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I *negate* resolved: the appropriation of outer space by private entities is unjust.

Framework

As required by the resolution, I value justice, defined as giving each their due. The only possible criterion is utilitarianism - it is presumed internally in every moral judgement and their claims to be non-consequentialist don't function in practice.

Greene in 2002

Greene, Joshua. Mr. Green has a BA from Harvard College and a PhD in Philosophy from Princeton University; he is now a Professor of Psychology at Harvard. "The Terrible, Horrible, No Good, Very Bad Truth about Morality and What to Do about It," 2002. https://emilkirkegaard.dk/en/wp-content/uploads/Joshua-D.-Greene-The-Terrible-Horrible-No-Good-Very-Bad-Truth-about-Morality-and.pdf.

Some people who talk of balancing rights may think there is an algorithm for deciding which rights take priority over which. If that's what we mean by 302 "balancing rights," then we are wise to shun this sort of talk. **Attempting to solve moral problems using a complex deontological algorithm is dogmatism** at its most esoteric, but dogmatism all the same. However, it's likely that **when** some **people talk about "balancing competing rights and obligations" they are already thinking like consequentialists** in spite of their use of deontological language. Once again, what deontological language does best is express the thoughts of people struck by strong, emotional moral intuitions: "It doesn't matter that you can save five people by pushing him to his death. To do this would be a violation of his rights!"19 That is why angry protesters say things like, "Animals Have Rights, Too!" rather than, "Animal Testing: The Harms Outweigh the Benefits!" Once again, rights talk captures the apparent clarity of the issue and absoluteness of the answer. But sometimes rights talk persists long after the sense of clarity and absoluteness has faded. One thinks, for example, of the thousands of children whose lives are saved by drugs that were tested on animals and the "rights" of those children. **One finds oneself balancing the "rights" on both sides** by asking how many rabbit lives one is willing to sacrifice in order to save one human life, and so on, **and at the end of the day one's underlying thought is as thoroughly consequentialist as can be**, despite the deontological gloss. And **what's wrong with that? Nothing, except for the fact that the deontological gloss adds nothing** and furthers the myth that there really are "rights," etc. **Best to drop it.** When deontological talk gets sophisticated, the thought it represents is either dogmatic in an esoteric sort of way or covertly consequentialist.

Case

Contention 1 is that the appropriation of outer space is necessary for humankind.

There are two primary avenues of appropriation.

(1) First is resource extraction.

Asteroids hold high concentrations of rare earth and platinum-group metals.

Greenspan in 2016

Greenspan, Andy. Mr. Greenspan is a Ph.D. candidate in Applied Physics at the Harvard John A. Paulson School of Engineering and Applied Sciences. "Precious Metals in Peril: Can Asteroid Mining Save Us?" Science in the News, October 25, 2016. https://sitn.hms.harvard.edu/flash/2016/precious-metals-peril-can-asteroid-mining-save-us/.

While scientists study asteroids to better understand the formation of the solar system and humanity's origins on this rock we call home, asteroids could become economically valuable as well. **Asteroids** often **contain important metals such as iron, nickel, and cobalt**, **as well as** small amounts of **precious metals such as platinum** (Figure 2). Given these considerations, **a single asteroid with the right composition could be worth trillions** of dollars **in raw materials.**

On earth, a supply shortage of rare earth metals leads to ongoing resource wars - asteroids enable mining that isn't bought at the expense of the global south. The Democratic Republic of Congo (or DRC), home to some of the world's greatest metal reserves, has been thrust into bloody conflict that has claimed more than 6 million lives since 1996 (World Without Genocide)**.**

Snow in 2013

Snow, Dan. Dan Snow graduated with first-class honors in history from Balliol College, Oxford University and has worked in historical journalism since 2002. He traveled to the DRC in 2013 while working on a documentary for BBC. "DR Congo: Cursed by Its Natural Wealth." *BBC News*, October 9, 2013. https://www.bbc.com/news/magazine-24396390.

The Portuguese, Belgians, Mobutu and the present government have all deliberately stifled the **development** of a strong state, army, judiciary and education system, because it **interferes with the**ir **primary focus, making money from what lies under the Earth.** The billions of pounds **those minerals** have generated **have brought nothing but misery and death to the very people who live on top of them, while enriching** a microscopic elite in the Congo and their **foreign backers, and underpinning our technological revolution in the developed world.** The Congo is a land far away, yet our histories are so closely linked. We have thrived from a lopsided relationship, yet we are utterly blind to it. The price of that myopia has been human suffering on an unimaginable scale.

Aside from solving ongoing conflict over resources, space based extraction is better for the environment.

