# Und

Collapses to util

Don’t always do right thing

#### The ROB is to vote for the debater who proves the truth or falsity of the resolution – anything else moots 6 minutes of the aff since it’s predicated on proving the truth of the rez – prefer it:

#### Five dictionaries define to negate as to deny the truth of and affirm as to prove true which means the sole judge obligation is to vote on the resolution’s truth or falsity[[1]](#footnote-1). This outweighs on common usage – it is abundantly clear that our roles are verified, meaning that only truth testing is jurisdictional.

#### Ground- truth testing allows for the more ground than any other ROB since it allows for a literal infinite amount of arguments on a range of argumentation style giving the most breadth and depth of topic and phil ed

#### Circularity- debate is a question of truth or falsity, and the aff advocacy is the focus of every round- all arguments against this concede it’s validity, since it’s premised on your own argument being true

#### Grant me 1ar theory otherwise the NC can read 7 minutes of abuse and then I cant check and lose

#### DTD on theory to deter future abuse and set the best norms- dta incentivizes strategic concessions that don’t rectify any abuse

#### No 2nr RVIs cuz a 6 minute 2nr sandbagging RVIs makes the 2ar impossible to win, disincentivizing countering abuse.

#### No new 2NR paradigm issues or theory because you can make whole new arguments with 6 minutes forcing me to respond in only half the time creating a 6:3 skew, and can be solved by reading in the 1N

#### Fairness is a voter – it’s a prerequisite to evaluation of the round as debate’s a competitive activity, which require the better debater win, but that’s impossible when there’s a skew against us

#### Accept all aff paradigm issues in the 1AR– a) the 1AR is too short to win both paradigm issues and a theory shell since we need to also respond to 7 minutes of the 1NC, so it’s most fair – b) key to norms setting since otherwise you’ll just dump a ton of blippy paradigm issues in the 2NR and we always lose theory since we only have ½ of the time – means you get away with infinite abuse.

# T

“Unjust” (n.d.) Retrieved Jan. 22, 2022. *Google.com* – Definitions from Oxford Langauges

not based on or behaving according to what is morally right and fair.

"resistance to unjust laws"

#### This entails that the affirmative must advocate a topical change in the status quo.

#### Violation: They don’t defend a course of action.

#### 1. Justice is normative. To say that something is unjust entails that it ought to be stopped or redressed. The aff advocacy is a meaningless abstraction unless it defends a course of action.

#### 2. Truth testing is awful.

#### A) It turns an urgent public policy question into an esoteric question of philosophical labels, which kills real world decision-making skills – i.e. without a plan there is no counterplan or disad ground;

#### B) It turns negating into an endless quest for counterwarrants, which make the debate irresolvable because we don’t know how many counterwarrants justify a neg ballot, and kills clash because the discussion is about assessing the salience of extreme examples rather than engaging with a competing advocacies.

#### C) It kills precision by forcing both sides to defend sweeping generalizations that no responsible scholar would ever defend without qualification. Plans require more rigorous scholarship.

#### Don’t let them say that the resolution has no actor or verb. Their advocacy only needs to entail the resolution to be topical. Proving that a plan baring the private appropriation of outer space by private entities produces the most just world proves the resolution true. They get to choose which actor would best accomplish this objective because a plan with any actor might entail the resolution.

#### Don’t let them say the interp is unpredictable – the Aff read a plan in virtually every round at College Prep and Harvard-Westlake.

# Util

## NC

### NC Shell - Util

#### The standard is consistency with utilitarianism

#### Reason is internally motivating. Human self-esteem is tied to avoiding cognitive dissonance, which in turn requires regarding other’s interests as equal to your own. This means that regarding the wellbeing of all people equally sparks a self-motiving moral emotion.

