### 1

#### CP Text: States ought to ratify the Kigali Amendment

#### Ozone layer is fixed by 2030 because of the Montreal Protocol

UN, 9-16-2019, "Ozone on track to heal completely in our lifetime, UN environment agency declares on World Day.," UN News, https://news.un.org/en/story/2019/09/1046452//EL

The phaseout of controlled uses of ozone-depleting substances has not only helped replenish the protective layer for future generations but is also helping guard human health by filtering harmful rays from reaching Earth, said UNEP shared in a statement. The recognition of this success comes on World Ozone Day, marked 16 September. This year celebrates “32 Years and Healing”; a commemoration of the international commitment to protect the ozone later and the climate under the historic Montreal Protocol, which has led to the phase-out of 99 per cent of ozone-depleting chemicals in refrigerators, air-conditioners and other consumer products. Since 2000, parts of the ozone layer have recovered at a rate of 1-3 per cent every ten years, the latest Scientific Assessment of Ozone Depletion estimates. At projected rates the “Northern Hemisphere and mid-latitude ozone will heal completely by the 2030’s”, UNEP said, with the Southern Hemisphere repaired by the 2050’s, and Polar Regions in the following decade. UN Secretary-General, António Guterres said “we must be careful not to neglect the ozone layer,” as we “rightly focus our energies on tackling climate change”, spotlighting the importance of preventing threats posed by emission of ozone-depleting gases. Regenerating the ozone has helped curb the effects of climate change - with approximately 135 billion tonnes of carbon dioxide emissions from 1990 to 2010 averted by a strong protective shield. As of late last year, the World Meteorological Organization (WMO) reported the global concentration of carbon dioxide and other greenhouse gases is still steadily on the rise, with consequential warming effects on the planet and ozone-teardown. Damaging effects of ozone-depleting substances allow increased ultraviolet (or UV) rays to reach the earth, increasing incidents of skin cancers, eye cataracts, compromised immune systems and harm to agricultural lands and forests. The Montreal Protocol is, to date, the only UN treaty to be adopted by all Member States, with all parties sharing responsibilities relating to phasing out ozone-depleting substances, controlled trade of such substances, annual data reporting and other matters. “We can celebrate success,” UNEP said, “but we must all push to keep hold of these gains, in particular by remaining vigilant and tackling any illegal sources of ozone-depleting substances as they arise.” Looking forward, the agency has called for wholehearted support of the Kigali Amendment to the Montreal Protocol, which entered into force on 1 January of this year. The agreement targets the phasing of hydrofluorocarbons (HFCs), climate-warming gases, which could avoid up to 0.4 degrees Celsius of global temperature rise by end of the century.

#### Regulations based on the Montreal Protocol are historically successful and minimize ozone

NASA, 9-18-2012, "Watching the Ozone Hole Before and After the Montreal Protocol," No Publication, https://earthobservatory.nasa.gov/images/79198/watching-the-ozone-hole-before-and-after-the-montreal-protocol//EL

About a quarter-century ago, scientists and policymakers unveiled what the United Nations calls “the most successful treaty in UN history.” On September 16, 1987, the first 24 nations signed on to the Montreal Protocol on Substances that Deplete the Ozone Layer; 173 more have signed on in the years since. The international agreement likely saved the world from an environmental crisis, while setting an example for how to develop and implement environmental policy. Prompted by scientific observations from the laboratory, the ground, aircraft, and satellites, the Montreal Protocol first reduced and then banned the chlorine- and bromine-based chemicals (particularly chlorofluorocarbons, or CFCs) that destroy atmospheric ozone. The destruction of the ozone layer allows more of the Sun’s ultraviolet radiation to reach the surface of the planet, increasing the risk of sunburns, skin cancer, and eye damage. The most prominent and infamous sign of depletion is the annual “ozone hole” that forms around the South Pole. The images above show the Antarctic ozone hole on September 16 (the International Day for the Preservation of the Ozone Layer) in the years 1979, 1987, 2006, and 2011. The first two maps are based on data from the Total Ozone Mapping Spectrometer (TOMS) on the Nimbus-7 satellite. The other two maps are made with data from the Ozone Monitoring Instrument on the Aura satellite. Though taken by different instruments, the data sets have all been cross-calibrated and reanalyzed by scientific models. An animation of the data (high-resolution download below the main image) reveals the formation and dissipation of the ozone hole from July 1 to December 31 in each of the four years. Stratospheric ozone is typically measured in Dobson Units (DU), which is the number of molecules required to create a layer of pure ozone 0.01 millimeters thick at a temperature of 0 degrees Celsius and an air pressure of 1 atmosphere (the pressure at the surface of the Earth). The average amount of ozone in Earth’s atmosphere is 300 Dobson Units, equivalent to a layer 3 millimeters (0.12 inches) thick—the height of 2 pennies stacked together. In 1979—when scientists were just coming to understand that atmospheric ozone could be depleted—the area of ozone depletion over Antarctica grew to 1.1 million square kilometers, with a minimum ozone concentration of 194 Dobson Units. In 1987, as the Montreal Protocol was being signed, the area of the hole reached 22.4 million square kilometers and ozone concentrations dropped to 109 DU. By 2006, the worst year for ozone depletion to date, the numbers were 29.6 million square kilometers and just 84 DU. By 2011, the most recent year with a complete data set, the hole stretched 26 million square kilometers and dropped to 95 DU. According to NASA scientist Pawan Bhartia, “The Antarctic hole is stabilizing and may be slowly recovering. Our focus now is to make sure that it is healing as expected.” The amount of ozone-depleting substances (ODS) in the atmosphere has stopped rising in recent years, and may actually be decreasing. The yearly ozone hole should continue for a while, though, as CFCs and other ODSs can last for decades in the air. Scientists found in a 2009 study that without the Montreal Protocol, global ozone depletion (not just Antarctic) would be at least 10 times worse than current levels by 2050. “Changes in the ozone hole now are not significantly driven by changes in CFCs, but instead driven by year-to-year changes in weather in the stratosphere,” said Bhartia, who in 1985 was the first researcher to present satellite data showing the Antarctic ozone hole. “Like two snowflakes, two ozone holes are never alike. ”

