# 1NC vs Lunar Heritage

## 1NC – Shell

#### Interpretation: outer space consists of regions outside the atmospheres of celestial bodies

Tanabe 19 [(Rosie, updater and writer at NWE) “Outer space,” New World Encyclopedia, 1/8/2019] JL

Outer space (often called space) consists of the relatively empty regions of the universe outside the [atmospheres](https://www.newworldencyclopedia.org/entry/Atmosphere) of celestial bodies. *Outer* space is used to distinguish it from airspace and terrestrial locations. There is no clear boundary between [Earth's atmosphere](https://www.newworldencyclopedia.org/entry/Earth%27s_atmosphere) and space, as the [density](https://www.newworldencyclopedia.org/entry/Density) of the atmosphere gradually decreases as the altitude increases.

#### The moon has an atmosphere—

Siegal 21[(Ethan, a Ph.D. astrophysicist and author of "Starts with a Bang!" He is a science communicator, who professes physics and astronomy at various colleges. He has won numerous awards for science writing since 2008 for his blog, including the award for best science blog by the Institute of Physics.) “The “airless” Moon really does have an atmosphere, after all,” Big Think, November 17, 2021. <https://bigthink.com/starts-with-a-bang/airless-moon-atmosphere/>] RR

And yet, the Moon actually does have an atmosphere: one that’s measurable and detectable. In addition, it has something even better than an atmosphere: an atmospheric “tail” made of sodium atoms. Here’s the fascinating science behind our lunar companion’s tenuous, but nonnegligible, atmosphere, which we mustn’t ignore any longer.

#### Violation: Lunar Heritage Sites are located on the moon, not in outer space.

Nasa 13 [(Nasa, The National Aeronautics and Space Administration is America’s civil space program and the global leader in space exploration. The agency has a diverse workforce of just under 18,000 civil servants, and works with many more U.S. contractors, academia, and international and commercial partners to explore, discover, and expand knowledge for the benefit of humanity. With an annual budget of $23.2 billion in Fiscal Year 2021, which is less than 0.5% of the overall U.S. federal budget, NASA supports more than 312,000 jobs across the United States, generating more than $64.3 billion in total economic output (Fiscal Year 2019).) “Lunar Heritage Sites,” NASA, 12/13/13. <https://moon.nasa.gov/resources/53/lunar-heritage-sites/>] RR

**Chart, diagram

Description automatically generated**

This graphic highlights locations on the moon NASA considers "lunar heritage sites" and the path NASA's Gravity Recovery and Interior Laboratory spacecraft will take on their final flight.

Navigators on the GRAIL team have designed an end of mission plan that rules out the extremely remote possibility of either of the two GRAIL spacecraft impacting near any of these historic locations. The Apollo 11, 12, 14, 16 and 17 landing sites are indicated with green circles. The Surveyor sites are indicated with yellow squares. The Soviet Union's Luna and Lunakhod landing sites are indicated with red diamonds and red triangles, respectively.

The ground tracks for the Ebb and Flow spacecraft during their final half-orbits are shown in blue and red.

#### Standards:

#### Limits – their interpretation means that they allow for the elimination of private appropriation on earth, asteroids, galaxies, comets, mars etc. This explodes neg prep burdens since outer space activity is so vague – no generics exist to answer both the earth and the moon aff, so affs would just win with a tiny impact every round

#### Ground – allowing debates about celestial bodies denies the neg links to core generics like space democracy bad, space colonization good, the moon pic, the property rights NC, etc. – that kills clash by forcing negatives to the fringes of argumentation that disagree with everything and kills fairness by giving the aff a major prep advantage since they only need to frontline the few negative arguments that link to their aff.

#### Fairness and education are voters – debate’s a game, and fairness is necessary to determine the winner of the game, and education is the reason why schools fund debate.

#### Drop the debater – dropping the argument doesn’t rectify abuse since winning T proves why we don’t have the burden of rejoinder against their aff.

#### Use competing interps – reasonability invites arbitrary judge intervention since there’s no consensus as to what’s reasonable.

#### No RVIs – fairness and education are logical litmus tests and they incentivize baiting theory and prepping it out which turns substance crowdout

## 1NC- Off

#### The transhumanist dream ignores the physical reality of labor

HS 13 [(HumanStrike Blog, blog on neoliberalism, capitalism, and critical theory; cites Giorgio Agamben, prof of philosophy at Univ of Vienna, and Christian Mazzari, Director of Socio-Economic Research at the Scuola Universitaria della Svizzera Italiana) “bare life, immaterial labour, foxconn. first draft” Human Strike Blog, July 24, 2013] AT

Jon Seltin makes a similar argument about transhumanists, those who dream of a post-human future in which we transcend the boundaries of our physical bodies and use technology to become immortal. They, too, ignore the physical reality of the machines they use, and the hidden labor that produces them. As he puts it: “The supposed fluidity, transcendence and liberation associated with digital technologies and hyperbolic post-human futures are structurally contingent on the cheap labour and dehumanisation of these other post-humans” (Seltin 2009, 53). Likewise, the fact that post-operaists can argue for a living wage and make the claim that we have almost approached communism, and need only rid ourselves of the parasitic phantom of financial capitalism, is predicated on ignoring the processes that produce the cognitive worker’s means of production: the bare life of the assembly-line worker making their iphones, and the bare life of the migrant domestic worker ensuring their reproduction. Seltin reminds us of “…those assembly workers whose integration with technologies and machines is marked not by liberation and transcendence but their absolute antitheses: by ~~crippling~~ poverty, an absolute lack of economic and personal security, and a complete alienation from the symbolic spaces that their labor produces. While many electronics assembly workers may have no access to the internet, their cheap labour provides the material basis upon which the dreams of digital disembodiment of transhumanists are based.” (2009, 53).

#### The aff’s vision of technological paradise where people are able to modify their bodies through anti ageing practices is based in the narrow experiences of the first world consumer. *Where does your technology come from?* This is the fatal flaw in the affirmative’s logic that perpetuates hyper-exploitation and dehumanization along racial lines. This extraction is key to the functioning of capitalism.

HS 13 [(HumanStrike Blog, blog on neoliberalism, capitalism, and critical theory; cites Giorgio Agamben, prof of philosophy at Univ of Vienna, and Christian Mazzari, Director of Socio-Economic Research at the Scuola Universitaria della Svizzera Italiana) “Neoliberalism, Suzhi, and Bare Life” Human Strike Blog, MAY 21, 2013] AT