Lazari-Radek and Singer 2014 - Katarzyna de Lazari-Radek [Assistant Prof of Philosophy, U. of Lodz] and Peter Singer [Prof of Bioethics, Princeton U.; Prof. U. of Melbourne], The Point of View of the Universe: Sidgwick & Contemporary Ethics. Oxford: Oxford University Press. (2014). pp. 63-65 AT

In the concluding chapter of *The Methods* Sidgwick mentions another kind of feeling that can arise from understanding a moral truth, when he says that a selfish person is likely to feel, ‘in a thousand ways … the discord between the rhythms of his own life and of that larger life of which his own is but an insignificant fraction’ (*ME* 501). This sounds very much like the emotional state that psychologists know as ‘cognitive dissonance’ – a state of unease or discomfort caused by holding conflicting beliefs. The Swedish sociologist Gunnar Myrdal invoked this idea in his celebrated 1944 study of race relations in America, *An American Dilemma*. As Myrdal put it, all Americans – including Southern whites who at the time openly defended racial segregation – accepted the “American Creed” of equality and democracy. The tension between this moral stance and the reality of race relations in the South would, Myrdal believed, come to a head, and be resolved in favour of equality. His prediction was accurate, although this does not prove that he had correctly diagnosed the cause of the change.

Self-esteem is an important human need that contributes to personal happiness. Believing that something is the right thing to do, while knowing that one is not doing it, is likely to undermine one’s self-esteem. Richard Keshen, in *Reasonable Self-Esteem*, argues that reasonable people gain self-esteem by knowing that their beliefs are in accord with the relevant evidence, and their values are not open to reasonable criticism by others. For Keshen, a reasonable person is one whose defining commitment is to have reasonable beliefs about the world, about what is in her interests, and about what she ought to do.40 The concept of values not open to reasonable criticism by others begins with not being influenced by biased thinking, but Keshen takes this further by arguing that at the core of the reasonable person’s ethical life is the recognition that others are like us, and therefore in some sense, their lives and their well-being are of equal significance to our own. The reasonable person cannot have self-esteem while ignoring the interests of others whose well-being she recognizes as equally significant. (We will see in Chapter 5 that Keshen’s argument here has points of contact with Sidgwick’s arguments for his principle of universal benevolence.) Keshen argues that the reasonable person can see herself as part of a tradition stretching from Aristotle through Galileo to our own times – and he includes Sidgwick among the exemplars of this tradition, no only because of Sidgwick’s commitment to reason in his philosophical work, but also because of the way he demonstrated his commitment to live according to reason when he resigned his fellowship because of his inability to accept the articles of faith of the Church of England.41 The reasonable person can therefore see herself as belonging to a worthy tradition, and this can enhance her sense of self-respect.

Cognitive dissonance and reasonable self-esteem are not simply unmotivated desires or emotions that happen to us, as hunger does, but desires or emotions that are motivated by beliefs that involve our ability to reason. It would be very difficult to be a rational being and remain completely indifferent to inconsistency; nor can one have reasonable self-esteem while knowing that one’s actions are very far from one’s values, or that one is acting on principles that do not have a sound basis that a reasonable person could accept. These motives for acting ethically therefore fit well with Sidgwick’s notion that accepting a moral judgment has a normal emotional concomitant or expression.

#### No intent-foresight distinction – If we foresee a consequence, then it becomes part of our deliberation which makes it intrinsic to our action since we intend it to happen.

#### Preventing extinction is the most ethical outcome

Bostrom 13 (Nick, Professor at Oxford University, Faculty of Philosophy & Oxford Martin School, Director, Future of Humanity Institute, Director, Oxford Martin Programme on the Impacts of Future Technology University of Oxford, “Existential Risk Prevention as Global Priority”, Global Policy Volume 4, Issue 1, February 2013 // AKONG)