#### The Kigali Amendment to the Montreal Protocol prevents production of CFCs – companies and countries support it

Mohamed Atani, 1-16-2018, "The Kigali Amendment to the Montreal Protocol: Another Global Commitment to stop climate change," UNEP, https://www.unep.org/news-and-stories/story/kigali-amendment-montreal-protocol-another-global-commitment-stop-climate//EL

For many people across the world, the 15th of October, 2016 was just another normal day going about their usual business to accomplish their to-do lists for the day. Perhaps unknown to many outside the world of ‘environment’ and all its jargon, something extremely significant was happening in Africa, in the beautiful Rwanda. Delegates from all over the world had convened in the capital, Kigali from October 10-15, for the 28th Meeting of the Parties to the Montreal Protocol. Back in the 1920’s, coolants and fridges were discovered to be very toxic, causing severe health complications to humans. CFCs were the solution to address this, but decades later, CFCs were also found to be the root cause of a hole in the stratosphere- commonly referred to as the ozone hole. The ozone layer is the natural shield against the sun’s harmful ultraviolet rays, which can cause severe health risks such as skins cancers. This damage to the ozone layer prompted governments to moot an environmental agreement to govern the production and use of harmful substances that damage the ozone. The Montreal Protocol on Substances that Deplete the Ozone Layer was designed to reduce the production and consumption of ozone depleting substances in order to reduce their abundance in the atmosphere, and thereby protect the earth’s fragile ozone Layer. The protocol was agreed on September 16th in 1987 and entered into force on January 1st in 1989. A unique feature of the protocol is an adjustment provision that enables the Parties to the Protocol to respond quickly to new scientific information, in a bid to accelerate the reductions required on chemicals already covered by the Protocol. These adjustments are then automatically applicable to all countries that ratified the Protocol. Developing countries are given more time to comply with the phase out decisions, and also they receive funding from the Multilateral Fund to facilitate compliance with the Protocol’s provisions. In Kigali, delegates worked tirelessly day and night to negotiate and reach a deal on a timetable that would mandate countries to phase down the production and usage of hydroflourocarbons (HFCs). Following seven years of continuous consultations, Parties to the Montreal Protocol struck a landmark legally binding deal to reduce the emissions of powerful greenhouse gases in a move that could prevent up to 0.5 degrees Celsius of global warming by the end of this century, while continuing to protect the ozone layer. HFCs are man-made chemicals that are primarily used in air conditioning, refrigeration and foam insulation, and are powerful greenhouse gases that can be thousands of times more potent than carbon dioxide in contributing to climate change. The 2015 Africa Adaptation Gap Report observes that for a below 20C global warming scenario the agriculture sector will be hit by up to 40% yield declines, and result in a 25 – 90% increase in incidences of undernourishment putting 50% of Africa’s population under risk of undernourishment, not to mention massive economic losses given that the sector employs up to 64 per cent labor and contributes up to 34 per cent to GDP on average. “Africa is a continent that is deeply vulnerable to climate change. We are witnessing disastrous droughts — our people are losing lives. We need to address climate change if we are to address poverty,” said Vincent Biruta, Rwanda’s Minister of Natural Resources. Environmental experts note that the Kigali Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer could be the single largest real contribution the world has made so far towards keeping the global temperature rise "well below" 2 degrees Celsius, a target agreed at the Paris climate conference last year; this amendment is a huge step forward to achieving that target. The talks in Kigali may not have attracted as much attention as the Paris event last year, but the outcome from the meeting is expected to have even greater impact on Parties’ efforts to slow down climate change. The new deal includes specific targets and timetables to replace HFCs with more planet-friendly alternatives, provisions to prohibit or restrict countries that have ratified the protocol or its amendments from trading in controlled substances with states that are yet to ratify it, and an agreement by rich countries to help finance the transition of poor countries to alternative safer products. Notably, African countries opted to phase down the chemicals faster than required, citing the grave threats the region faces due to climate change. Top officials from the chemical industry, including producers of the chemicals, manufacturers of equipment that use HFCs were also in Kigali; a demonstration that companies throughout the HFCs supply chain support strong global action on these harmful substances. The final deal divided the world economies into three groups, each with a target phasedown date. The richest countries, including the United States and those in the European Union, will reduce the production and consumption of HFCs from 2019. Much of the rest of the world, including China, Brazil and all of Africa, will freeze the use of HFCs by 2024. A small group of the world’s hottest countries such as Bahrain, India, Iran, Iraq, Kuwait, Oman, Pakistan, Qatar, Saudi Arabia, and the United Arab Emirates have the most lenient schedule and will freeze HFCs use by 2028. As pressure mounts on governments worldwide for less talk and more action to address climate change, the Kigali Amendment is indeed, a commendable move that adds momentum to a series of new global climate change agreements, including the Paris agreement which will officially enter into force next month on 4 November, 2016.