Hein et al. in 2018, accounting for space launch and reentry, explain that

Hein, Andreas, Michael Saidani, and Hortense Tollu. All authors work at the Laboratoire Genie Industriel at the Université Paris-Saclay. "Exploring Potential Environmental Benefits of Asteroid Mining. 69th International Astronautical Congress," 2018. https://hal.archives-ouvertes.fr/hal-01910090/document.

If we compare these rough estimates with the CO2eq values **for** Earth-based **platinum mining,** we immediately see that **the global warming effect of Earthbased mining is several orders of magnitude larger**, even for secondary platinum. Table 2 shows the ratio between the Earth-based platinum mining emissions and the **[than] space-based mining** emissions. A difference of two orders of magnitudes for primary platinum and one order of magnitude for secondary platinum is observed. For a mixture of primary and secondary platinum, we get values with two orders of magnitude difference.

Moreover, these resources are crucial to the transition to renewable energy.

Calma in 2021

Calma, Justine. Justine Calma is a science reporter at The Verge covering the environment and climate change. "2021 Was the Year Clean Energy Finally Faced Its Mining Problem." The Verge, December 29, 2021. https://www.theverge.com/22858437/2021-mining-critical-minerals-clean-energy-renewables-climate-change.

Instead of cutting through landscapes with oil and gas wells and pipelines, **clean energy industries** and their suppliers will **open up the Earth to hunt for critical minerals like lithium, cobalt, and copper.** Compared to a gas-fired power plant, **an onshore wind turbine requires** nine times more **mineral resources**, according to the International Energy Agency. Building **an EV requires six times more minerals than a gas-powered car.** MOVE FORWARD WITHOUT THROWING CERTAIN COMMUNITIES UNDER THE BUS It's about time to scrutinize what that hunger for minerals might cause, given the recent boom in pledges from countries and companies alike to reach net zero greenhouse gas emissions. Digging up the necessary minerals is already proving to be a minefield. Protests are popping up at proposed mines that no one really wants in their backyard. The conflicts that cropped up in 2021 are just the beginning of a challenging road ahead. In May, **the International Energy Agency** (IEA) **issued a warning: the world isn't mining enough of the minerals that are the building blocks of a clean energy future. And supply chains** for many critical minerals **are vulnerable**, according to the IEA's report. "Left unaddressed, **these** potential **vulnerabilities could make global progress towards a clean energy future slower and more costly** – and therefore hamper international efforts to tackle climate change," Fatih Birol, executive director of the IEA, said in a statement at the time. "This is what energy security looks like in the 21st century." The **cobalt used in EV batteries**, for example, **mostly comes from the Democratic Republic of Congo.** A majority of the world's rare earth minerals, used in EV motors and wind turbines, are produced and processed in China**.** So if anything rattles production in those countries, the whole world might feel the effects. On top of that, the **concentration of power over vital resources in specific countries** and companies **creates the potential for environmental and human rights abuses, which have plagued supply chains** for cobalt and rare earth minerals. Investigations into cobalt mines that are essential suppliers to the EV battery industry have already found widespread labor abuses. To make things harder, the COVID-19 pandemic has put even more pressure on clean energy supply chains. Rising shipping and commodity prices could delay or even cancel solar projects slated for 2022, according to research firm Rystad Energy. **Soaring metal prices could slow down the entire transition to renewable energy throughout the decade**, says the International Monetary Fund.

(2) The second avenue is space area appropriation for energy production.

Space area appropriation independently is key to clean energy efforts and solving climate change.

Autry in 2019

Autry, Greg. Dr. Greg Autry is an educator, space policy wonk, writer and tech entrepreneur. He researches and publishes on space commerce, entrepreneurship, technology innovation and trade policy. Greg is a Clinical Professor of Space Leadership, Policy and Business with the Thunderbird School of Global Management at Arizona State University. He also serves as Chair of the Safety Working Group on the Commercial Space Transportation

Advisory Committee (COMSTAC) at the FAA. He was nominated by the President to serve as the Chief Financial Officer at NASA, and holds a BA in history from Cal Poly Pomona as well as an MBA and a PhD (policy-econ & strategy comps) from the Merage School of Business at UC Irvine. "Space Research Can Save the Planet—Again." Foreign Policy. Foreign Policy, July 20, 2019. https://foreignpolicy.com/2019/07/20/space-research-can-save-the-planet-again-climate-change-environment/.