So, this value that is imbued in urban middle-class children in China or in well-off children in the United States who are groomed from a young age to be competitive, flexible, desirable, is derived from the reproductive labor of a highly regulated, super-exploited flexible class of migrant domestic workers. While this labor is paid, unlike the reproductive labor of the wife or mother in Fortunati’s formulation, I believe that the relation between obscured domestic work and the productive, “high-quality” bodies of cognitive laborers is the same. The former are portrayed as unskilled or, in Endnotes’ formulation, as merely a result of high income-differentials, and not productive of value, while the latter are seen as the true workers of our immaterial age. This ~~blindness~~ [ignorance] to the value-producing nature of racialized, gendered domestic work is comparable to the refusal to see women’s work as ‘real work’ by Marxists in the mid-twentieth century, and is, as I shall argue later, necessary to post-operaist discourses about immaterial labor and their subsequent arguments for social democracy. One last note before returning to the main current of this piece: Hairong tells us that employers see the malleability of domestic laborers as a ‘blank slate’ that can be shaped according to their own needs, while Anagost tells us that she observed in discourses of suzhi “nothing less than a substitution of bodies in which the extraction of value from one body was being accumulated in the other (2004, 191). She argues that the bare life of migrant workers, their pure potentiality–or in Hairong’s formulation the ‘blank slate’ of their subjectivity–is appropriated in order to form the ‘qualified life’ of middle-class, intellectual workers (Anagost 2004, 193). Here we can begin to see the relation between bare life and qualified life as sources of value, one hidden and obscured and one privileged through attention both from middle-class intellectual workers and supposedly critical anti-capitalists. In the next section, I will address more fully this notion of bare life and qualified life in domestic labor, industrial production, and cognitive labor, the omission of these nuances among contemporary post-operaists, and the effect of this lacuna on their analyses and political strategies. Bare Life and Qualified Life: Factories and Cognitive Labor According to Agamben, classical Greeks used two different terms to describe life: “zoē, which expressed the simple fact of living common to all living beings (animals, men, or gods), and bios, which indicated the form or way of living proper to an individual or group….what was at issue [in using bios] for both thinkers was not at all simple natural life but rather a qualified life, a particular way of life” (Agamben 1998, 1). He then offers us a framework for understanding both the historical and contemporary logic of sovereignty and biopolitics: “The fundamental categorical pair of Western politics is not that of friend/enemy but that of bare life/political existence, zoē/bios, exclusion/inclusion. There is politics because man is the living being who, in language, separates and opposes himself to his own bare life and, at the same time, maintains himself in relation to that bare life in an inclusive exclusion” (1998, 9). While I find Agamben’s framework extraordinarily important overall, I would like to focus particularly on the production of bare life and qualified life, zoē and bios, in the realms of production. The extraction of value from bare life is fundamental to contemporary capitalism, but there remains an important distinction between the extraction of value from bare life and from qualified life, even as those distinctions may be experienced by the same bodies. Thus while for the Western or urban cognitive worker value is extracted from their bare life, it is additionally extracted from their qualified life: they are subjectivized as both zoe and bios, in line with Agamben’s formulation of the inseparability of the two under contemporary sovereignty. However, the Chinese factory worker or the migrant domestic worker are subjected purely as zoē, as a source of bare life existing outside of the law and functioning only to produce value. I argue for this distinction in contrast to Marazzi, who sees bare life as interchangeable with the proletariat (Marazzi 2011, 41-42), even while unwittingly focusing on those forms of labor that are most qualified. What I take issue with is not the argument that the body is an exploited source of value for all subjects under contemporary capitalism, but the failure to recognize the dramatic differences in how that exploitation functions and is distributed according to race, gender, and geographical location. Christian Marazzi tells us, in his critique of financial capitalism, that “bio-capitalism produces value by extracting it not only from the body functioning as the material instrument of work, but also from the body understood as a whole.” (2011, 49). This may be correct, but let us examine the arenas in which this value extraction takes place in his work. Echoing our earlier discussion of the birth of neoliberalism, he tells us of “the emergence of atypical labor and of second generation autonomous labor, former employees who become self-employed” (2011, 50), and then of the massive value produced by our cooperative labor in the form of co-production: “These crowdsourcing strategies, leaching vital resources from the multitudes, represent the new organic composition of capital, the relationship between constant capital dispersed throughout society and variable capital as the whole of sociality, emotions, desires, relational capacities and a lot of ‘free labor’ (unpaid labor) dispersed in the sphere of the consumption and reproduction in the forms of life, of individual and collective imaginary” (2011, 115). Who are the “multitudes” in this formulation? Who are the productive workers, and is this value that is extracted from them extracted from their bare life or from qualified life? By seeing value as produced only through the collective intellectual work of those people who are plugged into the internet, into culture, into crowdsourcing, Marazzi casts those workers from excluded populations as irrelevant, as always already not part of the multitudes. From where does the productive capacity of these “multitudes” come? Are these creative subjects produced only through their own self-work? Do the physical tools that they use spring into existence from the general intellect? From where do their computers, their iphones, their network routers and servers come? I would like to return here to Anagost’s formulation of bare life and suzhi, and the notion of the qualified life, bios. The neoliberal subject is precisely not bare life, it is in fact an extraordinarily qualified life, imbued with values, qualities, and skills that make it so productive in Marazzi’s view. I do not think it entirely coincidental that suzhi translates into quality, and that Anagost and Hairong perceive the presence of migrant domestic workers in urban families as part of a process of investing in and increasing the suzhi of the children. This value that is extracted from domestic workers, the value that is transferred to children who will become cognitive laborers, computer programmers, entrepreneurs–Marazzi’s multitudes–is an accumulation of quality: the future entrepreneur becomes ‘qualified’ precisely by an extraction of value from the unqualified, bare life of the domestic worker. Anagost still sees bare life as fundamental to the experience of both: “it would seem that the body–or if not the body as such, then Agamben’s ‘bare life’–provides a common substrate that underlies both the Chinese state’s strategies for developing the latent potentialities of the masses and the absorption of the individual in technologies of the self, in which care of the body becomes an obsessive focus of bourgeois consumption–an intensification of the body as a site of investment” (2004, 200). However, even if the bare life of Marazzi’s multitude is extracted for value, they still exist as bios as well. The domestic workers, and, as we shall soon see, the industrial workers producing the very digital devices needed for co-production, exist entirely as excluded bare life, in a state of exception much more brutal than that which extracts value from our qualified life. Citing Agamben, Nicholas De Genova defines bare life as “what remains when human existence, while yet alive, is nonetheless stripped of all the encumbrances of social location and juridical identity, and thus bereft of all of the qualifications for properly political inclusion and belonging” (De Genova 2012, 133). It is hard to imagine describing the cognitive worker of the post-operaists’ multitudes as “stripped of…social location and juridical identity.” Indeed, it is precisely their social existence that makes them productive of value. Not so with the workers in China’s Foxconn factories or the Export Processing Zones of Southeast Asia. These workers exist in conditions of super-exploitation, working 12 hours daily and up to a month straight without time off during periods of high demand (China Labor Watch). They are the hands that assemble the ideas of Marazzi’s multitudes. Like the blank slate of the domestic worker, they are pure potentiality, desired for their malleability and their dexterity, performing repetitive actions as quickly as possible. Here there is no need for them to improve themselves; there is no entrepreneurship of the self, only a massive reserve army of labor that can be used and discarded as needed. Here is where value is truly extracted from bare life, from bodies “stripped of…social location and juridical identity.” Anagost again: In neoliberal economic logics, this latent potentiality of the body as a body for exploitation is unleashed by the positioning of the subject at the edge of a precipice, through the threat of a failure to be recognized as a body of value or even annihilation of the body’s very existence due to unsafe labor conditions. In other words, not only does potentiality define capacities that are expressed in the usual sense of being the product of education and training, but there is a superexploitation of the body through an expansion of what it can be made to tolerate in terms of work discipline and stress. (2004, 201, emphasis mine). De Genova agrees with this characterization of the migrant laborer as bare life: “to the extent that migrant labor commonly confronts territorially-defined ‘national’ states with the raw force and vital energies of human life—as labor-power–with no juridical sanction, we may recognize anew the figure of bare life, the negative, abject counterpart to human universality and pure potentiality, which sovereign power can only seek to banish” (De Genova 2012, 145). With this foundation, I would like to turn now to the concentration camp, to Agamben’s argument that the camp contains the logic of modern sovereignty, is the “nomos of the modern.” Specifically, I argue that those sites of production most ignored by theorists of cognitive labor–sweatshops in LA, Export Processing Zones in SE Asia, industrial centers in China–are camps in Agamben’s sense, states of exception where workers are reduced entirely to bare life. In describing the concentration camps of Nazi Germany and the subsequent extension of their logic into the heart of sovereign power in democracy, Agamben tells us that “[i]nsofar as its inhabitants were stripped of every political status and wholly reduced to bare life, the camp was also the most biopolitical space ever to have been realized, in which power confronts nothing but pure life, without any mediation” (1998, 169). Later: “if the essence of the camp consists in the materialization of the state of exception and in the subsequent creation of a space in which bare life and the juridical rule enter into a threshold of indistinction, then we must admit that we find ourselves virtually in the presence of a camp every time such a structure is created, independent of the kinds of crimes that are committed there and whatever its denomination and specific topography” (Agamben 1998, 174). Thus the Nazi concentration camps, the refugee camps into which refugees without political status are herded and held in a zone of indistinction, or, as I argue following Jon Seltin, the Export Processing Zones that exist specifically in a state of exception, are all part of the same logic of sovereignty and reduction of life to bare life. As Seltin tells us: “The EPZ is by its very definition a ‘state of exception’, the logic of which establishes the conditions for the production of instrumentalized bare life. The definitional feature of an EPZ is that the laws and policy framework governing its operations are ‘distinct from what applies elsewhere” (2009, 54). EPZs are granted exemptions from the labor laws of the countries in which they reside, tax breaks, and tariff relaxations; they are, literally, camps designed according to the needs of capital, in which the citizens of the countries of their geographical location are stripped of their juridical existence. We can see this logic at play in maquiladoras, in the EPZs of SE Asia, in the use of undocumented migrants in sweatshops in LA, and in the use of interns in Foxconn’s factories to circumvent minimum wage standards (Friends of Gongchao, 2013). The conditions of these camps, or industrial centers, are likewise characterized by their role as “the most biopolitical space to ever have been realized.” Seltin again: “The workers in EPZs are often subject to strict biopolitical regimes of control, regulation and observation….Wright [in an ethnographical study of Mexican electronics maquiladoras workers] describes how the female employees are expected to, very literally, ‘embody the very concept of flexibility’ in that they are regarded as incomplete subjects, as untrainable bare life whose bodies serve “merely a conduit for the supervisor’s knowledge.’ Thus the maquiladora floor-worker is produced through the utter differentiation of zoē and bios, that is, as a body which is governed and operated through what Wright describes as a ‘prosthetics of supervision” (2009, 54). If these industrial centers are the fundamental biopolitical space where bare life is put to work, it seems disingenuous to view the labor of cognitive workers in the United States and Western Europe through the same lens. While the logic of availability, total mobilization of one’s potentiality, and total subsumption under capital may be the same, the practical application is extraordinarily different. It is no coincidence that these divisions of labor are separated along racialized, gendered, and geographic lines; capitalism has depended on and continues to depend on an uneven population and uneven geographical development. It is also no coincidence, I believe, that those theorists of cognitive labor and the general intellect, those so concerned about the ways our affects are put to work and our creativity exploited, cast labor as universal and homogenous, with an enormous blindspot hovering over superexploited portions of the proletariat: migrants, workers in post-colonial or post-socialist countries, those cast as inferior by white supremacy and patriarchy. The social democrats and orthodox Marxists of yesteryear focused only on the formal industrial working class, dismissing domestic labor, reproductive work, or agricultural labor as unimportant, and dismissing the struggles of people of color or women as superfluous to the primary contradiction of labor and capital. Likewise, the social democrats of today, the self-appointed theorists of the multitude and global insurgency, see only that type of work that they themselves perform, and not the underlying labor that props them up. Jon Seltin makes a similar argument about transhumanists, those who dream of a post-human future in which we transcend the boundaries of our physical bodies and use technology to become immortal. They, too, ignore the physical reality of the machines they use, and the hidden labor that produces them. As he puts it: “The supposed fluidity, transcendence and liberation associated with digital technologies and hyperbolic post-human futures are structurally contingent on the cheap labour and dehumanisation of these other post-humans” (Seltin 2009, 53). Likewise, the fact that post-operaists can argue for a living wage and make the claim that we have almost approached communism, and need only rid ourselves of the parasitic phantom of financial capitalism, is predicated on ignor ing the processes that produce the cognitive worker’s means of production: the bare life of the assembly-line worker making their iphones, and the bare life of the migrant domestic worker ensuring their reproduction. Seltin reminds us of “…those assembly workers whose integration with technologies and machines is marked not by liberation and transcendence but their absolute antitheses: by crippling poverty, an absolute lack of economic and personal security, and a complete alienation from the symbolic spaces that their labor produces. While many electronics assembly workers may have no access to the internet, their cheap labour provides the material basis upon which the dreams of digital disembodiment of transhumanists are based.” (2009, 53) Anagost tells us, citing Spivak, that “capital ‘must provide itself with the mind of one class of human beings and the body of the other.’ The mind of the capitalist class is appropriated as the conscious bearer of the movement of capital–’capital personified and endowed with consciousness and a will’ (Marx). The body of the working class is appropriated for its superadequation, the surplus value it produces” (2004, 205). The general intellect of the post-operaists, the collective intelligence created by a global network of cognitive workers that they bemoan as a commons which is enclosed by capital, is perhaps instead the mind of capital, putting to work the bodies of migrants in China, migrant domestic workers, and women of color. We must be aware of the role that biopolitics plays in crafting us as subjects and extracting value from us, but we must also be aware that the global proletariat, or the ‘multitude’, is not a homogeneous mass that experiences exploitation in the same way, but a highly differentiated series of populations, some few of which are granted massive privileges at the expense of many others. Remembering this reminds us that a simple shift in government policies or a return to the welfare state won’t deliver us to communism, nor will individual practices of revolt and refusal through a solitary ‘human strike,’ but only a complete destruction of the current world and its subsequent re-imagining.

#### Capitalism is unsustainable and causes extinction – resource scarcity, environmental degradation, war

Trainer ’16 (Ted; 5/10/16; Conjoint Lecturer in the School of Social Sciences, University of New South Wales, leading proponent of de-growth and sustainability issues; Resilience; “Sustainability – The Simpler Way perspective”; <http://www.resilience.org/articles/General/2016/07_July/Sustainability%20The%20Simpler%20Way%20Perspective.pdf>; DOA: 7/15/17)