Some other ethical perspectives We have thus far considered existential risk from the perspective of utilitarianism (combined with several simplify- ing assumptions). We may briefly consider how the issue might appear when viewed through the lenses of some other ethical outlooks. For example, the philosopher Robert Adams outlines a different view on these matters: I believe a better basis for ethical theory in this area can be found in quite a different direction—in a commitment to the future of human- ity as a vast project, or network of overlapping projects, that is generally shared by the human race. The aspiration for a better society—more just, more rewarding, and more peaceful—is a part of this project. So are the potentially end- less quests for scientific knowledge and philo- sophical understanding, and the development of artistic and other cultural traditions. This includes the particular cultural traditions to which we belong, in all their accidental historic and ethnic diversity. It also includes our interest in the lives of our children and grandchildren, and the hope that they will be able, in turn, to have the lives of their children and grandchil- dren as projects. To the extent that a policy or practice seems likely to be favorable or unfavor- able to the carrying out of this complex of pro- jects in the nearer or further future, we have reason to pursue or avoid it. ... Continuity is as important to our commitment to the project of the future of humanity as it is to our commit- ment to the projects of our own personal futures. Just as the shape of my whole life, and its connection with my present and past, have an interest that goes beyond that of any iso- lated experience, so too the shape of human history over an extended period of the future, and its connection with the human present and past, have an interest that goes beyond that of the (total or average) quality of life of a popula- tion-at-a-time, considered in isolation from how it got that way. We owe, I think, some loyalty to this project of the human future. We also owe it a respect that we would owe it even if we were not of the human race ourselves, but beings from another planet who had some understanding of it (Adams, 1989, pp. 472–473). Since an existential catastrophe would either put an end to the project of the future of humanity or drasti- cally curtail its scope for development, we would seem to have a strong prima facie reason to avoid it, in Adams’ view. We also note that an existential catastrophe would entail the frustration of many strong preferences, sug- gesting that from a preference-satisfactionist perspective it would be a bad thing. In a similar vein, an ethical view emphasising that public policy should be determined through informed democratic deliberation by all stake- holders would favour existential-risk mitigation if we suppose, as is plausible, that a majority of the world’s population would come to favour such policies upon reasonable deliberation (even if hypothetical future peo- ple are not included as stakeholders). We might also have custodial duties to preserve the inheritance of humanity passed on to us by our ancestors and convey it safely to our descendants.23 We do not want to be the failing link in the chain of generations, and we ought not to delete or abandon the great epic of human civili- sation that humankind has been working on for thou- sands of years, when it is clear that the narrative is far from having reached a natural terminus. Further, many theological perspectives deplore naturalistic existential catastrophes, especially ones induced by human activi- ties: If God created the world and the human species, one would imagine that He might be displeased if we took it upon ourselves to smash His masterpiece (or if, through our negligence or hubris, we allowed it to come to irreparable harm).24 We might also consider the issue from a less theoreti- cal standpoint and try to form an evaluation instead by considering analogous cases about which we have defi- nite moral intuitions. Thus, for example, if we feel confident that committing a small genocide is wrong, and that committing a large genocide is no less wrong, we might conjecture that committing omnicide is also wrong.25 And if we believe we have some moral reason to prevent natural catastrophes that would kill a small number of people, and a stronger moral reason to pre- vent natural catastrophes that would kill a larger number of people, we might conjecture that we have an even stronger moral reason to prevent catastrophes that would kill the entire human population.

#### Pleasure and pain are intrinsically valuable.

**Moen 16** [Ole Martin Moen, Research Fellow in Philosophy at University of Oslo “An Argument for Hedonism” Journal of Value Inquiry (Springer), 50 (2) 2016: 267–281] SJDI, brackets in original

Let us start by observing, empirically, that a widely shared judgment about intrinsic value and disvalue is that pleasure is intrinsically valuable and pain is intrinsically disvaluable. On virtually any proposed list of intrinsic values and disvalues (we will look at some of them below), pleasure is included among the intrinsic values and pain among the intrinsic disvalues. This inclusion makes intuitive sense, moreover, for **there is something undeniably good about** the way **pleasure** feels **and** something **undeniably bad about** the way **pain** feels, and neither the goodness of pleasure nor the badness of pain seems to be exhausted by the further effects that these experiences might have. “Pleasure” and “pain” are here understood inclusively, as encompassing anything hedonically positive and anything hedonically negative.2 The special value statuses of pleasure and pain are manifested in how we treat these experiences in our everyday reasoning about values. If you tell me that you are heading for the convenience store, **I might ask: “What for?”** This is a reasonable question, for when you go to the convenience store you usually do so, not merely for the sake of going to the convenience store, but for the sake of achieving something further that you deem to be valuable. You might answer, for example: “To buy soda.” This answer makes sense, for soda is a nice thing and you can get it at the convenience store. I might further inquire, however: “What is buying the soda good for?” This further question can also be a reasonable one, for it need not be obvious why you want the soda. You might answer: “Well, I want it for the pleasure of drinking it.” If I then proceed by asking “**But** what is the pleasure of drinking the soda good for?” the discussion is likely to reach an awkward end. The reason is that the **pleasure is not good for anything further;** it is simply that for which going to the convenience store and buying the soda is good.3 As Aristotle observes: **“We never ask** [a man] **what his end is in being pleased, because** we assume that **pleasure is** choice **worthy in itself.”**4 Presumably, a similar story can be told in the case of pains, for if someone says “This is painful!” we never respond by asking: “And why is that a problem?” We take for granted that if something is painful, we have a sufficient explanation of why it is bad. If we are onto something in our everyday reasoning about values, it seems that **pleasure and pain are both places where we reach the end of the line in matters of value.**