#### Biden says yes, causing follow on

Alex Hillbrand, 1-27-2021, "Biden Announces Move to Ratify Kigali Amendment on HFCs," NRDC, https://www.nrdc.org/experts/alex-hillbrand/biden-announces-move-ratify-kigali-amendment-hfcs//EL

Earlier today, by executive order, President Biden directed his administration to prepare to send the Kigali Amendment phasing down super-polluting hydrofluorocarbons (HFCs) to the Senate for its advice and consent to U.S. ratification. The president’s quick action on Kigali sends a powerful signal to the world that the U.S. will join the global effort to cut reliance on these dangerous gases and drive a deep domestic and international climate agenda as well. The order formally directs the State Department to prepare a ‘transmittal package’ to the U.S. Senate for the Kigali Amendment, the first step of the U.S. ratification process, within 60 days. The Kigali Amendment is a 2016 global pact under the Montreal Protocol to phase down climate-warming HFCs over the coming decades. Both Gina McCarthy and John Kerry helped negotiate the agreement, which the U.S. signed in 2016 but has not yet ratified. Amendments to the Montreal Protocol typically require the Senate’s ‘advice and consent’ to ratification, making today’s announcement a key step towards bringing the U.S. properly into the agreement. The Biden administration’s move shows how serious it is about achieving the massive climate benefits the Kigali Amendment can deliver. Kigali implementation worldwide can avoid HFC use equivalent to as much as 70 billion tons of carbon dioxide between now and 2050 and can prevent up to one half a degree Celsius of climate warming over this century. The passage of the bipartisan American Innovation and Manufacturing Act at the end of the last Congress equips the administration with comprehensive authority to carry out the HFC phasedown in the United States. NRDC and our partners plan to be there each step of the way to make sure EPA and other agencies move as quickly and ambitiously as they can to reduce U.S. HFC by 85% over 15 years, as Kigali requires, or more. Once the State Department submits the transmittal package, it will fall to the U.S. Senate to determine whether to move forward with Kigali ratification. The prospects seem bright: in 2018 thirteen Republican Senators sent a letter to President Trump expressing support for ratifying the Kigali amendment and noting its economic benefits for the United States. And more than 17 GOP Senators cosponsored the AIM Act, along with essentially all Democrats. Like the original Montreal Protocol and subsequent amendments, there is every reason to expect bipartisan support for Kigali ratification. Congress has also repeatedly appropriated funds to support the Montreal Protocol’s Multilateral Fund, which assists developing countries in their implementation. The continuation of this support will be essential to achieving Kigali’s potential benefits. More than 120 nations have already ratified the Kigali Amendment. U.S. ratification will pave the way for similar action by China, India, and other major economies already moving forward on domestic action but which have yet to ratify. Several of these countries were understandably waiting for a signal that the U.S. would move forward under the agreement; the U.S. was a top proponent of a global HFC phasedown in the years leading up to the Kigali Amendment and its continued leadership couldn’t be more important. The Biden team deserves applause for moving quickly on HFCs. It’s time now to recommit, in the U.S. and around the globe, to the Kigali Amendment once again and embark as fast as we can on the transition to a world beyond HFCs.

### 2

#### Private sector mining is coming now – new tech and precious resources create concrete incentives.

Davenport 20 Davenport, Christian. [Reporter covering NASA and the space industry, Education: Colby College, B.A., American Studies]“A Dollar Can't Buy You a Cup of Coffee but That's What NASA Intends to Pay for Some Moon Rocks.” *The Washington Post*, WP Company, 3 Dec. 2020, https://www.washingtonpost.com/technology/2020/12/03/moon-mining-contracts-named/. //Debatedrills AS

NASA announced Thursday that several companies had won contracts to mine the moon and turn over small samples to the space agency for a small fee. In one case, a company called Lunar Outpost bid $1 for the work, a price NASA jumped at after deciding the Colorado-based robotics firm had the technical ability to deliver.