Firstly let’s set the scene; The deteriorating state of the planet. The resource base and environmental conditions on which the present levels of global production and consumption are built are obviously deteriorating at an alarming rate. Few if any would not be aware of this but it is important to briefly remind ourselves before focusing on how impossible it would be for this base to sustain affluence and growth for all. A glance at the situation reveals that resources are becoming more scarce and costly, including energy, productive land, minerals, food, fish, wood and water, and ecosystems are being severely damaged. We are losing species, forests, land, coral reefs, grasslands and fisheries at accelerating rates. A sixth era of massive biodiversity loss appears to have begun. We are polluting the planet with excess carbon dioxide, nitrogen and many toxic chemicals. The mass of big animals on the planet has declined sharply in recent decades, probably down by 90% in the sea. The World Wildlife Fund says that in general the quality of global ecosystems has deteriorated 30% since about 1970, and its “Footprint” measure indicates that we are now taking biological resources at a rate that would take 1.5 planets to provide in a sustainable way. (2014.) The reason for all this massive resource depletion and damage to the environment is simply that there is far too much producing and consuming going on. This is causing too many resources to be taken from nature and too many wastes to be dumped back into nature. Now consider the limits case: Could everyone live as we do? The 10-15% of the world’s people living in regions such as North America, Australia and Europe have per capita levels of resource use that are around 20 times the average for the poorest half of people. How likely is it that all the 9.7 billion people expected by 2050 could rise to the present rich world level of resource use? If they did live as we do then world annual resource production and consumption, and ecological damage, would be approaching 6 times as great as at present. Yet present levels of resource use and environmental impact are far from sustainable. The World Wildlife Fund’s ”Footprint” analysis yields an even higher multiple. They estimate that it takes about 8 ha of productive land to provide water, energy settlement area and food for one person living in Australia. So if 9 billion people were to live as we do we would need about 72 billion ha of productive land. But that is about 9 times all the available productive land on the planet. Now add the absurdly impossible implications of economic growth. But the foregoing argument has only been that the present levels of production and consumption are quite unsustainable. **Yet** we are determined to increase present living standards and levels of output and consumption, as much as possible and **without any end** in sight. In other words, our supreme national goal is economic growth. Few people seem to recognise the absurdly impossible consequences of pursing economic growth. If we rich countries have a 3% p.a. increase in economic activity until 2050 then our output, **resource use and environmental impact will be** around **4 times as great** as it is now, **and doubling every 23 years** thereafter. Now what if by 2050 all the expected 9.7 billion people expected to be living on earth had risen to the “living standards” we in rich countries would then have given 3% economic growth. Total world output, resource, use and environmental impact would be approaching 15 times as great as they are now … unless technical advance and efficiency gains could greatly reduce them. (See below.) These multiplies must be the focal point in discussions of sustainability. **Grasping the magnitude of** the **overshoot and** of the **unsustainability is crucial** here. The numbers show that present, let alone probable **2050** rich world **levels of consumption, are grossly unsustainable** and could never be extended to all people. But can’t technical advance solve the problems? Most people hold the "technical fix faith", believing that technical advance will solve the resource and environmental problems and thereby make it unnecessary for us to question the commitment to affluence and growth. When considering the following evidence keep in mind that what we need is not just to stop increases in impacts as growth goes on -- we need to reduce impacts dramatically before sustainable levels are reached. There is a very strong case that technical advance is nowhere near capable of solving the sustainability problems facing us. Note that many miraculous technical developments, e.g., in physics, astronomy, genetics, and medicine, are not so relevant here where the focus is on the possibility of making big improvements in the efficiency and energy costs of producing energy and materials, and of cutting ecological impacts. Following are some of the main elements in the case. 1. Efficiency gains to date. It is not the case that technical achievements in the relevant areas have been very encouraging. Ayres and Vouroudis (2009) note that for many decades the efficiency of production of electricity and fuels, electric motors, ammonia and iron and steel has more or less plateaued. In many crucial areas such as producing energy and minerals (below) the trend is towards worse efficiency, i.e., the need is for increasing inputs per unit of output. 2. The deteriorating productivity growth rate. **Technical advance** is regarded as a major determinant of productivity growth and that **has been in long term decline since the 1970s**. Even the advent of computerisation has had a surprisingly small effect, a phenomenon now labelled the “Productivity Paradox.” In fact the UK productivity growth rate has recently has gone below zero; i.e., productivity has actually deteriorated. (Weldon, 2016.) 3. Little or no “decoupling” is occurring for materials or energy use. This is the most important issue; does recent history indicate that economic output has been or can be separated from materials and energy use, so that growth can continue while resource demand falls? The “Tech-Fix faith” is fundamentally dependent on the assumption that massive decoupling is possible. But all the evidence seems to say that the amount of materials or energy needed to produce a unit of GDP in rich countries has not improved much if at all in recent years. The box below refers to some of the evidence. Weidmann et al. (2014) say “…for the past two decades global amounts of iron ore and bauxite extractions have risen faster than global GDP.” “… resource productivity…has fallen in developed nations.” “There has been no improvement whatsoever with respect to improving the economic efficiency of metal ore use.” Giljum et al. (2014, p. 324) report in the world as a whole only a 0.9% p.a. improvement in the dollar value extracted from the use of each unit of minerals between 1980 and 2009, and that over the 10 years before the GFC there was no improvement. “…not even a relative decoupling was achieved on the global level.” They point out that the picture would have been worse had they included the many materials in rich world imports. **Diederan’s account** (2009) **of** the **productivity** of minerals discovery effort **is even more pessimistic**. **Between 1980 and 2008 the** annual major **deposit discovery rate fell from 13 to less than 1, while discovery expenditure went from** about **$1.5 billion** p.a. **to $7 billion** p.a., **meaning** the **productivity** of expenditure **fell by a factor** in the vicinity **of** around **100, which is an annual decline of** around **40%** p.a. Recent **petroleum figures are similar**; in the last decade or so **the discovery rate has not increased but discovery expenditure** more or less **trebled**. (Johnson, 2010.) **Schandl** et al. (2015) **say “ …** there is a very high coupling of energy use to economic growth, meaning that an increase in GDP drives a proportional increase in energy use.” “Our results show that while relative **decoupling can** be achieved in some scenarios, **no**ne would **lead to an absolute reduction in energy or materials footprint**.” **In all three** of their **scenarios** “… **energy use continues to be strongly coupled with economic activity**...” **Alvarez found that for Europe, Spain and the US, GDP increased 74% in 20 years, but materials use actually increased 85%**. (Latouche, 2014.) **Similar conclusions** re stagnant or declining materials use productivity etc. **are arrived** at **by Aadrianse**, 1997, **Dittrich** et al., (2014), **Schutz**, **Bringezu and Moll**, (2004), **Warr**, (2004), **Berndt**, (1990), **Smil**, (2014) **and Victor** (2008, pp. 55-56). (Note that economists often claim that the “energy intensity” of rich world economies is improving, but this is only because they fail to take into account the huge amounts of energy used overseas to produce imports, and “fuel switching”; see Kaufman, 2004.) 4. There is ecological deterioration in almost all domains. Technical advance has obviously not slowed, halted or reversed overall damage to the planet’s ecosystems. The “Environmental Kuznets Curve” thesis is an application of the decoupling claim to environmental impacts, asserting that as countries become richer impacts increase for a time but then plateau and fall. There is little doubt now that the thesis is not valid. Rich countries are in general not solving their most serious environmental problems. Alexander’s review (2014) concludes that for the world as a whole, ”… decades of extraordinary technological development have resulted in increased, not reduced, environmental impacts.” These many sources and figures show the extreme implausibility of the tech-fix faith that in future technical advances will enable us to stop worrying about limits and any need to dramatically reduce consumption or the obsession with economic growth. Conclusions on the limits to growth case. In view of these lines of argument it is difficult to see how anyone could disagree with the basic limits to growth case. Present ways are so grossly unsustainable there is no possibility of all people rising to the living standards we take for granted today in rich countries, let alone those we are seeking. Again the most important point is the magnitude of the overshoot. Most people have no idea of how far beyond sustainable levels of consumption we are or how big the reductions should be. For decades many scientists and agencies are have been emphasizing the validity and importance of the basic limits case. Sustainable ways that all could share appear to require us to go down to per capita rates of resource consumption around 10% of those we have now. It follows from the above discussion that the only solution is to shift to some kind of Simpler Way, i.e., to lifestyles, settlements and systems that make it possible for us to live well on a small fraction of our present rich world levels, with no economic growth.

#### The alt is to understand anti-capitalist revolution through a lens that accounts for positionality – this solves

Hs 13 [(HumanStrike Blog, blog on neoliberalism, capitalism, and critical theory; cites Giorgio Agamben, prof of philosophy at Univ of Vienna, and Christian Mazzari, Director of Socio-Economic Research at the Scuola Universitaria della Svizzera Italiana) “introduction” Human Strike Blog, April 24, 2013] AT

Finally, I will look at contemporary forms of struggle and resistance that are popularly cited by both anarchists and post-Operaists, from the banlieue riots of Paris in 2005 to the Arab Spring, the London lootings of 2011, and the turn in China towards rioting and destruction in labor conflicts in place of unionization or conventional strikes. I will suggest that there are fundamental similarities in biopolitical control, constant availability, and precarity that inform all of these forms of resistance, even while the manifestations of these forms of control and value extraction are applied very differently based on specific conditions After all, “global civil war still has its local specificities”. I will argue that it is no accident that certain characteristics of demandlessness, looting, and a lack of programmatism are found in common around the globe. However, I will also argue that both the post-Operaists’ fetishization of ‘democractic practices’ found in Occupy, the Arab Spring, and elsewhere, and the nihilists’ fixation on destruction without demands, are both based in limited perceptions of contemporary revolt. I will argue for a more nuanced, diverse, and specific understanding of contemporary global revolts against control, empire, and capital, and argue for the importance of considering material differences based on identity and positionality even while I find affinity for a rejection of identity and processes of subjectification. This is an ambitious project. It is, in fact, extraordinarily incomplete and fragmentary. I hope it will serve as a starting point for future conversations, as a way to work out some thoughts and ask more questions, and as a way to take the best of the post-Operaists and the nihilists while remaining critical of both of them. I hope to prioritize specificity and contemporaneity, and to remain critical and skeptical while rejecting both outright nihilism and fuzzy social democracy.

## 1NC-Off

#### CP Text: States, except the United States, should ban the appropriation of outer space for asteroid mining by private entities. The United States should fund the appropriation of outer space for the mining of rare earth metals from asteroids by private entities.

#### The PIC is key to beat China and protect against Chinese REM gatekeeping

Stavridis 21 [(James, retired US Navy admiral, chief international diplomacy and national security analyst for NBC News, senior fellow at JHU Applied Physics Library, PhD in Law and Diplomacy from Tufts) “U.S. Needs a Strong Defense Against China’s Rare-Earth Weapon,” Bloomberg Opinion, March 4, 2021, https://www.bloomberg.com/opinion/articles/2021-03-04/u-s-needs-a-strong-defense-against-china-s-rare-earth-weapon] TDI

You could be forgiven if you are confused about what’s going on with rare-earth elements. On the one hand, news reports indicate that China may increase production quotas of the minerals this quarter as a goodwill gesture to the Joe Biden administration. But other sources say that China may ultimately ban the export of the rare earths altogether on “security concerns.” What’s really going on here?

There are 17 elements considered rare earths — lanthanum, cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium, scandium and yttrium — and while many aren’t actually rare in terms of global deposits, extracting them is difficult and expensive. They are used across high-tech manufacturing, including smartphones, fighter aircraft and components in virtually all advanced electronics. Of particular note, they are essential to many of the clean-energy technologies expected to come online in this decade.

I began to focus on rare-earth elements when I commanded the North Atlantic Treaty Organization’s presence in Afghanistan, known as the International Security Assistance Force. While Afghans live in an extremely poor country, studies have assessed that they sit atop $1 trillion to $3 trillion in a wide variety of minerals, including rare earths. Some estimates put the rare-earth levels alone at 1.4 million metric tons.

But every time I tried to visit a mining facility, the answer I got from my security team was, “It’s too dangerous right now, admiral.” Unfortunately, despite a great deal of effort by the U.S. and NATO, those security challenges remain, deterring the large foreign-capital investments necessary to harvest the lodes. Which brings us back to Beijing.

China controls roughly 80% of the rare-earths market, between what it mines itself and processes in raw material from elsewhere. If it decided to wield the weapon of restricting the supply — something it has repeatedly threatened to do — it would create a significant challenge for manufacturers and a geopolitical predicament for the industrialized world.

It could happen. In 2010, Beijing threatened to cut off exports to Japan over the disputed Senkaku Islands. Two years ago, Beijing was reportedly considering restrictions on exports to the U.S. generally, as well as against specific companies (such as defense giant Lockheed Martin Corp.) that it deemed in violation of its policies against selling advanced weapons to Taiwan.

President Donald Trump’s administration issued an executive order to spur the production of rare earths domestically, and created an Energy Resource Governance Initiative to promote international mining. The European Union and Japan, among others, are also aggressively seeking newer sources of rare earths.

Given this tension, it was superficially surprising that China announced it would boost its mining quotas in the first quarter of 2021 by nearly 30%, reflecting a continuation in strong (and rising) demand. But the increase occurs under a shadow of uncertainty, as the Chinese Communist Party is undertaking a “review” of its policies concerning future sales of rare earths. In all probability, the tactics of the increase are temporary, and fit within a larger strategy.

China will go to great lengths to maintain overall control of the global rare-earths supply. This fits neatly within the geo-economic approach of the One Belt, One Road initiative, which seeks to use a variety of carrots and sticks — economic, trade, diplomatic and security — to create zones of influence globally. In terms of rare earths, the strategy seems to be allowing carefully calibrated access to the elements at a level that makes it economically less attractive for competitors to undertake costly exploration and mining operations. This is similar to the oil-market strategy used by Russia and the Organization of Petroleum Exporting Countries for decades.

Some free-market advocates believe that China will not take aggressive action choking off supply because that could precipitate retaliation or accelerate the search for alternate sources in global markets. What seems more likely is a series of targeted shutdowns directed against specific entities such as U.S. defense companies, Japanese consumer electronics makers, or European industrial concerns that have offended Beijing.

The path to rare-earth independence for the U.S. must include: Ensuring supply chains of rare earths necessary for national security; promoting the exploitation of the elements domestically (and removing barriers to responsibly doing so); mandating that defense contractors and other critical-infrastructure entities wean themselves off Chinese rare earths; sponsoring research and development to find alternative materials, especially for clean energy technology; and creating a substantial stockpile of the elements in case of a Chinese boycott.

This is a bipartisan agenda. The Trump administration’s strategic assessment of what needs to be done (which goes beyond just 17 rare earths to include a total of 35 critical minerals) is thoughtful, and should serve as a basis for the Biden administration and Congress.