#### Collapses to util: Maximizing utility is the only way to affirm equal and unconditional human dignity.

**Cummiskey ’90 -** David Cummiskey. [Associate Philosophy Professor at Bates College].Kantian Consequentialism. Ethics, Vol. 100, No. 3. 1990. <http://www.jstor.org/stable/2381810>.

We must not obscure the issue by characterizing this type of case as the sacrifice of individuals for some abstract “social entity.” It is not a question of some persons having to bear the cost for some elusive “overall social good.” Instead, the question is whether some persons must bear the inescapable cost for the sake of other persons. Robert Nozick, for example, argues that “to use a person in this way does not sufficiently respect and take account of the fact that he is a separate person, that his is the only life he has.” But why is this not equally true of all those whom we do not save through our failure to act? **By emphasizing solely the one who must bear the cost if we act, we fail to** sufficiently **respect** and take account of **the many other separate persons**, **each with only one life, who will bear the cost of our inaction.** In such a situation, what would a conscientious Kantian agent, an agent motivated by the unconditional value of rational beings, choose? A morally good agent recognizes that the basis of all particular duties is the principle that “rational nature exists as an end in itself” (GMM 429). Rational nature as such is the supreme objective end of all conduct. **If one** truly **believes** that **all rational beings have** an **equal value**, then **the** rational **solution** to such a dilemma **involves maximally promoting the lives and liberties of as many** rational beings **as possible** (chapter 5). In order to avoid this conclusion, the non-consequentialist Kantian needs to justify agent-centered constraints. As we saw in chapter 1, however, even most Kantian deontologists recognize that agent-centered constraints require a non- value-based rationale. But we have seen that Kant’s normative theory is based on an unconditionally valuable end. How can a concern for the value of rational beings lead to a refusal to sacrifice rational beings even when this would prevent other more extensive losses of rational beings? **If the moral law is based on the value of rational beings and their ends, then what is the rationale for prohibiting a moral agent from maximally promoting these two tiers of value? If I sacrifice some for the sake of others, I do not use them arbitrarily, and I do not deny the unconditional value of rational beings. Persons may have “dignity**, **that** is, an unconditional and incomparable worth” that **transcends** any **market value** (GMM 436), **but persons also have a fundamental equality that dictates that some must sometimes give way for the sake of others** (chapters 5 and 7). The concept of the end-in-itself does not support the view that we may never force another to bear some cost in order to benefit others. If one focuses on the equal value of all rational beings, then equal consideration suggests that one may have to sacrifice some to save many.

#### Actor specificity – Util is the only moral system available to policymakers,

# CP

### NC - Long

#### TEXT: The Outer Space Treaty ought to be amended to establish an international legal trust system governing outer space.

Finoa 21 [Ivan Finoa (Department of Law University of Turin), “Building a New Legal Model for Settlements on Mars,” A. Froehlich (ed.), Assessing a Mars Agreement Including Human Settlements, Studies in Space Policy 30, 2021. <https://doi.org/10.1007/978-3-030-65013-1_7>]CT