“You’d be surprised at what a dollar can buy you in space,” Mike Gold, NASA’s acting associate administrator for international and interagency relations, said in a call with reporters.

But the modest financial incentives are not the [driver of the program](https://www.washingtonpost.com/technology/2020/09/10/moon-mining-nasa-search/?itid=lk_inline_manual_6). Nor to a large extent is the actual lunar soil. NASA is asking for only small amounts — between 50 and 500 grams (or 1.8 ounces to about 18 ounces). While there would be scientific benefits to the mission, it’s really a technology development program, allowing companies to practice extracting resources from the lunar surface and then selling them.

It would also establish a legal precedent that would pave the way for companies to mine celestial bodies in an effort blessed by the U.S. government to help build a sustainable presence on the moon and elsewhere.

To do that, NASA says it needs its astronauts, like the western pioneers, to “live off the land,” using the resources in space instead of hauling them from Earth. The moon, for example, has plenty of water in the form of ice. That’s not only key to sustaining human life, but the hydrogen and oxygen in water could also be used as rocket fuel, making the moon a potential gas station in space that could help explorers reach farther into the solar system.

Asteroids also have significant resources, particularly precious metals that could be used for in-space manufacturing. While the prospect of large mining and manufacturing facilities in orbit is still many years away, NASA wants to use the mining program as a small step toward that goal.

NASA is now trying to return astronauts to the moon under its Artemis program for the first time since 1972. Unlike its predecessor, Apollo, where the astronauts visited the lunar surface for a short while before coming home, the Artemis program would create a permanent presence on and around the moon.

“The ability to extract and utilize space resources is the key to achieving this objective of sustainability,” Gold said. “We must learn to generate our own water, air and even fuel. Living off the land will enable ambitious exploration activities that will result in awe-inspiring science and unprecedented discoveries.”

In 2015, then-President Barack Obama signed a law that allowed private companies the right to own the resources they mined in space. Under the program announced Thursday, NASA said the materials would be transferred from the private companies to NASA.

The effort would not violate the 1967 Outer Space Treaty, NASA officials have said, which prohibits nations from claiming sovereignty over a celestial body. NASA Administrator Jim Bridenstine previously likened the policy to the rules governing the seas.

**“We do believe we can extract and utilize the resources of the moon, just as we can extract and utilize tuna from the ocean,” he said earlier this year.**

As part of its lunar exploration mission, NASA has been working to get countries around the world to adopt what it calls the Artemis Accords, a legal framework that would govern behavior in space and on celestial bodies such as the moon.

The rules would allow private companies to extract lunar resources and create safety zones to prevent conflict and ensure that countries act transparently about their plans in space, while sharing their scientific discoveries.

The mining announcement came during the same week that China landed a spacecraft on the moon, extracted resources and then lifted off from the lunar surface in an effort to return the sample to Earth.

Instead of developing and sustaining a big government sample-return mission, NASA is taking another approach by partnering with the private sector. “If you step back and think about how really amazing it is that NASA can essentially piggyback on the private-sector space capabilities to perform this mission, it would not have been possible 10 years ago,” said Phil McAlister, the director of NASA’s commercial spaceflight division.

In addition to Lunar Outpost, the other companies chosen for NASA’s program are: ispace Japan and Europe, which would each charge $5,000 for the material; and Masten Space Systems of California, would charge $15,000.

All of the companies would already be on the moon, according to NASA, conducting other missions. McAlister said Lunar Outpost would be ferried to the moon by the lunar lander known as Blue Moon being developed by Jeff Bezos’s Blue Origin. (Bezos owns The Washington Post.) The company later clarified that it was looking at a number of landers to get it to the lunar surface, and not just Blue Origin’s. The ispace companies would fly on a Japanese lander, McAlister said, and Masten, already part of another NASA lunar contract, would use its own Masten XL-1 lander.

#### Reject the link turn – private sector space competition decreases costs and increases investment into space exploration and mining.

Grady 21 Grady , Monica. [Professor of Planetary and Space Sciences]“Private Companies Are Launching a New Space Race – Here's What to Expect.” *The Conversation*, 6 Oct. 2021, https://theconversation.com/private-companies-are-launching-a-new-space-race-heres-what-to-expect-80697. //Debatedrills AS

A benefit of the entry of the private sector into space exploration has been recognition of the high-tech companies that contribute to the growth of the economy as valuable targets for investment. Indeed, [a recent presentation](http://www.goldmansachs.com/our-thinking/podcasts/episodes/05-22-2017-noah-poponak.html?mediaIndex=1&autoPlay=true&cid=sch-pd-google-poponakpodcast64-searchad-201705--&mkwid=8cazG4Ns) at an international investment bank – under a heading of “Space; the next investment frontier” – declared that “investment interest has helped reduce launch costs and spur innovation across related industries, opening up a new chapter in the history of the space economy”.