#### REM access key to military primacy and tech advancement – alternatives fail

Trigaux 12 (David, University Honors Program University of South Florida St. Petersburg) “The US, China and Rare Earth Metals: The Future Of Green Technology, Military Tech, and a Potential Achilles‟ Heel to American Hegemony,” USF St. Petersberg, May 2, 2012, https://digital.stpetersburg.usf.edu/cgi/viewcontent.cgi?article=1132&context=honorstheses] TDI

The implications of a rare earth shortage aren’t strictly related to the environment, and energy dependence, but have distinct military implications as well that could threaten the position of the United States world’s strongest military. The United States place in the world was assured by powerful and decisive deployments in World War One and World War Two. Our military expansion was built upon a large, powerful industrial base that created more, better weapons of war for our soldiers. During the World Wars, a well-organized draft that sent millions of men into battle in a short amount of time proved decisive, but as the war ended, and soldiers drafted into service returned to civilian life, the U.S. technological superiority over its opponents provided it with sustained dominance over its enemies, even as the numerical size of the army declined. New technologies, such as the use of the airplane in combat, rocket launched missiles, radar systems, and later, GPS, precision guided missiles, missile defense systems, high tech tanks, lasers, and other technologies now make the difference between victory and defeat.

The United States military now serves many important functions, deterring threats across the world. The United States projects its power internationally, through a network of bases and allied nations. Thus, the United States is a powerful player in all regions of the world, and often serves as a buffer against conflict in these regions. US military presence serves as a buffer against Chinese military modernization in Eastern Asia, against an increasingly nationalist Russia in Europe, and smaller regional actors, such as Venezuela in South America and Iran in the Middle East. The U.S. Navy is deployed all over the world, as the guarantor of international maritime trade routes. The US Navy leads action against challenges to its maritime sovereignty on the other side of the globe, such as current action against Somali piracy. Presence in regions across the world prevents escalation of potential crisis. These could result in either a larger power fighting a smaller nation or nations (Russia and Georgia, Taiwan and China), religious opponents (Israel and Iran), or traditional foes (Ethiopia and Eretria, Venezuela and Colombia, India and Pakistan). US projection is also key deterring emerging threats such as terrorism and nuclear proliferation. While not direct challenges to US primacy, both terrorism and nuclear proliferation can kill thousands.

The US Air Force has a commanding lead over the rest of the world, in terms of both numbers and capabilities. American ground forces have few peers, and are unmatched in their ability to deploy to anywhere in the world at an equally unmatched pace.

The only perceived challenge to the United States militarily comes from the People’s Republic of China.76 While the United States outspends all other nations in the world put together in terms of military spending, China follows as a close second, and has begun an extensive modernization program to boot.77 The Chinese military however, is several decades behind the United States in air power and nuclear capabilities.78 To compensate, China has begun the construction of access-denial technology, preventing the US from exercising its dominance in China’s sphere of influence.79 Chinese modernization efforts have a serious long-term advantage over the United States; access to rare earth metals, and a large concentration of rare earth chemists doing research.80 This advantage, coupled with the U.S. losing access to rare earth metals, will even the odds much quicker than policymakers had previously anticipated. 81

The largest example is US airpower. With every successive generation of military aircraft, the U.S. Air Force becomes more and more dependent on Rare Earth Metals.82 As planes get faster and faster, they have to get lighter and lighter, while adding weight from extra computers and other features on board.83 To lighten the weight of the plane, scandium is used to produce lightweight aluminum alloys for the body of the plane. Rare Earth metals are also useful in fighter jet engines, and fuel cells.84 For example, rare earths are required to producing miniaturized fins, and samarium is required to build the motors for the F-35 fighter jet.85 F-35 jets are the next generation fighter jet that works together to form the dual plane combination that cements U.S. dominance in air power over the Russian PAK FA.86

Rare earth shortages don’t just affect air power, also compromising the navigation system of Abrams Tanks, which need samarium cobalt magnets. The Abrams Tank is the primary offensive mechanized vehicle in the U.S. arsenal. The Aegis Spy 1 Radar also uses samarium.87 Many naval ships require neodymium. Hell Fire missiles, satellites, night vision goggles, avionics, and precision guided munitions all require rare earth metals. 88

American military superiority is based on technological advancement that outstrips the rest of the world. Command and control technology allows the U.S. to fight multiple wars at once and maintain readiness for other issues, as well as have overwhelming force against rising challengers. This technology helps the U.S. know who, where, and what is going to attack them, and respond effectively, regardless of the source of the threat.

Rare Earth Elements make this technological superiority possible.

To make matters worse, the defense industrial base is often a single market industry, dependent on government contracts for its business. If China tightens the export quotas further, major US defense contractors will be in trouble.89 Every sector of the defense industrial base is dependent on rare earth metals. Without rare earths, these contractors can’t build anything, which collapses the industry.90

Rare Earth shortages are actually already affecting our military, with shortages of lanthanum, cerium, europium and gadolinium happening in the status quo. This prevents us not only from building the next generation of high tech weaponry, but also from constructing more of the weapons and munitions that are needed in the status quo. As current weapon systems age and they can’t be replaced, the US primacy will be undermined. Of special concern is that U.S. domestic mining doesn’t produce “heavy” rare earth metals that are needed for many advanced components of military technologies. Given the nature of many military applications, substitutions aren’t possible. 91

#### Primacy and allied commitments solve arms races and great power war – unipolarity is sustainable, and prevents power vacuums and global escalation

Brands 18 [(Hal, Henry Kissinger Distinguished Professor at Johns Hopkins University's School of Advanced International Studies and a senior fellow at the Center for Strategic and Budgetary Assessments) "American Grand Strategy in the Age of Trump," Page 129-133]

Since World War II, the United States has had a military second to none. Since the Cold War, America has committed to having overwhelming military primacy. The idea, as George W. Bush declared in 2002, that America must possess “strengths beyond challenge” has featured in every major U.S. strategy document for a quarter century; it has also been reflected in concrete terms.6

From the early 1990s, for example, the United States consistently accounted for around 35 to 45 percent of world defense spending and maintained peerless global power-projection capabilities.7 Perhaps more important, U.S. primacy was also unrivaled in key overseas strategic regions—Europe, East Asia, the Middle East. From thrashing Saddam Hussein’s million-man Iraqi military during Operation Desert Storm, to deploying—with impunity—two carrier strike groups off Taiwan during the China-Taiwan crisis of 1995– 96, Washington has been able to project military power superior to anything a regional rival could employ even on its own geopolitical doorstep.

This military dominance has constituted the hard-power backbone of an ambitious global strategy. After the Cold War, U.S. policymakers committed to averting a return to the unstable multipolarity of earlier eras, and to perpetuating the more favorable unipolar order. They committed to building on the successes of the postwar era by further advancing liberal political values and an open international economy, and to suppressing international scourges such as rogue states, nuclear proliferation, and catastrophic terrorism. And because they recognized that military force remained the ultima ratio regum, they understood the centrality of military preponderance.

Washington would need the military power necessary to underwrite worldwide alliance commitments. It would have to preserve substantial overmatch versus any potential great-power rival. It must be able to answer the sharpest challenges to the international system, such as Saddam’s invasion of Kuwait in 1990 or jihadist extremism after 9/11. Finally, because prevailing global norms generally reflect hard-power realities, America would need the superiority to assure that its own values remained ascendant. It was impolitic to say that U.S. strategy and the international order required “strengths beyond challenge,” but it was not at all inaccurate.

American primacy, moreover, was eminently affordable. At the height of the Cold War, the United States spent over 12 percent of GDP on defense. Since the mid-1990s, the number has usually been between 3 and 4 percent.8 In a historically favorable international environment, Washington could enjoy primacy—and its geopolitical fruits—on the cheap.

Yet U.S. strategy also heeded, at least until recently, the fact that there was a limit to how cheaply that primacy could be had. The American military did shrink significantly during the 1990s, but U.S. officials understood that if Washington cut back too far, its primacy would erode to a point where it ceased to deliver its geopolitical benefits. Alliances would lose credibility; the stability of key regions would be eroded; rivals would be emboldened; international crises would go unaddressed. American primacy was thus like a reasonably priced insurance policy. It required nontrivial expenditures, but protected against far costlier outcomes.9 Washington paid its insurance premiums for two decades after the Cold War. But more recently American primacy and strategic solvency have been imperiled.

THE DARKENING HORIZON For most of the post–Cold War era, the international system was— by historical standards—remarkably benign. Dangers existed, and as the terrorist attacks of September 11, 2001, demonstrated, they could manifest with horrific effect. But for two decades after the Soviet collapse, the world was characterized by remarkably low levels of great-power competition, high levels of security in key theaters such as Europe and East Asia, and the comparative weakness of those “rogue” actors—Iran, Iraq, North Korea, al-Qaeda—who most aggressively challenged American power. During the 1990s, some observers even spoke of a “strategic pause,” the idea being that the end of the Cold War had afforded the United States a respite from normal levels of geopolitical danger and competition. Now, however, the strategic horizon is darkening, due to four factors.

First, great-power military competition is back. The world’s two leading authoritarian powers—China and Russia—are seeking regional hegemony, contesting global norms such as nonaggression and freedom of navigation, and developing the military punch to underwrite these ambitions. Notwithstanding severe economic and demographic problems, Russia has conducted a major military modernization emphasizing nuclear weapons, high-end conventional capabilities, and rapid-deployment and special operations forces— and utilized many of these capabilities in conflicts in Ukraine and Syria.10 China, meanwhile, has carried out a buildup of historic proportions, with constant-dollar defense outlays rising from US$26 billion in 1995 to US$226 billion in 2016.11 Ominously, these expenditures have funded development of power-projection and antiaccess/area denial (A2/AD) tools necessary to threaten China’s neighbors and complicate U.S. intervention on their behalf. Washington has grown accustomed to having a generational military lead; Russian and Chinese modernization efforts are now creating a far more competitive environment.

#### Counterplan solves scenario 1 – climate solutions rely on REMs

Arrobas et al 17 [(Daniele La Porta Arrobas is a senior mining specialist with the World Bank based in Washington DC and has degrees in Geoscience and Environmental Management, Kirsten Hund is a senior mining specialist with the Energy and Extractives Global Practice of the World Bank and holds a Master’s in IR from the University of Groningen in the Netherlands, Michael Stephen McCormick, Jagabanta Ningthoujam has an MA in international economics and international development from JHU and a BS in MechE from Natl University of Singapore, John Drexhage also works at the Intl Institute for Sustainable Development) “The Growing Role of Minerals and Metals for a Low Carbon Future,” World Bank, June 30, 2017, https://documents.worldbank.org/en/publication/documents-reports/documentdetail/207371500386458722/the-growing-role-of-minerals-and-metals-for-a-low-carbon-future] TDI

* Full report - https://documents1.worldbank.org/curated/en/207371500386458722/pdf/117581-WP-P159838-PUBLIC-ClimateSmartMiningJuly.pdf

Climate and greenhouse gas (GHG) scenarios have typically paid scant attention to the metal implications necessary to realize a low/zero carbon future. The 2015 Paris Agreement on Climate Change indicates a global resolve to embark on development patterns that would significantly be less GHG intensive. One might assume that nonrenewable resource development and use will also need to decline in a carbon-constrained future. This report tests that assumption, identifies those commodities implicated in such a scenario and explores ramifications for relevant resource-rich developing countries. Using wind, solar, and energy storage batteries as proxies, the study examines which metals will likely rise in demand to be able to deliver on a carbon-constrained future. Metals which could see a growing market include aluminum (including its key constituent, bauxite), cobalt, copper, iron ore, lead, lithium, nickel, manganese, the platinum group of metals, rare earth metals including cadmium, molybdenum, neodymium, and indium—silver, steel, titanium and zinc. The report then maps production and reserve levels of relevant metals globally, focusing on implications for resource-rich developing countries. It concludes by identifying critical research gaps and suggestions for future work.

#### **It solves the second scenario – countries can’t proliferate if**

## Case

#### No private sector— your ev is about NASA sponsored projects, means the aff can’t solve. Your space x ev is about lunar bases in general, not lunar heritage.

#### The wright 13 ev is about extreme weather events, not about lunar damage or why lunar mapping would be able to solve.

#### Cooper 12— the US controls Alaska, it’s a state it can’t intercept missiles & no internal link, Hamil says nothing about aviation.