Today conservationists and other critics are more likely to see space programs as militaristic splurges that squander billions of dollars better applied to solving problems on Earth. These well-meaning complaints are misguided, however. Earth's problems—most urgently, **climate change**—**can be solved only from space.** That's where the tools and data already being used to tackle these issues were forged and where the solutions of the future will be too. **Space research has already been critical in averting** one major **environmental disaster.** It was NASA satellite data that revealed a frightening and growing hole in the ozone layer over the South Pole, galvanizing public concern that, in 1987, produced the Montreal Protocol: the first international agreement addressing a global environmental problem. Since then, thanks to worldwide restrictions on damaging chlorofluorocarbons, the ozone situation has stabilized, and a full planetary recovery is expected. As this case showed, space can provide the vital information needed to understand a problem—and a surprising range of ways to solve it. Climate change is a poster child for the critical role of space data. Trekking across the globe to measure ice sheets with drills and gauge sea temperatures from the sides of ships is an expensive, slow, and insufficient way to assay the state of the planet. Satellites operated by NASA, the U.S. National Oceanic and Atmospheric Administration, and an increasing number of commercial firms provide a plethora of multispectral imaging and radar measurements of developments such as coral reef degradation, harmful plankton blooms, and polar bears negotiating thinning ice. Much of the technology involved in observing the Earth today was initially developed for probes sent to explore other planets in our solar system. IT WAS NASA SATELLITE DATA THAT REVEALED A FRIGHTENING AND GROWING HOLE IN THE OZONE LAYER OVER THE SOUTH POLE, GALVANIZING PUBLIC CONCERN THAT, IN 1987, PRODUCED THE MONTREAL PROTOCOL: THE FIRST INTERNATIONAL AGREEMENT ADDRESSING A GLOBAL ENVIRONMENTAL PROBLEM. Indeed, understanding the evolution of other planets' climates is essential for modeling possible outcomes on Earth. NASA probes revealed how, roughly 4 billion years ago, a runaway greenhouse gas syndrome turned Venus into a hot, hellish, and uninhabitable planet of acid rain. Orbiters, landers, and rovers continue to unravel the processes that transformed a once warm and wet Mars into a frigid, dry dust ball—and scientists even to conceive of future scenarios that might terraform it back into a livable planet. Discovering other worlds' history and imagining their future offers important visions for climate change mitigation strategies on Earth, such as mining helium from the moon itself for future clean energy. Spinoff technologies from space research, from GPS to semiconductor solar cells, are already helping to reduce emissions; the efficiency gains of GPS-guided navigation shrink fuel expenditures on sea, land, and air by between 15 and 21 percent—a greater reduction than better engines or fuel changes have so far provided. Modern solar photovoltaic power also owes its existence to space. The first real customer for solar energy was the U.S. space program; applications such as the giant solar wings that power the International Space Station have continually driven improvements in solar cell performance, and NASA first demonstrated the value of the sun for powering communities on Earth by using solar in its own facilities. Promisingly, space-based solar power stations could overcome the inconvenient truth that wind and solar will never get us anywhere near zero emissions because their output is inherently intermittent and there is, so far, no

environmentally acceptable way to store their power at a global scale, even for one night. **Orbital solar power stations**, on the other hand, **would *continually face the sun, beaming clean power back through targeted radiation to Earth day or night, regardless of weather. They would*** *also be free from clouds and atmospheric interference and therefore* **operate with many times the efficiency of current solar tech**nology. Moving solar power generation away from Earth—already possible but held back by the current steep costs of lifting the materials into space—would preserve land and cultural resources from the blight of huge panel farms and save landfills from the growing problem of discarded old solar panels. Sustainable energy advocates in the U.S. military and the Chinese government are actively pursuing space-based solar power, but just making solar cells damages the environment due to the caustic chemicals employed. **Space technology offers the possibility of freeing the Earth's fragile biosphere** and culturally important sites **from** the **otherwise unavoidable damage** caused by manufacturing and mining. The U.S. start-up Made in Space is currently taking the first steps toward manufacturing in orbit. The company's fiber-optic cable, produced by machinery on the International Space Station, is orders of magnitude more efficient than anything made on Earth, where the heavy gravity creates tiny flaws in the material. Made in Space and others are eventually planning to build large structures, such as solar power stations, in space. As these technologies develop, they will augment each other, bringing costs down dramatically; space manufacturing, for instance, slashes the cost of solar installations in space.

This outweighs every impact, on magnitude, probability, scope, and reversibility.

Parry in 2019

Parry, Emyr. Mr. Parry has been Permanent Representative of the United Kingdom to the United Nations since July 2003, after serving as Permanent Representative to the North Atlantic Council in Brussels. He also served as Political Director of the Foreign and Commonwealth Office and as Director at the European Union. Sir Emyr completed his PhD in Polymer Physics at Cambridge University. "The Greatest Threat to Global Security: Climate Change Is Not Merely an Environmental Problem | United Nations." United Nations, 2019. https://www.un.org/en/chronicle/article/greatest-threat-global-security-climate-change-not-merely-environmental-problem.