7.5 A Proposal for an International Legal Trust System

Since several legal and policy issues may arise from the actual legal framework, a new international legal regime for outer space shall: (a) Provide for property rights or a lease allocation system, both incentivising investments in the space sector. The system would be supervised and led by the United Nations (UN) through the United Nations Office for Outer Space Affairs (UNOOSA). (b) Establish the rule of law in outer space. A laissez faire system could turn into anarchy whereby countries and companies could race to grab as many resources as possible bringing considerable potential conflict. (c) Recognise outer space as common heritage of mankind, instead of res communis.24 (d) Provide a sustainable exploitation of celestial bodies, to avoid the uncontrolled production of space debris or to prevent the complete exhaustion of the celestial bodies’ masses or their natural orbits.25 The United Nations should manage the ordered and sustainable economic development in outer space for the present and future generations. (e) Prevent the militarisation of outer space and favours the international collaboration, which are the same aims of the Outer Space Treaty’ drafters. (f) Consider the weak points of the Moon Agreement which led to nations’ refusal to sign. Only a widely accepted agreement would have the power of law in the international context.

The abovementioned requirements could be met by establishing an international Legal Trust System (ILTS). A trust is an arrangement that assigns assets to one or more trustees that will manage them in the interest of one or more beneficiaries. The latter may include the trustee or the settlor.26 Translated in the ILTS, mankind would assume the role of settlor and beneficiary of the outer space resources. The UNOOSA would act as main trustee of outer space resources and trading property rights and leases to companies and countries. The rights over the celestial bodies or over its resources would depend on the nature of the celestial body itself. For example, property rights are preferable to a lease over asteroids, as they could just disappear after the exploitation. Both leases and property rights can be provided over lands and mining sites on Mars. Leases or defeasible titles are preferable for some land mass on those celestial bodies which could hypothetically be used by humankind pending an Earth disaster. In the case of lucrative activities, such as mining, companies will choose whether to get the exclusive use over the resource through payment of the lease or through annual payment linked to net proceeds or to production charges.

7.6 The Functioning of the International Legal Trust System

When a company is interested in leasing or buying an outer space resource, before starting any operations, it must send a plan of work to the United Nations. The plan of work shall include all the details of the activity that would be carried out; it shall be consistent with pre-established parameters of sustainability and shall not interfere with other space activities. If the UN approves the company plan of work, the country of the company assumes the role of co-trustee for the specific resource. Thus, as a cotrustee, countries must investigate whether all activities of their national companies are consistent with the plan of work authorised by the UN. These supervisory duties would be added to the responsibility of nations for all space objects that are launched within their territory.27 The UN, as main trustee, would oversee that countries are performing their duties. This model would be the ordinary one. There would be also an extraordinary model, in which the UN would be the only trustee. This model would be possible in two instances: when the country of the applicant for a private company is not technologically able to act as a trustee or when the applicant of the activity is a country itself. Furthermore, as stated previously, the beneficiaries of this trust are the countries of the world and their citizens; hence all mankind would take concrete profit from lease transactions and benefit sharing. The income from the sales, leases and benefit sharing can be distributed to mankind by financing international global goals, following a similar model of the 17 Sustainable Development Goals adopted by the United Nations in 2015, which addressed poverty, inequality, climate change, environmental degradation, and peace and justice. Finally, the International Legal Trust System would meet acceptance because every country would obtain benefit sharing to improve its living standard and space faring nations would rely on property rights.

# Climate Innovation DA

## NC

### NC – Regular

#### The private sector is essential for space exploration – competition is key and government development is not effective, efficient, or cheap enough. Thiessen 21:

Marc Thiessen, 6-1, 21, Washington Post, Opinion: SpaceX’s success is one small step for man, one giant leap for capitalism, https://www.washingtonpost.com/opinions/2020/06/01/spacexs-success-is-one-small-step-man-one-giant-leap-capitalism/