#### No link to atmospheric sciences— no warrant for why satellites would be good at this.

#### Their uniqueness evidence is from 2019 and we’ve yet to see largescale movements to establish lunar bases

#### Volcanic eruptions cause global cooling and reduce co2 emissions— key to solve warming

Euronews 21 [(Europe’s leading international news channel, providing global, multilingual news with a European perspective to over 440 million homes in 160 countries.) “La Palma eruption: Are volcanoes good or bad for climate change?” Euronews, 9/20/21. <https://www.euronews.com/green/2021/09/20/la-palma-eruption-are-volcanoes-good-or-bad-for-climate-change>] RR

Despite emitting huge clouds of particles and gases, volcanoes release the equivalent of one per cent of the amount of CO2 that human activity does. Every two and a half hours, human activities release around the same amount of CO2 as a Mount St Helens eruption, according to NASA.

Volcanoes aren't a particularly big emitter of CO2 when compared to human-related sources.

But researchers at the University of Cambridge have recently found that human-caused climate change could have “important consequences” for how volcanic gasses interact with the atmosphere.

As the atmosphere warms, plumes of ash emitted by large, infrequent volcanic eruptions rise even higher. Climate change also means that particles from these clouds could move from the tropics to higher latitudes.

The combined effect of this is that the haze caused by volcanic eruptions would block more sunlight, increasing the temporary cooling effect they normally have.

For smaller eruptions, however, the cooling effect could be reduced by around 75 per cent. This is because the warming atmosphere makes it difficult for volcanic plumes to reach the stratosphere where they have a longer-lasting effect on the climate.

“The effects of climate change and some of the feedback loops it can cause are becoming more obvious now,” says co-author Dr Anja Schmidt.

“But the climate system is complex: getting a grasp of all these feedback loops is critical to understanding our planet and making accurate climate projections.”

So can volcanoes help slow down climate change?

A recent study by scientists at the UK’s University of Southampton discovered that in the past, chains of volcanoes may have also acted as a “safety valve” for the Earth’s climate.

“It is a balancing act,” says Professor Martin Palmer, co-author of the study.

“On one hand, these volcanoes pumped out large amounts of CO2 that increased atmospheric CO2. On the other hand, these same volcanoes helped remove that carbon via rapid weathering reactions.”

These ‘weathering reactions’ are when rocks at the Earth’s surface naturally break down and dissolve. The elements that are produced, such as calcium and magnesium, then make their way to the ocean via rivers. It is here that they form the minerals which help lock up CO2.

**Warming causes extinction**

**Ramanathan et al. 17** [Veerabhadran Ramanathan is Victor Alderson Professor of Applied Ocean Sciences and director of the Center for Atmospheric Sciences at the Scripps Institution of Oceanography, University of California, San Diego, Dr. William Collins is an internationally recognized expert in climate modeling and climate change science. He is the Director of the Climate and Ecosystem Sciences Division (CESD) for the Earth and Environmental Sciences Area (EESA) at the Lawrence Berkeley National Laboratory (LBNL), Prof. Dr Mark Lawrence, Ph.D. is scientific director at the Institute for Advanced Sustainability Studies (IASS) in Potsdam, Örjan Gustafsson is a Professor in the Department of Environmental Science and Analytic Chemistry at Stockholm University, Shichang Kang is Professor, Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences (CAS); CAS Center for Excellence in Tibetan Plateau Earth Sciences, and Molina, M.J., Zaelke, D., Borgford-Parnell, N., Xu, Y., Alex, K., Auffhammer, M., Bledsoe, P., Croes, B., Forman, F., Haines, A., Harnish, R., Jacobson, M.Z., Lawrence, M., Leloup, D., Lenton, T., Morehouse, T., Munk, W., Picolotti, R., Prather, K., Raga, G., Rignot, E., Shindell, D., Singh, A.K., Steiner, A., Thiemens, M., Titley, D.W., Tucker, M.E., Tripathi, S., & Victor, D., authors come from the following 9 countries - US, Switzerland, Sweden, UK, China, Germany, Australia, Mexico, India, “Well Under 2 Degrees Celsius: Fast Action Policies to Protect People and the Planet from Extreme Climate Change,” Report of the Committee to Prevent Extreme Climate Change, September 2017, http://www.igsd.org/wp-content/uploads/2017/09/Well-Under-2-Degrees-Celsius-Report-2017.pdf] TDI

**Climate change is becoming an existential threat with warming in excess of 2°C within the next three decades and 4°C to 6°C within the next several decades. Warming of such magnitudes will expose as many as 75% of the world’s population to deadly heat stress in addition to disrupting the climate and weather worldwide. Climate change is an urgent problem requiring urgent solutions**. This paper lays out urgent and **practical solutions that are ready for implementation now, will deliver benefits in the next few critical decades**, and places the world on a path to achieving the longterm targets of the Paris Agreement and near-term sustainable development goals. The approach consists of four building blocks and 3 levers to implement ten scalable solutions described in this report by a team of climate scientists, policy makers, social and behavioral scientists, political scientists, legal experts, diplomats, and military experts from around the world. These solutions will enable society to decarbonize the global energy system by 2050 through efficiency and renewables, drastically reduce short-lived climate pollutants, and stabilize the climate well below 2°C both in the near term (before 2050) and in the long term (post 2050). It will also reduce premature mortalities by tens of millions by 2050. As an insurance against policy lapses, mitigation delays and faster than projected climate changes, the solutions include an Atmospheric Carbon Extraction lever to remove CO2 from the air. The amount of CO2 that must be removed ranges from negligible, if the emissions of CO2 from the energy system and SLCPs start to decrease by 2020 and carbon neutrality is achieved by 2050, to a staggering one trillion tons if the carbon lever is not pulled and emissions of climate pollutants continue to increase until 2030.

There are numerous living laboratories including 53 cities, many universities around the world, the state of California, and the nation of Sweden, who have embarked on a carbon neutral pathway. These laboratories have already created 8 million jobs in the clean energy industry; they have also shown that **emissions of greenhouse gases and air pollutants can be decoupled from economic growth**. Another favorable sign is that **growth rates of worldwide carbon emissions have reduced from 2.9% per year during the first decade of this century to 1.3% from 2011 to 2014 and near zero growth rates during the last few years. The carbon emission curve is bending, but we have a long way to go and very little time for achieving carbon neutrality**. We need institutions and enterprises that can accelerate this bending by scaling-up the solutions that are being proven in the living laboratories. We have less than a decade to put these solutions in place around the world to preserve nature and our quality of life for generations to come. The time is now.

The Paris Agreement is an historic achievement. For the first time, effectively all nations have committed to limiting their greenhouse gas emissions and taking other actions to limit global temperature change. Specifically, 197 nations agreed to hold “the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels,” and achieve carbon neutrality in the second half of this century.

**The climate has already warmed by 1°C. The problem is running ahead of us, and under current trends we will likely reach 1.5°C in the next fifteen years and surpass the 2°C guardrail by mid-century with a 50% probability of reaching 4°C by end of century**. Warming in excess of 3°C is likely to be a global catastrophe for three major reasons:

• **Warming in the range of 3°C to 5°C is suggested as the threshold for several tipping points in the physical and geochemical systems; a warming of about 3°C has a probability of over 40% to cross over multiple tipping points, while a warming close to 5°C increases it to nearly 90%**

**, compared with a baseline warming of less than 1.5°C, which has only just over a 10% probability of exceeding any tipping point.**

**• Health effects of such warming are emerging as a major if not dominant source of concern. Warming of 4°C or more will expose more than 70% of the population, i.e. about 7 billion by the end of the century, to deadly heat stress and expose about 2.4 billion to vector borne diseases such as Dengue, Chikengunya, and Zika virus among others**. Ecologists and paleontologists have proposed that warming in excess of 3°C, accompanied by increased acidity of the oceans by the buildup of CO2 , can become a major causal factor for exposing more than 50% of all species to extinction. 20% of species are in danger of extinction now due to population, habitat destruction, and climate change.

The good news is that **there may still be time to avert such catastrophic changes**. The Paris Agreement and **supporting climate policies must be strengthened substantially within the next five years to bend the emissions curve down faster, stabilize climate, and prevent catastrophic warming**. To the extent those efforts fall short, societies and **ecosystems will be forced to contend with substantial needs for adaptation—a burden that will fall disproportionately on the poorest three billion who are least responsible for causing the climate change problem.**

Here we propose a policy roadmap with a realistic and reasonable chance of limiting global temperature to safe levels and preventing unmanageable climate change—an outline of specific science-based policy pathways that serve as the building blocks for a three-lever strategy that could limit warming to well under 2°C. The projections and the emission pathways proposed in this summary are based on a combination of published recommendations and new model simulations conducted by the authors of this study (see Figure 2). We have framed the plan in terms of four building blocks and three levers, which are implemented through 10 solutions. The first building block would be fully implementing the nationally determined mitigation pledges under the Paris Agreement of the UN Framework Convention on Climate Change (UNFCCC). In addition, several sister agreements that provide targeted and efficient mitigation must be strengthened. Sister agreements include the Kigali Amendment to the Montreal Protocol to phase down HFCs, efforts to address aviation emissions through the International Civil Aviation Organization (ICAO), maritime black carbon emissions through the International Maritime Organization (IMO), and the commitment by the eight countries of the Arctic Council to reduce black carbon emissions by up to 33%. There are many other complementary processes that have drawn attention to specific actions on climate change, such as the Group of 20 (G20), which has emphasized reform of fossil fuel subsidies, and the Climate and Clean Air Coalition (CCAC). HFC measures, for example, can avoid as much as 0.5°C of warming by 2100 through the mandatory global phasedown of HFC refrigerants within the next few decades, and substantially more through parallel efforts to improve energy efficiency of air conditioners and other cooling equipment potentially doubling this climate benefit.

For the second building block, numerous subnational and city scale climate action plans have to be scaled up. One prominent example is California’s Under 2 Coalition signed by over 177 jurisdictions from 37 countries in six continents covering a third of world economy. The goal of this Memorandum of Understanding is to catalyze efforts in many jurisdictions that are comparable with California’s target of 40% reductions in CO2 emissions by 2030 and 80% reductions by 2050—emission cuts that, if achieved globally, would be consistent with stopping warming at about 2°C above pre-industrial levels. Another prominent example is the climate action plans by over 52 cities and 65 businesses around the world aiming to cut emissions by 30% by 2030 and 80% to 100% by 2050. There are concerns that the carbon neutral goal will hinder economic progress; however, real world examples from California and Sweden since 2005 offer evidence that economic growth can be decoupled from carbon emissions and the data for CO2 emissions and GDP reveal that growth in fact prospers with a green economy.

The third building block consists of two levers that we need to pull as hard as we can: one for drastically reducing emissions of short-lived climate pollutants (SLCPs) beginning now and completing by 2030, and the other for decarbonizing the global energy system by 2050 through efficiency and renewables. Pulling both levers simultaneously can keep global temperature rise below 2°C through the end of the century. If we bend the CO2 emissions curve through decarbonization of the energy system such that global emissions peak in 2020 and decrease steadily thereafter until reaching zero in 2050, there is less than a 20% probability of exceeding 2°C. This call for bending the CO2 curve by 2020 is one key way in which this report’s proposal differs from the Paris Agreement and it is perhaps the most difficult task of all those envisioned here. Many cities and jurisdictions are already on this pathway, thus demonstrating its scalability. Achieving carbon neutrality and reducing emissions of SLCPs would also drastically reduce air pollution globally, including all major cities, thus saving millions of lives and over 100 million tons of crops lost to air pollution each year. In addition, these steps would provide clean energy access to the world’s poorest three billion who are still forced to resort to 18th century technologies to meet basic needs such as cooking. For the fourth and the final building block, we are adding a third lever, ACE (Atmospheric Carbon Extraction, also known as Carbon Dioxide Removal, or “CDR”). This lever is added as an insurance against surprises (due to policy lapses, mitigation delays, or non-linear climate changes) and would require development of scalable measures for removing the CO2 already in the atmosphere. The amount of CO2 that must be removed will range from negligible, if the emissions of CO2 from the energy system and SLCPs start to decrease by 2020 and carbon neutrality is achieved by 2050, to a staggering one trillion tons, if CO2 emissions continue to increase until 2030, and the carbon lever is not pulled until after 2030. This issue is raised because the NDCs (Nationally Determined Contributions) accompanying the Paris Agreement would allow CO2 emissions to increase until 2030. We call on economists and experts in political and administrative systems to assess the feasibility and cost-effectiveness of reducing carbon and SLCPs emissions beginning in 2020 compared with delaying it by ten years and then being forced to pull the third lever to extract one trillion tons of CO2

The fast mitigation plan of requiring emissions reductions to begin by 2020, which means that many countries need to cut now, is urgently needed to limit the warming to well under 2°C. Climate change is not a linear problem. Instead, we are facing non-linear climate tipping points that can lead to self-reinforcing and cascading climate change impacts. Tipping points and selfreinforcing feedbacks are wild cards that are more likely with increased temperatures, and many of the potential abrupt climate shifts could happen as warming goes from 1.5°C in 15 years to 2°C by 2050, with the potential to push us well beyond the Paris Agreement goals.