Recent scientific evidence has reinforced, and in some cases exceeded, our worst fears about the physical impacts facing us. It has become increasingly clear that **climate change has consequences** that reach the very heart of the security agenda: **flooding, disease and famine,** resulting in **migration on an unprecedented scale** in areas of already high tension; **drought and crop-failure,** leading to **intensified competition for** food, water and energy in regions where **resources** are already stretched to the limit; and **economic**

disruption on the scale predicted in the 2006 Stern Review on the Economics of Climate Change, and not seen since the end of the Second World War. **This is** not about narrow national security, but **about collective security** in a fragile and increasingly interdependent world. And tragically, once again, **it will be the most vulnerable** and the least able to cope who will be **hit first.** There is no choice between a stable climate and the fight against poverty -- without the first, the second will certainly fail. Anyone still convinced that climate change is purely an environmental problem should read the report published on 16 April by the Military Advisory Board, a group of highly respected retired Admirals and Generals in the United States. During these retired military officers' careers, they have stood face to face with everything, from containment and deterrence of the Soviet nuclear threat during the cold war to the more recent struggle against terrorism and extremism. And yet they categorically state in their report that projected **climate change** poses a serious threat to America's national security. They say it **is "a threat multiplier for instability in some of the most volatile regions of the world"**. In other words, an unstable climate will create the very kind of tensions and conflicts that the Security Council deals with, day in and day out, yet more frequent and even more severe.

Not accounting for intensified conflict and instability, the human impacts of *temperature increases alone* are explained by

Bressler in 2021

Bressler, R. Daniel. R. Daniel (Danny) Bressler is a fifth-year PhD Candidate in Sustainable Development at Columbia University. His research interests include environmental economics, climate change, international security, and nuclear proliferation. He is also a Global Priorities Fellow with the Forethought Foundation and a Nuclear Scholar at the Center for Strategic and International Studies (CSIS).Danny graduated from Brown University in 2012 magna cum laude and phi beta kappa with a double major in economics and history. “The Mortality Cost of Carbon.” *Nature Communications* 12, no. 1 (July 29, 2021): 4467. https://doi.org/10.1038/s41467-021-24487-w.

In addition to marginal effects, we find that pursuing the DICE-EMR optimal emissions path has significant mortality benefits in aggregate over the twenty-first century. **Pursuing the** DICE-EMR **optimal emissions path saves a projected 74 million lives over the course of the twenty-first century** (see Fig. 3), as the number of temperature-related excess deaths falls from 83 million in the DICE baseline emissions scenario to 9 million in the DICE-EMR optimal emissions scenario.

Thus, to uphold any form of justice or morality proposed by either the affirmative or negative, you must negate.

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Contention 1

Contention 2

Contention 3

Hein Methodology

The scope and functional unit define the reference against which mining activities on Earth and space are compared. The functional unit quantifies the service delivered by the product system. For our two cases of water mining in space and platinum mining on Earth and space, we use the following functional units:

- 1 kg of water delivered to cis-lunar orbit.
- 1 kg of platinum supplied to the Earth.

In terms of scope, **we limit our analysis to greenhouse gas emissions, as data is available from various sources.** Furthermore, **our system boundary is drawn to include the operations phase, which includes E1, launch and commissioning phase, E2, utilisation phase in space, and F, disposal, according to the ESA lifecycle assessment guidelines** [37]. Contrary to the guidelines, in our case we interpret F not as disposal but re-entry of platinum to Earth. For an Earth-based mine, the operations phase would essentially include the operation of the mine post installation. Furthermore, the boundary is drawn around the direct production and refining system of platinum or water. The reason for the limitation to the operations phase is that the publicly available sources of LCA data for platinum mining is limited to the operations phase, which contains extraction and refining. **One could argue that for space-based mining, only E2 should be taken into consideration, as the production of the mining infrastructure is not taken into account for Earth-based mining. However, we interpret the launch infrastructure with launch pads, fuel depots, etc. as part of the infrastructure as well as launchers, and spacecraft. We therefore consider operations in the wider sense of operating this whole infrastructure, encompassing both E1 and E2. Consistent with carbon footprint analysis, we take Scope 1** (emissions are direct emissions from owned or controlled sources) **and Scope 2** (indirect emissions from the generation of purchased energy) **into account**, in order to arrive at results that can be compared with platinum LCA results from the literature.