#### The plan removes the economic incentives for space exploration and asteroid mining—the mere threat is sufficient to kill investment.

Basulto 21 Basulto, Dominic. “How Property Rights in Outer Space May Lead to a Scramble to Exploit the Moon's Resources.” *The Washington Post*, WP Company, 5 Dec. 2021, https://www.washingtonpost.com/news/innovations/wp/2015/11/18/how-property-rights-in-outer-space-may-lead-to-a-scramble-to-exploit-the-moons-resources/.

What’s happening now, in essence, is a sea change in how we think about outer space. To convince private commercial space exploration companies to invest millions of dollars, there have to be economic incentives involved. In short, financial backers of these companies have to be able to realize a profit from their investments if innovation is going to happen. That’s the reality.

Richards cites the rights of fishing boats in international waters as an economic template for the SPACE Act, “The ships are owned by companies flying flags of nations under which laws they are bound: they have a right to peacefully fish in international waters that they don’t own; but they have a right of ownership of the fish once obtained.”

The fishing analogy is a useful one. It suggests that we’re simply extending the same economic principles used on Earth to the moon and beyond, not creating new principles. Seafaring nations are now spacefaring nations. Moon Express even refers to the moon as “the eighth continent,” suggesting that people should think about the moon the same way they think about the other seven continents on the planet. And Planetary Resources, an asteroid mining company, refers to the “off-planet economy.”

Throughout the annals of exploration, there have always been commercial incentives. Would the untapped economic potential of America have been possible without similar types of incentives? One example cited by backers of the SPACE Act is the Homestead Act of 1862, which paved the way for Americans to search for gold and timber. Governments they say, have an important role to play here by passing legislation that catalyzes, rather than stifles, growth and innovation.

For supporters of the SPACE Act, the year 2017 looms large. That’s exactly 50 years since the passage of the 1967 Outer Space Treaty. And it’s also the deadline for winning the $30 million Google Lunar X-PRIZE. If privately owned companies are going to be landing on the surface of the moon within the next 24 months, they are going to want assurances that their innovative efforts now are going to have an economic payoff later.

#### Space mining solves warming.

Duran 21, (Paloma Duran is a journalist and industry analyst at Mexico Business News, “Is Space Mining the Best Option to Face Climate Change?”), 11-03-21, Mexico Business News, https://mexicobusiness.news/mining/news/space-mining-best-option-face-climate-change // Debatedrills AS

Going to net zero means that more mining is needed. Experts have said that the current supply cannot support the necessary metals demand for the green transition. As a result, new mining alternatives have gained greater relevance, among them is **space mining.** Several countries, including Mexico, have shown their interest in this alternative, creating a new space race.

“The solar system can support a billion times greater industry than we have on Earth. When you go to vastly larger scales of civilization, beyond the scale that a planet can support, then the types of things that civilization can do are incomprehensible to us … We would be able to promote healthy societies all over the world at the same time that we would be reducing the environmental burden on the Earth,” said Dr. Phil Metzger, Planetary Scientist at the University of Central Florida.

Currently, there are several attempts to address global warming and transition to a net zero carbon economy. There has been an increasing interest in renewable energy and infrastructure, which has increased demand for various minerals, especially lithium, cobalt, nickel, copper and rare earth elements. However, according to experts, the world is close to entering a metals supercycle, **where demand will exceed available supply**, causing prices to skyrocket.

Consequently, the mining industry has sought alternatives to achieve the required supply. Options include recycling and improved mine waste management, sea mining and space mining. The latter is considered one of the alternatives with the greatest potential. However, a regulatory framework is still lacking and there is almost no experience in this regard.

Despite the lack of knowledge regarding space mining, it has become a very attractive option since the planet is running out of resources. While some people believe that land-based mining is cheaper than space mining, experts believe this may change in the long term. Furthermore, within the solar system there are countless bodies rich in minerals, ores and elements that will accelerate the fight against climate change.

“There will come a point when there is nothing left to mine on the surface, prompting mines to reach even further below. But even those resources are destined to run out and so we will aim toward ocean mining, which already has specific technologies that are being developed. Nevertheless, even those mines are limited as well. The mine of the future, which today may seem unlikely, will no longer be on our planet. There will be a time when space mining will be as common as an open leach mine,” Eder Lugo, Minerals Head at Siemens, told MBN.