Where Do We Go from Here?

**A massive effort will be needed to stop warming at 2°C, and time is of the essence. With unchecked business-as-usual emissions, global warming has a 50% likelihood of exceeding 4ºC and a 5% probability of exceeding 6ºC in this century, raising existential questions for most, but especially the poorest three billion people. A 4ºC warming is likely to expose as many as 75% of the global population to deadly heat.** Dangerous to catastrophic impacts on the health of people including generations yet to be born, on the health of ecosystems, and on species extinction have emerged as major justifications for mitigating climate change well below 2ºC, although we must recognize that the uncertainties intrinsic in climate and social systems make it hard to pin down exactly the level of warming that will trigger possibly catastrophic impacts. To avoid these consequences, we must act now, and we must act fast and effectively. This report sets out a specific plan for reducing climate change in both the near- and long-term. With aggressive urgent actions, we can protect ourselves. Acting quickly to prevent catastrophic climate change by decarbonization will save millions of lives, trillions of dollars in economic costs, and massive suffering and dislocation to people around the world. This is a global security imperative, as it can avoid the migration and destabilization of entire societies and countries and reduce the likelihood of environmentally driven civil wars and other conflicts.

Staying well under 2°C will require a concerted global effort. We must address everything from our energy systems to our personal choices to reduce emissions to the greatest extent possible. We must redouble our efforts to invent, test, and perfect systems of governance so that the large measure of international cooperation needed to achieve these goals can be realized in practice. The health of people for generations to come and the health of ecosystems crucially depend on an energy revolution beginning now that will take us away from fossil fuels and toward the clean renewable energy sources of the future. It will be nearly impossible to obtain other critical social goals, including for example the UN agenda 2030 with the Sustainable Development Goals, if we do not make immediate and profound progress stabilizing climate, as we are outlining here.

1. The Building Blocks Approach The 2015 Paris Agreement, which went into effect November 2016, is a remarkable, historic achievement. For the frst time, essentially all nations have committed to limit their greenhouse gas emissions and take other actions to limit global temperature and adapt to unavoidable climate change. Nations agreed to hold “the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels” and “achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century” (UNFCCC, 2015). Nevertheless, the initial Paris Agreement has to be strengthened substantially within fve years if we are to prevent catastrophic warming; **current pledges place the world on track for up to 3.4°C by 2100 (UNEP, 2016b). Until now, no specifc policy roadmap exists that provides a realistic and reasonable chance of limiting global temperatures to safe levels and preventing unmanageable climate change**. This report is our attempt to provide such a plan— an outline of specifc solutions that serve as the building blocks for a comprehensive strategy for limiting the warming to well under 2°C and avoiding dangerous climate change (Figure 1). The frst building block is the full implementation of the nationally determined mitigation pledges under the Paris Agreement of the UN Framework Convention on Climate Change (UNFCCC) and strengthening global sister agreements, such as the Kigali Amendment to the Montreal Protocol to phase down HFCs, which can provide additional targeted, fast action mitigation at scale. For the second building block, numerous sub-national and city scale climate action plans have to be scaled up such as California’s Under 2 Coalition signed by 177 jurisdictions from 37 countries on six continents. The third building block is targeted measures to reduce emissions of shortlived climate pollutants (SLCPs), beginning now and fully implemented by 2030, along with major measures to fully decarbonize the global economy, causing the overall emissions growth rate to stop in 2020-2030 and reach carbon neutrality by 2050. Such a deep decarbonization would require an energy revolution similar to the Industrial Revolution that was based on fossil fuels. The fnal building block includes scalable and reversible carbon dioxide (CO2 ) removal measures, which can begin removing CO2 already emitted into the atmosphere. Such a plan is urgently needed. Climate change is not a linear problem. Instead, climate tipping points can lead to self-reinforcing, cascading climate change impacts (Lenton et al., 2008). Tipping points are more likely with increased temperatures, and many of the potential abrupt climate shifts could happen as warming goes from 1.5°C to 2°C, with the potential to push us well beyond the Paris Agreement goals (Drijfhout et al., 2015). In order to avoid dangerous climate change, we must address these concerns. **We must act now, and we must act fast. Reduction of SLCPs will result in fast, near-term reductions in warming, while present-day reductions of CO2 will result in long-term climate benefts**. This two-lever approach—aggressively cutting both SLCPs and CO2 –-will slow warming in the coming decades when it is most crucial to avoid impacts from climate change as well as maintain a safe climate many decades from now. To achieve the nearterm goals, we have outlined solutions to be implemented immediately. These solutions to bend down the rising emissions curve and thus bend the warming trajectory curve follow a 2015 assessment by the University of California under its Carbon Neutrality Initiative (Ramanathan et al., 2016). The solutions are clustered into categories of social transformation, governance improvement, market- and regulation-based solutions, technological innovation and transformation, and natural and ecosystem management. Additionally, we need to intensely investigate and pursue a third lever—ACE (Atmospheric Carbon Extraction). While many potential technologies exist, we do not know the extent to which they could be scaled up to remove the requisite amount of carbon from the atmosphere in order to achieve the Paris Agreement goals, and any delay in mitigation will demand increasing reliance on these technologies. Yet, there is still hope. Humanity can come together, as we have done in the past, to collaborate towards a common goal. We have no choice but to tackle the challenge of climate change. We only have the choice of when and how: **either now, through the ambitious plan outlined here, or later, through radical adaptation and societal transformations in response to an ever-deteriorating climate system that will unleash devastating impacts—some of which may be beyond our capacity to fully adapt to or reverse for thousands of years.**

2. Major Climate Disruptions: How Soon and How Fast? “Without adequate mitigation and adaptation, climate change poses unacceptable risks to global public health.” (WHO, 2016)

The planet has already witnessed nearly 1°C of warming, and another 0.6°C of additional warming is currently stored in the ocean to be released over the next two to four decades, if climate warming emissions are not radically reduced during that time (IPCC, 2013). The impacts of this warming on extreme weather, droughts, and foods are being felt by society worldwide to the extent that many think of this no longer as climate change but as climate disruption. Consider the business as usual scenario:

15 years from now: In 15 years, planetary warming will reach 1.5°C above pre-industrial global mean temperature (Ramanathan and Xu, 2010; Shindell et al., 2012). This exceeds the 0.5°C to 1°C of warming during the Eemian period, 115,000– 130,000 years ago, when sea-levels reached 6-9 meters (20-30 feet) higher than today (Hansen et al., 2016b). The impacts of this warming will affect us all yet will disproportionately affect the Earth’s poorest three billion people, who are primarily subsistence farmers that still rely on 18th century technologies and have the least capacity to adapt (IPCC, 2014a; Dasgupta et al., 2015). They thus may be forced to resort to mass migration into city slums and push across international borders (U.S. DOD, 2015). The existential fate of lowlying small islands and coastal communities will also need to be addressed, as they are primarily vulnerable to sea-level rise, diminishing freshwater resources, and more intense storms. In addition, many depend on fsheries for protein, and these are likely to be affected by ocean acidifcation and climate change. Climate injustice could start causing visible regional and international conficts. All of this will be exacerbated as the risk of passing tipping points increases (Lenton et al., 2008).

30 years from now: By mid-century, warming is expected to exceed 2°C, which would be unprecedented with respect to historical records of at least the last one million years (IPCC, 2014c). Such a warming through this century could result in sea-level rise of as much as 2 meters by 2100, with greater sea-level rise to follow. A group of tipping points are clustered between 1.5°C and 2°C (Figure 2) (Drijfhout et al., 2015). The melting of most mountain glaciers, including those in the Tibetan-Himalayas, combined with mega-droughts, heat waves, storms, and foods, would adversely affect nearly everyone on the planet.

80 years from now: In 80 years, warming is expected to exceed 4°C, increasing the likelihood of irreversible and catastrophic change (World Bank, 2013b). 4ºC warming is likely to expose as much as 75% of the global population to deadly heat (Mora et al., 2017). The 2°C and 4°C values quoted above and in other reports, however, are merely the central values with a 50% probability of occurrence (Ramanathan and Feng, 2008). There is a 5% probability the warming could be as high as 6°C due to uncertainties in the magnitude of amplifying feedbacks (see Section 4). This in turn could lead to major disruptions to natural and social systems, threatening food security, water security, and national security and fundamentally affecting the great majority of the projected 11.2 billion inhabitants of the planet in 2100 (UN DESA, 2015).

3. What Are the Wild Cards for Climate Disruption? Increasing the concentrations of greenhouse gases in the atmosphere increases radiative forcing (the difference between the amount of energy entering the atmosphere and leaving) and thus increases the global temperature (IPCC, 2013). However, climate wild cards exist that can alter the linear connection with warming and anthropogenic emissions by triggering abrupt changes in the climate (Lenton et al., 2008). Some of these wild cards have not been thoroughly captured by the models that policymakers rely on the most. These abrupt shifts are irreversible on a human time scale (<100 years) and will create a notable disruption to the climate system, condemning the world to warming beyond that which we have previously projected. These climate disruptions would divert resources from needed mitigation and upset mitigation strategies that we have already put in place.

1. Unmasking Aerosol Cooling: The frst such wild card is the unmasking of an estimated 0.7°C (with an uncertainty range of 0.3°C to 1.2°C) of the warming in addition to mitigating other aerosol effects such as disrupting rainfall patterns, by reducing emissions of aerosols such as sulfates and nitrates as part of air pollution regulations (Wigley, 1991; Ramanathan and Feng, 2008). Aerosol air pollution is a major health hazard with massive costs to public health and society, including contributing to about 7 million deaths (from household and ambient exposure) each year (WHO, 2014). While some aerosols, such as black carbon and brown carbon, strongly absorb sunlight and warm the climate, others refect sunlight back into space, which cools the climate (Ramanathan and Carmichael, 2008). The net impact of all manmade aerosols is negative, meaning that about 30% of the warming from greenhouse gases is being masked by co-emitted air pollution particles (Ramanathan and Carmichael, 2008). As we reduce greenhouse gas emissions and implement policies to eliminate air pollution, we are also reducing the concentration of aerosols in the air. Aerosols last in the atmosphere for about a week, so if we eliminate air pollution without reducing emissions of the greenhouse gases, the unmasking alone would lead to an estimated 0.7°C of warming within a matter of decades (Ramanathan and Feng, 2008). We must eliminate all aerosol emissions due to their health effects, but we must simultaneously mitigate emissions of CO2 , other greenhouse gases, and black carbon and co-pollutants to avoid an abrupt and very large jump in the near-term warming beyond 2°C (Brasseur and Roeckner, 2005).

