orleans, “Space Capitalism: How Humans will Colonize Planets, Moons, and Asteroids,” 2018, Springer, pp. 108, EA]

Space debris is a major challenge to space exploration (Goldsmith 2015). The higher the speed (see Chap. 1 on the need for hyper speeds), the worse will be the issue of impact avoidance or damage in the event of impact. It is through the unregulated free market that solutions to intractable problems are found. Explorers will be well motivated to develop methods for detection of both minuscule and massive invisible objects and quick reaction mechanisms for avoidance of things large and small.

#### 6] Commercial space is the lynchpin of tech innovation

Hampson ‘17

Joshua Hampson 17, Security Studies Fellow at the Niskanen Center, 1-25-2017, “The Future of Space Commercialization”, Niskanen Center, https://republicans-science.house.gov/sites/republicans.science.house.gov/files/documents/TheFutureofSpaceCommercializationFinal.pdf

Innovation is generally hard to predict; some new technologies seem to come out of nowhere and others only take off when paired with a new application. It is difficult to predict the future, but it is reasonable to expect that a growing space economy would open opportunities for technological and organizational innovation. In terms of technology, the difficult environment of outer space helps incentivize progress along the margins. Because each object launched into orbit costs a significant amount of money—at the moment between $27,000 and $43,000 per pound, though that will likely drop in the future —each 19 reduction in payload size saves money or means more can be launched. At the same time, the ability to fit more capability into a smaller satellite opens outer space to actors that previously were priced out of the market. This is one of the reasons why small, affordable satellites are increasingly pursued by companies or organizations that cannot afford to launch larger traditional satellites. These small 20 satellites also provide non-traditional launchers, such as engineering students or prototypers, the opportunity to learn about satellite production and test new technologies before working on a full-sized satellite. That expansion of developers, experimenters, and testers cannot but help increase innovation opportunities. Technological developments from outer space have been applied to terrestrial life since the earliest days of space exploration. The National Aeronautics and Space Administration (NASA) maintains a website that lists technologies that have spun off from such research projects. Lightweight 21 nanotubes, useful in protecting astronauts during space exploration, are now being tested for applications in emergency response gear and electrical insulation. The need for certainty about the resiliency of materials used in space led to the development of an analytics tool useful across a range of industries. Temper foam, the material used in memory-foam pillows, was developed for NASA for seat covers. As more companies pursue their own space goals, more innovations will likely come from the commercial sector. Outer space is not just a catalyst for technological development. Satellite constellations and their unique line-of-sight vantage point can provide new perspectives to old industries. Deploying satellites into low-Earth orbit, as Facebook wants to do, can connect large, previously-unreached swathes of 22 humanity to the Internet. Remote sensing technology could change how whole industries operate, such as crop monitoring, herd management, crisis response, and land evaluation, among others. 23 While satellites cannot provide all essential information for some of these industries, they can fill in some useful gaps and work as part of a wider system of tools. Space infrastructure, in helping to change how people connect and perceive Earth, could help spark innovations on the ground as well. These innovations, changes to global networks, and new opportunities could lead to wider economic growth.

#### Innovation is the best method to combat human extinction – prepares against every every possible threat from warming to AI to pandemics

Matthews ‘18

Matthews, Dylan. “How to Help People Millions of Years from Now.” Vox, Vox, 26 Oct. 2018, [https://www.vox.com/future-perfect/2018/10/26/18023366/far-future-effective-altruism-existential-risk-doing-good. //](https://www.vox.com/future-perfect/2018/10/26/18023366/far-future-effective-altruism-existential-risk-doing-good.%20//) rc Phoenix

If you care about improving human lives, you should overwhelmingly care about those quadrillions of lives rather than the comparatively small number of people alive today. The 7.6 billion people now living, after all, amount to less than 0.003 percent of the population that will live in the future. It’s reasonable to suggest that those quadrillions of future people have, accordingly, hundreds of thousands of times more moral weight than those of us living here today do. That’s the basic argument behind Nick Beckstead’s 2013 Rutgers philosophy dissertation, “On the overwhelming importance of shaping the far future.” It’s a glorious mindfuck of a thesis, not least because Beckstead shows very convincingly that this is a conclusion any plausible moral view would reach. It’s not just something that weird utilitarians have to deal with. And Beckstead, to his considerable credit, walks the walk on this. He works at the Open Philanthropy Project on grants relating to the far future and runs a charitable fund for donors who want to prioritize the far future. And arguments from him and others have turned “long-termism” into a very vibrant, important strand of the effective altruism community. But what does prioritizing the far future even mean? The most literal thing it could mean is preventing human extinction, to ensure that the species persists as long as possible. For the long-term-focused effective altruists I know, that typically means identifying concrete threats to humanity’s continued existence — like unfriendly artificial intelligence, or a pandemic, or global warming/out of control geoengineering — and engaging in activities to prevent that specific eventuality. But in a set of slides he made in 2013, Beckstead makes a compelling case that while that’s certainly part of what caring about the far future entails, approaches that address specific threats to humanity (which he calls “targeted” approaches to the far future) have to complement “broad” approaches, where instead of trying to predict what’s going to kill us all, you just generally try to keep civilization running as best it can, so that it is, as a whole, well-equipped to deal with potential extinction events in the future, not just in 2030 or 2040 but in 3500 or 95000 or even 37 million. In other words, caring about the far future doesn’t mean just paying attention to low-probability risks of total annihilation; it also means acting on pressing needs now. For example: We’re going to be better prepared to prevent extinction from AI or a supervirus or global warming if society as a whole makes a lot of scientific progress. And a significant bottleneck there is that the vast majority of humanity doesn’t get high-enough-quality education to engage in scientific research, if they want to, which reduces the odds that we have enough trained scientists to come up with the breakthroughs we need as a civilization to survive and thrive. So maybe one of the best things we can do for the far future is to improve school systems — here and now — to harness the group economist Raj Chetty calls “lost Einsteins” (potential innovators who are thwarted by poverty and inequality in rich countries) and, more importantly, the hundreds of millions of kids in developing countries dealing with even worse education systems than those in depressed communities in the rich world.