**More than 150 million asteroids measuring approximately 100m are believed to be in the inner solar system alone.** In addition, astronomers have also identified abundant minerals near the Earth’s space and the Main Asteroid Belt. There are three main groups into which asteroids are divided: C- type, S- type, and M- type. The last two groups are the most abundant in minerals such as **gold, platinum, cobalt, zinc, tin, lead, indium, silver, copper and rare earth metals.**

### 3

#### Appropriation is key to private sector innovation: regulations hinder it significantly.

EOPCEA 21 [Executive Office of the President Council of Economic Advisers. “Economic Report of the President.” 1/21. Chapter 8: “Exploring New Frontiers in Space Policy and Property Rights.” https://www.govinfo.gov/content/pkg/ERP-2021/pdf/ERP-2021-chapter8.pdf]

#### The Department of Defense continues to foster partnerships with the private sector through design competitions that award contracts to both large and small space technology companies, and through consulting programs that mentor small companies in competing for these contracts. These events and programs include the Space Enterprise Consortium; the Space Pitch Day, which awards grants to accelerate new technology; and the National Security Space Launch, which is helping to create new engines and launch vehicles. These partnerships help break down barriers to entry for smaller firms in this industry, which will drive competition and innovation, while decreasing the cost of operating within the space economy. To ensure that the United States maintains its leadership in space innovation and remains the flag of choice for space commerce, it must maintain a business-friendly regulatory environment that offers streamlined permitting, encourages innovation and risk-taking, and safeguards workers, the public, and property. The Trump Administration has prioritized regulatory reform over the past four years, and it continues to focus on cutting red tape in the space sector. With regulatory authorities distributed among the Federal Aviation Administration, Federal Communications Commission, and National Oceanic Atmospheric Administration, the Trump Administration has made efforts to modernize the authorization process for new space missions, as directed in Space Policy Directive-2. In addition, Federal Government procurement regulations are often complex and burdensome for the private sector. In fact, government-procured space systems were historically characterized by high costs, long program schedules, and frequent delays due to these regulations (Butow et al. 2020). This discouraged efficiency, innovation, and the entrance of new actors into the market. In the interest of increasing competition and innovation while reducing costs and bureaucracy, the Administration continues to remove undue regulatory barriers and increase the efficiency of existing processes. Doing so will foster a free and prosperous space economy, enable commercial space companies to operate more efficiently, and allow new firms to participate in the private space industry.

#### Public sector space innovation falls continues to fall short. The private sector is key to space research/innovation.

Follett 21 [Andrew Follett- previously space and science reporter for Daily Caller News Foundation, researcher for the Congressional Committee on Science, Space and Technology, the National Aeronautics and Space Administration, the Cato Institute, and the Competitive Enterprise Institute. currently conducts research analysis for nonprofit in Washington, D.C., area.. “Private Firms Are the Key to Space Exploration.” 8/21/21. National Review. https://www.nationalreview.com/2021/08/private-firms-are-the-key-to-space-exploration/]