It was one small step for man, one giant leap for capitalism. Only three countries have ever launched human beings into orbit. This past weekend, SpaceX became the first private company ever to do so, when it sent its Crew Dragon capsule into space aboard its Falcon 9 rocket and docked with the International Space Station. This was accomplished by a company Elon Musk started in 2002 in a California strip mall warehouse with just a dozen employees and a mariachi band. At a time when our nation is debating the merits of socialism, SpaceX has given us an **incredible testament to the power of American free enterprise.** While the left is advocating unprecedented government intervention in almost every sector of the U.S. economy, from health care to energy, **today Americans are celebrating the successful privatization of space travel.** If you want to see the difference between what government and private enterprise can do, consider: It took a private company to give us the first space vehicle with touch-screen controls instead of antiquated knobs and buttons. It took a private company to give us a capsule that can fly entirely autonomously from launch to landing — including docking — without any participation by its human crew. It also took a private company to invent a reusable rocket that can not only take off but land as well. When the Apollo 11 crew reached the moon on July 20, 1969, Neil Armstrong declared “the Eagle has landed.” On Saturday, SpaceX was able to declare that the Falcon had landed when its rocket settled down on a barge in the Atlantic Ocean — ready to be used again. That last development will save the taxpayers incredible amounts of money. The cost to NASA for launching a man into space on the space shuttle orbiter was $170 million per seat, compared with just $60 million to $67 million on the Dragon capsule. The cost for the space shuttle to send a kilogram of cargo into to space was $54,500; with the Falcon rocket, the cost is just $2,720 — a decrease of 95 percent. And while the space shuttle cost $27.4 billion to develop, the Crew Dragon was designed and built for just $1.7 billion — making it the lowest-cost spacecraft developed in six decades. SpaceX did it in six years — far faster than the time it took to develop the space shuttle. ***The private sector does it better, cheaper, faster and more efficiently than government***. Why? Competition. Today, SpaceX has to compete with a constellation of private companies — including legacy aerospace firms such as Orbital ATK and United Launch Alliance and innovative start-ups such as Blue Origin (which is designing a Mars lander and whose owner, Jeff Bezos, also owns The Post) and Virgin Orbit (which is developing rockets than can launch satellites into space from the underside of a 747, avoiding the kinds of weather that delayed the Dragon launch). In the race to put the first privately launched man into orbit, upstart SpaceX had to beat aerospace behemoth Boeing and its Starliner capsule to the punch. It did so — for more than $1 billion less than its competitor. **That spirit of competition and innovation will revolutionize space travel in the years ahead.** Indeed, Musk has his sights set far beyond Earth orbit. Already, SpaceX is working on a much larger version of the Falcon 9 reusable rocket called Super Heavy that will carry a deep-space capsule named Starship capable of carrying up to 100 people to the moon and eventually to Mars. Musk’s goal — the reason he founded SpaceX — is to colonize Mars and make humanity a multiplanetary species. He has set a goal of founding a million-person city on Mars by 2050 complete with iron foundries and pizza joints. Can it be done? Who knows. But this much is certain: **Private-sector innovation is opening the door to a new era of space exploration**. Wouldn’t it be ironic if, just as capitalism is allowing us to explore the farthest reaches of our solar system, Americans decided to embrace socialism back here on Earth?

#### Continued private space development is the only way to make sustainable energy feasible – empirics prove. Autry 19:

Greg Autry {the director of the Southern California Commercial Spaceflight Initiative at the University of Southern California, vice president at the National Space Society, and chair of the International Space Development Conference, }, 19 - ("Space Research Can Save the Planet—Again," Foreign Policy, 7-20-2019, <https://foreignpolicy.com/2019/07/20/space-research-can-save-the-planet-again-climate-change-environment/)//marlborough-wr/>

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. 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 technology. 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. Eventually, firms will be able to supply endeavors in space with materials from the moon and asteroids, avoiding the cost and environmental impact of lifting them into orbit. Mining the solar system comes with its own potential impacts, but extracting resources from distant and lifeless worlds is clearly preferable to the continued degradation of the Earth.

1. <http://dictionary.reference.com/browse/negate> - to deny the existence, evidence, or truth of:, <http://www.merriam-webster.com/dictionary/negate> -  to deny the existence or truth of, <http://www.thefreedictionary.com/negate> - to deny the existence, evidence, or truth of (something). , <http://www.vocabulary.com/dictionary/negate> - If something is proved false or untrue, it has been negated, https://www.yourdictionary.com/negateNegate is defined as to deny, to prove false

   Affirm is according to: Dictionary.com – maintain as true, Merriam Webster – to say that something is true, Vocabulary.com – to affirm something is to confirm that it

   is true, Oxford dictionaries – accept the validity of, Thefreedictionary – assert to be true [↑](#footnote-ref-1)