2. Tipping Points**: It is likely that as we cross the 1.5°C to 2°C thresholds we will trigger so called “tipping points” for abrupt and nonlinear changes in the climate system with catastrophic consequences** for humanity and the environment (Lenton, 2008; Drijfhout et al., 2015). Once the tipping points are passed, the resulting impacts will range in timescales from: disruption of monsoon systems (transition in a year), loss of sea ice (approximately a decade for transition), dieback of major forests (nearly half a century for transition), reorganization of ocean circulation (approximately a century for transition), to loss of ice sheets and subsequent sea-level rise (transition over hundreds of years) (Lenton et al., 2008). Regardless of timescale, once underway many of these changes would be irreversible (Lontzek et al., 2015). There is also a likelihood of crossing over multiple tipping points simultaneously. Warming of close to 3°C would subject the system to a 46% probability of crossing multiple tipping points, while warming of close to 5°C would increase the risk to 87% (Cai et al., 2016). Recent modeling work shows a “cluster” of these tipping points could be triggered between 1.5°C and 2°C warming (Figure 2), including melting of land and sea ice and changes in highlatitude ocean circulation (deep convection) (Drijfhout et al., 2015). This is consistent with existing observations and understanding that the polar regions are particularly sensitive to global warming and have several potentially imminent tipping points. The Arctic is warming nearly twice as quickly as the global average, which makes the abrupt changes in the Arctic more likely at a lower level of global warming (IPCC, 2013). Similarly, the Himalayas are warming at roughly the same rate as the Arctic and are thus also more susceptible to incremental changes in temperature (UNEP-WMO, 2011). This gives further justifcation for limiting warming to no more than 1.5°C.

While all climate tipping points have the potential to rapidly destabilize climate, social, and economic systems, some are also **self-amplifying feedbacks that once set in motion increase warming in such a way that they perpetuate yet even more warming. Declining Arctic sea ice, thawing permafrost, and the poleward migration of cloud systems are all examples of self-amplifying feedback mechanisms, where initial warming feeds upon itself to cause still more warming acting as a force multiplier (Schuur et al., 2015).**

#### Russia’s economy is irreparably damaged –

**Friedman 4/6** [(George Friedman - US geopolitical forecaster and strategists on international affairs) “Opinion: Russia is the world’s biggest loser from oil’s crash, and that’s reason to worry,” Market Watch. 4-26-2020] LM

At **issue for Russia is the collapse of oil prices** US:CLM20 CL.1, 1.36%    BRN00, 1.36%  . **A country that depends so heavily on any one commodity,** as Russia does, will always be vulnerable. Since the price of commodities is inherently volatile, determined as it is by the robustness of industrial powers, **the exporter can neither control the price nor have an opportunity to generate investment capital on a systematic basis.**

**There was a time when Russia could use energy sales** — or energy embargoes, as the case may be **— to make Europe tremble. But now the world is awash in energy**, and **Russia’s recent effort**s to reach an entente with the Saudis **failed to support oil prices.** The Russians have floated conspiracy theories of U.S. and Saudi collaboration designed to cripple the Russian economy with low energy prices and few markets, but that assumes that any conspiracy would need to lower prices. **The supply of energy has surged, largely because of the U.S. energy sector, and demand did not keep up.**

The price of oil already was declining, but now the price has collapsed because of the coronavirus pandemic. The contraction of the global economy inevitably decreased the need for energy. Attempts by OPEC, an organization that in truth is irrelevant to today’s realities, to raise prices have failed. In the 1970s, demand surged and OPEC could manage the supply. Some among us will recall the Arab oil embargo, which defined the 1970s and was the opportunity for countries like the Soviet Union and Iran to create modern economies. The oil producers assumed that their power, and therefore income, would be permanent. But high prices generated a search for new sources of oil and gas, as well as new efficiencies in energy use, and the price fell dramatically in the 1980s.

Now, the Soviet Union fell for many reasons — inefficiency and corruption had been mainstays of the system for decades — but things changed in the 1980s. For one, defense budgets soared as Moscow tried to keep pace with U.S. military development, particularly the legendary Star Wars project, as much legend as a project. For another, the price of energy fell, and the Russians were heavily dependent on energy sales. Russia was caught in a vise between defense spending and falling energy prices, and this ultimately undermined the basis of the Soviet Union.

After the fall of the Soviet Union in 1991, Russia faced the old challenge of building a modern economy rather than a Potemkin village of modernity. The first decade after the fall was chaotic as investment bankers and oligarchs appropriated the wealth under the banner of privatization. The emergence of Vladimir Putin, the former KGB agent who was tied into the oligarchy, should have led to a surge of modernization. Energy prices were reasonably high, and investment capital for a modern economy could, in theory, have been created.

Instead, investment capital was diverted for profit and safety outside of Russia, and Putin, who depended on the oligarchs for his power, could not do what he knew had to be done. Over time, his power surged and investment was possible, but as the process began to accelerate, the price of energy declined and with it the foundation for investment. In the past few days, it has totally evaporated.

**Russia’s challenge is not building a new generation of hypersonic missiles,** nor investing in advanced technologies. Russia’s challenge now is to avoid collapse. **The Russian budget is distributed among its constituent regions,** which pay the teachers and doctors and firemen. But **with the decline of energy prices, Russia’s budget declines,** and as it declines, **the regions contract.** Russia, a Third World country, has few counters to low energy prices.

#### Russian econ decline checks Russian aggression

Jeff D. Colgan 14 [(Jeff D. Colgan, assistant professor in the School of International Service at American University in Washington, D.C.) Petro-aggression: How Russia’s oil makes war more likely, Washington Post 4-1-2014] SJDI

The third storyline is the most important yet most neglected: Russia’s resource curse. Russia’s energy revenues (from both oil and gas) have ensconced Vladimir Putin as an autocrat and given him a free hand in foreign policy. Russia is so heavily dependent on its energy revenues that it is a classic petrostate, making it more susceptible to corruption, autocracy and violent conflict. Russia’s incursion into Crimea can be seen as a close cousin of petro-aggression. A state is more likely to instigate international conflict when it has a combination of (a) oil income and (b) a leader with aggressive preferences. A lot more likely: 250 percent more military conflict than a typical non-petrostate, on average. Oil income means more military spending, increasing the state’s scope for potential conflicts. Even more importantly, it distorts the domestic politics of the state, reducing the leader’s domestic political risk from military adventurism and aggressive foreign policy. In my book on petro-aggression, I argued that revolutionary leaders are systematically more likely to have aggressive preferences (e.g., Qaddafi, Hussein and Khomeini). Putin is not a revolutionary leader, but that is not a necessary condition for having aggressive preferences. He has repeatedly avowed a hard-nosed, realpolitik view of the world. He has repeatedly asserted his ambition to return Russia to its status as a superpower of the first rank. It seems plausible to view Putin as an aggressive leader. So we ought to be wary when he lines up military forces next to the Ukrainian border.

Here lies the real risk of Europe’s energy situation: So long as it continues to buy Russian oil and gas, it is sending massive amounts of cash to a neighboring dictator. By keeping the taps on, Putin consolidates his power as Russian dictator. What does all this imply for European and American energy policy? Any major changes to Ukraine or Europe’s natural gas consumption would involve infrastructure investments that will play out over years or decades. So we should be skeptical that energy policy can be used as a short-term solution to the crisis: Shale gas from the U.S. is not going solve anything in Ukraine just now. But energy policy is important for the long term. America and especially Europe should have a hard look at managing their reliance on fossil fuels. Diversifying away from fossil fuels would bring security benefits (in addition to some obvious environmental ones), in part by reducing the money sent to petrostates like Russia. For Europe, this means more openness to civilian nuclear power as a source of energy that is less bad than the alternatives. At the very least, natural gas could be managed with a better pipeline infrastructure to prevent Russia from embargoing individual European countries. In short, Europeans should get serious about an energy policy that is consistent with their political and environmental values. In doing so, they can help wean Russia off its energy income, and thereby reduce its leader’s scope for autocracy at home and belligerence abroad.\*9

#### Lunar basing creates a search for extraterrestrial life— immac reads yellow

Green 10, David A. "How the UK can lead the terrestrial translation of biomedical advances arising from lunar exploration activities." Earth, Moon, and Planets 107.1 (2010): 127-146. (Programme Director, Space Physiology & Health MSc at Kings College London)//Elmer

Space-faring nations have accumulated much knowledge regarding the acute changes associated with microgravity in human and non-human organisms (Cle´ment and Slenzka 2006). Numerous methods and countermeasures have been devised to ameliorate such changes in an attempt to preserve astronaut and mission capability (Garshnek 1989; Williams 2003). Furthermore, research within the space environment has provided unique insights into areas as diverse as gene expression (e.g. Cogoli and Cogoli-Greuter 1997), immunology (Sonnenfeld and Shearer 2002; Borchers et al. 2002), wound healing (Davidson et al. 1999), bone physiology (e.g. Turner 2000; Vico et al. 2000), musculoskeletal (Narici and de Boer 2010) and cardiovascular regulation (reviews; Hargens and Richardson 2009; Hughson 2009), angiogenesis (Radek et al. 2008), circadian/sleep rhythm and performance (Mallis and DeRoshia 2005) in addition to sensory-motor function (e.g. Kalb and Solomon 2007; Souvestre et al. 2008). ISS studies have shown how fundamental gravity is for functional development (Temple et al. 2002), although most of the work refers to mammalian, or in a broader context, animal development, rather than that of humans, about which we know extremely little in a space environment. It has also provided insights into how we perceive the world around us, and ourselves within it (Lipshits et al. 2005). Intriguingly, whilst ‘normal’ earthbound physiology appears in the main to be negatively affected by a reduction in gravity, viral virulence of certain human pathogenic bacteria increases when compared to their ground based control groups (Wilson et al. 2007). Such findings are not only fascinating but provide a bridge between medicine and biomedical research, and also between space biomedicine and other areas of space biology, including astrobiology. Terrestrial applications of prolonged space environment exposure that the lunar surface offers insights for issues ranging from cardiovascular pathology, e.g. orthostatic intolerance, ageing/disuse/spinal cord (Edgerton et al. 2000; Pavy-Le Traon et al. 2007) pathology such as osteoporosis, falls risk (Cle´ment et al. 2005), radiation/cancer risk, psychology of the individual and the group, human factors and medical devices such as healthcare extension technologies. Space biomedicine has also helped and has the potential to further aid people living in developing countries, for example through telemedicine. Furthermore, space biomedicine has much to tell us about the major causes of mortality in the developed world (Mortimer et al. 2009), such as the metabolic syndrome and cardiovascular disease. It also provides useful models of individualised medicine (Kalow 2002), including pharmacogenetics and genetic-lifestyle interactions (Mattick 2003). In particular, the radiation environment of the Moon could provide unprecedented opportunities for fundamental research in the field of radiation biology (Gridley et al. 2009) and carcinogenesis (Rykova et al. 2008) not possible on Earth (ESA 1992). Whilst ISS has been an undoubted geopolitical success, significant biomedical insights have only recently started to accrue. Key factors include the limited number of astronauts and the high degree of control individual Agency’s maintain, which often results in differential countermeasure adoption. As a consequence, determination of both the true nature of space-related physiological insults, and thus the optimal countermeasures that should be adopted is far from complete (e.g. Cavanagh et al. 2005). Issues surrounding partial gravity are even more unclear and potentially more enlightening than microgravity in terms of biological mechanisms. As such Lunar exploration is emerging as a potential destination to learn about life beyond Earth and to further explore the solar system via a combination of collaboration and competition among space-faring nations (Space report 2009). The Moon of today appears far more viable as a location than it appeared during Apollo missions. For instance, evidence of ice deposits have been discovered within polar craters, which may provide liquid water for colonists and their hydroponic crops and those constituents may be converted into rocket fuel. Such a tightly controlled (and controllable) environment (if sustainable) could be particularly useful in the investigation of countermeasure interaction such as diet/nutritional supplementation and exercise (Convertino 2002). Although subject numbers would initially be low, high levels of motivation and extensive remote monitoring (telemedicine) would facilitate excellent long-term adherence. Space (and thus lunar) habitation has been suggested as a model of ‘accelerated’ ageing (Vernikos and Schneider 2010) and/or disuse pathology (Elmann-Larsen and Schmitt 2003) in view of the resultant similarities including loss of bone density, muscle volume/ strength and cardiorespiratory de-conditioning. As a society we have the moral, social and economic imperative to keep our citizens alive and functional. However, the number of over 60s is forecast to be 1.25 billion by 2025, of which most will suffer at least one chronic disease and 50% two or more, typically complex, challenging and resource intensive. For instance, the US expends 75% of its healthcare resources upon chronic, and 90% upon age-related conditions. Within Europe, 37% have at least one chronic condition, accounting for 77% of the total disease burden, 86% of all deaths, and 70% percent of total health expenditure, particularly expensive if poorly managed. Therefore, similarities to terrestrial medicine and their ‘accelerated’ nature renders lunar space biomedicine the opportunity to offer substantial terrestrial returns in terms of knowledge, health and wellbeing and economic development.