#### America’s public-sector space program recently had a rough couple of weeks that perfectly exemplify why it desperately needs a free-market overhaul. On July 29, the International Space Station (ISS) suffered a serious loss of control after a Russian spacecraft docked with it, accidentally causing the station to make a full 540-degree rotation and a half before coming to a stop upside down, when the astronauts got it under control. Like most NASA programs, the ISS is massively over budget. Costs were initially projected at $12.2 billion, but the bill ultimately reached a stunning $150 billion. American taxpayers paid around 84 percent of that. What happened to the American dream of human space exploration? Put simply, the government happened. NASA devolved into a jobs program to bring home the space bacon. Then, on August 10, NASA’s inspector general released a report deeming plans to send astronauts back to the moon in 2024 unfeasible because of significant delays in developing the mission’s spacesuits. Right now the suits are being built by 27 different companies that successfully lobbied the government for a piece of the action. SpaceX’s Elon Musk has rightly noted that NASA has “too many cooks in the kitchen.” The difference between NASA’s cumbersome designed-by-committee suits and SpaceX’s suits — created by a single contractor — is remarkable, even to the naked eye. The report unconvincingly blames NASA’s failure to develop a new spacesuit over the last 14 years solely on shifting technical requirements. It recommends “ensuring technical requirements for the next-generation suits are solidified before selecting the acquisition strategy to procure suits for the ISS and Artemis programs.” Instead of dealing with the problem, the Biden administration is trying to distract attention from the space agency’s mismanagement by announcing plans to land the first person of color on the moon . . . even though NASA has been incapable of sending astronauts of any color into space under its own power since July 2011. NASA has been reduced to begging the Russians for a ride. The agency’s troubled Constellation program, meant to replace the Space Shuttle fleet, was canceled after tens of billions of dollars had already been spent. But NASA’s troubles are, depressingly, likely to get even worse. In November the James Webb Space Telescope (JWST) will finally launch, after taxpayers have forked over $9.7 billion. It was originally supposed to launch in 2007 on a budget of $500 million. That means the project is over a decade behind schedule and costing almost 20 times its initial budget. Perhaps the telescope, meant to locate potentially habitable planets around other stars and perhaps even extraterrestrial life, could instead search for a calendar . . . or fiscal sanity . . . in the stars? JWST isn’t the first NASA space telescope to suffer cost overruns and setbacks. The Hubble Space Telescope (HST) was originally intended to launch in 1983, but technical issues delayed the launch until 1990 because the main mirror was incorrectly manufactured. JWST is very likely to fail because it is supposed to unfold itself “origami style” in space in an extremely technically complicated process. If difficulties arise, JWST lacks HST’s generous margin for error because of its location far beyond earth’s orbit at the Sun-Earth L2 LaGrange point. NASA currently lacks the capability to send a team of astronauts out that far to fix any problems. Even if NASA could get out to JWST, the telescope doesn’t have a grappling ring for an astronaut to grab onto and thus could potentially kill astronauts attempting to fix it. It is hard to imagine a better example of the private sector’s amazing ability to outcompete government bureaucracy and mismanagement than NASA’s planned Shuttle replacement, the Space Launch System. It is estimated to cost more than $2 billion per flight. That’s on top of the $20 billion and nine years the agency has already spent developing the vehicle. Contrast that with the comparatively inexpensive $300 million spent by SpaceX to develop the Falcon 9 in a little over four years, and the fact that each Falcon 9 costs around $62 million. One SLS launch could pay for over 32 SpaceX launches. Private ventures such as SpaceX are more efficient because they have a lot more incentive to avoid excessive costs and focus on solutions: Their own money is at stake, and people spend their own money more carefully than they spend taxpayer dollars collected from others. Multiple private American space firms are currently pursuing accomplishments beyond those of NASA, and they are more advanced and ambitious than the entire government space programs of China and the European Union combined. So one possible solution to NASA’s woes would be to greatly increase its reliance on commercial launch providers. And one way to do that would be to return to the system that made civil aviation great: prizes to reward private-sector innovation. Charles Lindbergh flew across the Atlantic Ocean in pursuit of the privately funded Orteig prize, valued at almost $395,000 in today’s money. Another famous example was the X Prize, which rewarded Burt Rutan’s company Scaled Composites with over $14 million in today’s money for becoming the first nongovernmental organization to launch a reusable and manned space vehicle, SpaceShipOne. The X Prize succeeded in creating over $100 million in investment by private corporations and individuals. Aerospace experts expect that establishing a $10 billion prize for successfully landing a crew on Mars and returning it safely to earth could very well lead to a successful landing. That’s a bargain compared with the $500 billion cost estimates NASA puts out for the same objective. And of course in the worst-case failure scenario for a prize program, taxpayers would pay nothing until the mission was complete. A system based on private enterprise incentivized by a fixed prize would end government cost overruns and waste. The cause of space exploration is simply too important to leave to the public sector.

#### Space research solves climate change.

Autry 19 [Greg Autry- Professor of Space Leadership, Policy and Business at Thunderbird School of Global Management. Former NASA Presidential Appointee. “Space Research Can Save the Planet—Again.” 7/20/19. Foreign Policy. https://foreignpolicy.com/2019/07/20/space-research-can-save-the-planet-again-climate-change-environment/]

**Climate change is a poster child for the critical role of space data.** Trekking across the globe to measure ice sheets with drills and gauge sea temperatures from the sides of ships is an expensive, slow, and insufficient way to assay the state of the planet. **Satellites operated by NASA, the U.S. National Oceanic and Atmospheric Administration, and an increasing number of commercial firms provide a plethora of multispectral imaging and radar measurements of developments such as coral reef degradation, harmful plankton blooms, and polar bears negotiating thinning ice.** Much of the technology involved in observing the Earth today was initially developed for probes sent to explore other planets in our solar system. IT WAS NASA SATELLITE DATA THAT REVEALED A FRIGHTENING AND GROWING HOLE IN THE OZONE LAYER OVER THE SOUTH POLE, GALVANIZING PUBLIC CONCERN THAT, IN 1987, PRODUCED THE MONTREAL PROTOCOL: THE FIRST INTERNATIONAL AGREEMENT ADDRESSING A GLOBAL ENVIRONMENTAL PROBLEM. **Indeed, understanding the evolution of other planets’ climates is essential for modeling possible outcomes on Earth.** NASA probes revealed how, roughly 4 billion years ago, a runaway greenhouse gas syndrome turned Venus into a hot, hellish, and uninhabitable planet of acid rain. Orbiters, landers, and rovers continue to unravel the processes that transformed a once warm and wet Mars into a frigid, dry dust ball—and scientists even to conceive of future scenarios that might terraform it back into a livable planet. Discovering other worlds’ history and imagining their future offers important visions for climate change mitigation strategies on Earth, such as mining helium from the moon itself for future clean energy. **Spinoff technologies from space research, from GPS to semiconductor solar cells, are already helping to reduce emissions; the efficiency gains of GPS-guided navigation shrink fuel expenditures on sea, land, and air by between 15 and 21 percent—a greater reduction than better engines or fuel changes have so far provided.** Modern solar photovoltaic power also owes its existence to space. The first real customer for solar energy was the U.S. space program; applications such as the giant solar wings that power the International Space Station have continually driven improvements in solar cell performance, and NASA first demonstrated the value of the sun for powering communities on Earth by using solar in its own facilities. **Promisingly, space-based solar power stations could overcome the inconvenient truth that wind and solar will never get us anywhere near zero emissions because their output is inherently intermittent and there is, so far, no environmentally acceptable way to store their power at a global scale, even for one night. Orbital solar power stations, on the other hand, would continually face the sun, beaming clean power back through targeted radiation to Earth day or night, regardless of weather. They would also be free from clouds and atmospheric interference and therefore operate with many times the efficiency of current solar technology.** Moving solar power generation away from Earth—already possible but held back by the current steep costs of lifting the materials into space—would preserve land and cultural resources from the blight of huge panel farms and save landfills from the growing problem of discarded old solar panels. Sustainable energy advocates in the U.S. military and the Chinese government are actively pursuing space-based solar power, but just making solar cells damages the environment due to the caustic chemicals employed. Space technology offers the possibility of freeing the Earth’s fragile biosphere and culturally important sites from the otherwise unavoidable damage caused by manufacturing and mining. The U.S. start-up Made in Space is currently taking the first steps toward manufacturing in orbit. The company’s fiber-optic cable, produced by machinery on the International Space Station, is orders of magnitude more efficient than anything made on Earth, where the heavy gravity creates tiny flaws in the material. Made in Space and others are eventually planning to build large structures, such as solar power stations, in space. As these technologies develop, they will augment each other, bringing costs down dramatically; space manufacturing, for instance, slashes the cost of solar installations in space.