#### Space exploration causes global war— miscalc, AI, ecological damage

Morton 18 [(Adam, a retired philosopher attached to the University of British Columbia. He is a philosophical generalist with a particular interest in issues about knowledge and about how people understand one another.) “Colonizing Other Planets Could Trigger War on Earth,” Newsweek, 11/22/21. <https://www.newsweek.com/colonizing-other-planets-could-trigger-war-earth-and-ecological-disaster-1226630>] RR

Plans for the exploration and even colonization of other planets are very much in the air, and getting to Mars in particular has become a billionaire's hobby lately. Elon Musk would like to establish a human colony on Mars in a matter of decades. (For the foreseeable future—a century, I would venture—Mars will be the only real possibility.) But planetary colonies may be a bad idea, even a disastrous idea. So, it is important to see the arguments against them, as well as their appeal. I begin with a reason that is sometimes made central to proposals for colonies—the idea that we should achieve them as soon as it is feasible.

It is a call for escape from imminent danger. The idea is that nuclear war, ecological catastrophe, or the rise of artificially intelligent robots, will wipe out humans on Earth. But a colony far away might survive, so that the species continues. Stephen Hawking is among those who have argued, or usually just pronounced, for versions of this (and if you want scientific authority, it is hard to do better). But the idea has serious flaws. It is hard to think of even a post-apocalyptic Earth that is less hospitable to any terrestrial life than Mars, let alone elsewhere in the solar system, so the challenges are enormous. But let us ignore that. Suppose that a colony had a reasonable chance of surviving, would the argument from danger justify founding it soon? I think not.

One danger is nuclear and biological war: One nation or ethnic group fears or hates another enough to unleash bombs or viruses. In a bad scenario they succeed. Millions die, and their territory becomes uninhabitable. In the worst scenario, the other side retaliates or the affliction spreads and eventually everyone is dead. But people survive on Mars. Which people? They will include members of one group or their opponents, so if the aim really is to wipe out this group it will be directed at the colonists as well. They are hated, and they are capable of retaliation. Bomb-bearing rockets are much simpler to make than people-bearing rockets. And someone crazy enough to push the button would be crazy enough to direct them at the hated enemy wherever they are found. So, the colony would not be safe. At any rate, it will not be not safe enough that founding it is a better bet than making war less likely on Earth. Worse, any nation party to founding a colony will arouse suspicion in its enemies that it is scheming to start and survive a war. And this makes war more rather than less likely.

Another danger is the rise of smart robots. But again, there is no escape in space. Space travel and running a colony use as much computation as they can get. This was true of the moon landings and it is even truer now. Human beings have an essential role in plans and design, but on the trip itself they are mostly just going along for the ride. So, imagine, just for the sake of argument, that hyper-calculating artificial intelligences are in a position to threaten human civilization. The extension of that civilization on another planet relies even more on those very powers, which will have to be networked to earthly computation. If mere humans can hack into machinery in targeted countries to disrupt them, then these super-capable but malevolent AIs will have no problem. Whatever their "motives," these will be the same elsewhere as on earth, and space is less of an obstacle to the flow of (mis)information and commands than to the flow of people and physical objects. No safety there.

The third danger is ecological. We are ruining the climate and polluting the oceans. We could develop technology that mitigated or even reversed the dangers. It would be easier than developing technology for surviving on Mars, where we must grow food and create oxygen in a very cold and dark environment without much protection from radiation and a limited supply of water. Moreover, getting enough people to Mars to make a colony that could survive without help from home, self-sufficient technologically and with enough genetic diversity that our already rather uniform species would have a future, would involve a lot of rockets. Musk talks in terms of 10,000 flights, although some plans require more. And this would be just to get things started. We just do not know what the impact on the earth and its atmosphere of the launches and the prior manufacturing would be. It would not be positive, at any rate. And industrial power and scientific brains would be diverted away from the needs of earth to the well-being of the colony. It is not what we need; you would only think that we could afford it if you were blind to how desperate things really are. So again, the colony solution is likely to make the earthly situation even more dire.

#### AI causes extinction.

Bilton 14’ [(Nick, a Special Correspondent for Vanity Fair, where he writes about technology, politics, business and culture. A columnist and reporter for The New York Times for over a decade, Bilton is a bestselling author, screenwriter, CNBC contributor and host of the Vanity Fair podcast, Inside the Hive.) Internally cites Bostrom (Nick, Professor, University of Oxford, Director, Future of Humanity Institute, Director, Governance of AI program) Musk (Elon, South African entrepreneur Elon Musk is known for founding Tesla Motors and SpaceX, which launched a landmark commercial spacecraft in 2012.) Hawking (Steven, an English theoretical physicist, cosmologist, and author who was director of research at the Centre for Theoretical Cosmology at the University of Cambridge at the time of his death.) Docherty (Bonnie, a lecturer on law at Harvard University and a senior researcher at Human Rights Watch) Hassabis (Demis, founder and chief executive of DeepMind) “Artificial Intelligence as a Threat” The New York Times 11/5/2014] BC

Ebola sounds like the stuff of nightmares. Bird flu and SARS also send shivers down my spine. But I’ll tell you what scares me most: artificial intelligence.

The first three, with enough resources, humans can stop. The last, which humans are creating, could soon become unstoppable.

Before we get into what could possibly go wrong, let me first explain what artificial intelligence is. Actually, skip that. I’ll let someone else explain it: Grab an iPhone and ask Siri about the weather or stocks. Or tell her “I’m drunk.” Her answers are artificially intelligent.

Right now these artificially intelligent machines are pretty cute and innocent, but as they are given more power in society, these machines may not take long to spiral out of control.

In the beginning, the glitches will be small but eventful. Maybe a rogue computer momentarily derails the stock market, causing billions in damage. Or a driverless car freezes on the highway because a software update goes awry.

But the upheavals can escalate quickly and become scarier and even cataclysmic. Imagine how a medical robot, originally programmed to rid cancer, could conclude that the best way to obliterate cancer is to exterminate humans who are genetically prone to the disease.

Nick Bostrom, author of the book “Superintelligence,” lays out a number of petrifying doomsday settings. One envisions self-replicating nanobots, which are microscopic robots designed to make copies of themselves. In a positive situation, these bots could fight diseases in the human body or eat radioactive material on the planet. But, Mr. Bostrom says, a “person of malicious intent in possession of this technology might cause the extinction of intelligent life on Earth.”

Artificial-intelligence proponents argue that these things would never happen and that programmers are going to build safeguards. But let’s be realistic: It took nearly a half-century for programmers to stop computers from crashing every time you wanted to check your email. What makes them think they can manage armies of quasi-intelligent robots?

I’m not alone in my fear. Silicon Valley’s resident futurist, Elon Musk, recently said artificial intelligence is “potentially more dangerous than nukes.” And Stephen Hawking, one of the smartest people on earth, wrote that successful A. I. “would be the biggest event in human history.

Unfortunately, it might also be the last.” There is a long list of computer experts and science fiction writers also fearful of a rogue robot-infested future.

Two main problems with artificial intelligence lead people like Mr. Musk and Mr. Hawking to worry. The first, more near-future fear, is that we are starting to create machines that can make decisions like humans, but these machines [don’t have morality](http://ethicbots.na.infn.it/meetings/kom/veruggio.pdf) and likely never will.

The second, which is a longer way off, is that once we build systems that are as intelligent as humans, these intelligent machines will be able to build smarter machines, often referred to as superintelligence. That, experts say, is when things could really spiral out of control as the rate of growth and expansion of machines would increase exponentially. We can’t build safeguards into something that we haven’t built ourselves.

“We humans steer the future not because we’re the strongest beings on the planet, or the fastest, but because we are the smartest,” said James Barrat, author of “Our Final Invention: Artificial Intelligence and the End of the Human Era.” “So when there is something smarter than us on the planet, it will rule over us on the planet.”

What makes it harder to comprehend is that we don’t actually know what superintelligent machines will look or act like. “Can a submarine swim? Yes, but it doesn’t swim like a fish,” Mr. Barrat said. “Does an airplane fly? Yes, but not like a bird. Artificial intelligence won’t be like us, but it will be the ultimate intellectual version of us.”

Perhaps the scariest setting is how these technologies will be used by the military. It’s not hard to imagine countries engaged in an arms race to build machines that can kill.

Bonnie Docherty, a lecturer on law at Harvard University and a senior researcher at Human Rights Watch, said that the race to build autonomous weapons with artificial intelligence — which is already underway — is reminiscent of the early days of the race to build nuclear weapons, and that treaties should be put in place now before we get to a point where machines are killing people on the battlefield.

“If this type of technology is not stopped now, it will lead to an arms race,” said Ms. Docherty, who has written several reports on the dangers of killer robots. “If one state develops it, then another state will develop it. And machines that lack morality and mortally should not be given power to kill.”

So how do we ensure that all these doomsday situations don’t come to fruition? In some instances, we likely won’t be able to stop them.

But we can hinder some of the potential chaos by following the lead of Google. Earlier this year when the search-engine giant acquired DeepMind, a neuroscience-inspired, artificial intelligence company based in London, the two companies put together an artificial intelligence safety and ethics board that aims to ensure these technologies are developed safely.

Demis Hassabis, founder and chief executive of DeepMind, said in a video interview that anyone building artificial intelligence, including governments and companies, should do the same thing. “They should definitely be thinking about the ethical consequences of what they do,” Dr. Hassabis said. “Way ahead of time.”]

#### Heg decline causes unstable nuclear alliances – escalates to multistate nuclear war

Hayes 18 [Peter Hayes, Nautilus Institute, Berkeley, California, USA; Center for International Security Studies, Sydney University. Trump and the Interregnum of American Nuclear Hegemony. November 8, 2018. <https://www.tandfonline.com/doi/full/10.1080/25751654.2018.1532525>]

During a post-hegemonic era, long-standing nuclear alliances are likely to be replaced by ad hoc nuclear coalitions, aligning and realigning around different congeries of threat and even actual nuclear wars, with much higher levels of uncertainty and unpredictability than was the case in the nuclear hegemonic system.

There are a number of ways that this dynamic could play out during the interregnum, and these dynamics are likely to be inconsistent and contradictory. In some instances, the sheer momentum of past policy combined with bureaucratic inertia and the potency of political, military service and corporate interests, may ensure that residual aspects of the formerly hegemonic postures are adhered to even as formal nuclear alliances rupture. Even as they reach for the old anchors, these states may be forced to adjust and retrench strategically, or start to take their own nuclear risks by making increasingly explicit nuclear threats and deployments against nuclear-armed adversaries – as Japan has begun to do with reference to its “technological deterrent” since about 2012.9 This period could last for many years until and when nuclear war breaks out and leads to a post-nuclear war disorder; or a new, post-hegemonic strategic framework is established to manage and/or abolish nuclear threat.

Under full-blown American nuclear hegemony, fewer states had nuclear weapons, the major nuclear weapons states entered into legally binding restraints on force levels and they learned from nuclear near-misses to promulgate rules of the road and tacit understandings. The lines drawn during full-blown collisions involving nuclear weapons were stark and concentrated the minds of leaders greatly. In a nuclear duel, it was clear that only one of two sides could fire first; the only question was which one. Now, with nine nuclear weapons states, and conflicts conceivably involving three, four or more of them, no matter how much leaders concentrate, it will not be evident who is aiming at who, who may fire first, and during a volley, who fired first and even who hit whom.

In a highly proliferated world, nuclear-armed states may feel driven to obtain larger nuclear forces able to deter multiple adversaries at the same time, sufficient to conduct not only a few nuclear attacks but configured to fight more than one protracted nuclear war at a time, especially in nuclear states torn apart by civil war and post-nuclear attack reconstruction. The first time nuclear weapons are used since 1945 will be shocking, the second time, less so, the third time, the new normal.