# Case

#### Try or die to avoid mass extinction.

Becker, Presidential Climate Action Project for Obama, 15 years at the U.S. Department of Energy and a journalism career that began when he was a combat correspondent in Vietnam at age 19, 2/6/2017

(William, Who Wants to Live on Mars?, www.huffingtonpost.com/william-s-becker/who-wants-to-live-on-mars\_b\_14632700.html)

Some of the most intelligent people alive - among them,, billionaire Elon Musk, fellow billionaire Sir Richard Branson and theoretical physicist Stephen Hawking - want us to colonize Mars. Hawking predicts unless we prepare another celestial body to be our lifeboat, humanity is destined to suffer mass extinction due in part to our unsustainable squandering of Earth’s resources.

“Although the chance of a disaster to planet Earth in a given year may be quite low, it adds up over time, and becomes a near certainty in the next thousand or ten thousand years,” Hawking says. “By that time we should have spread out into space, and to other stars, so a disaster on Earth would not mean the end of the human race.”

Musk has less patience. He’s working with NASA on an interplanetary transport that will take take the first astronauts to Mars in the 2030s. Later, regular people could make the trip for $200,000 per ticket (checked baggage fees not included) in one of Musk’s interplanetary space buses. “I really think there are two fundamental paths,” Musk says. “One path is we stay on Earth forever, and some eventual extinction event wipes us out.” The other path: Traveling 19,000 miles over three months to get to a barren planet of rocks, dust and deadly radiation. “It will be like, really fun to go, you’ll have a great time,” Musk says.

## Detritus

#### Turn – Kigali CP decreases probability of war by strengthening global relations and cooperation in the space sector.

**Houser 17** [Kristin, “Private Companies, Not Governments, Are Shaping the Future of Space Exploration”, Futurism. 12 June 2015 https://futurism.com/private-companies-not-governments-are-shaping-the-future-of-space-exploration] //DebateDrills LC

Truthfully, **the likelihood of humanity ever calling it a day on space exploration is slim** to none. The universe is huge, with [galaxy estimates in the trillions](https://www.theatlantic.com/science/archive/2016/10/so-many-galaxies/504185/), so the goalpost will continue moving back (to bring another sport into the analogy). Rather than focusing on competing in what is ultimately an unwinnable race**, private and government-backed space agencies can actually benefit from collaboration** thanks to their inherent differences.

“**The way that SpaceX, Planetary Resources, or Virgin Galactic approaches space exploration is going to be very different from NASA or the Air Force**,” explains Lewicki. **Private companies aren’t beholden to the same slow processes that often stall government** projects, **and they can secure or reallocate funding much more swiftly** if need be. However, unlike agencies like NASA, they do have shareholders to keep happy and a need to constantly pursue profitability.

**The two sectors**, therefore, **have a tremendous opportunity to help one another**. **Private companies can generate revenue through government contracts** —for example, [NASA has contracted Boeing](https://futurism.com/a-breakthrough-for-boeings-starliner/) to transport astronauts to the International Space Station (ISS), and SpaceX just closed a deal with the U.S. Air Force to [launch its secretive space drone](https://futurism.com/spacex-secures-u-s-air-force-contract-for-the-worlds-most-mysterious-space-drone/). **This leaves the government agencies free to pursue the kind of forward-thinking, longer-term research that might not immediately generate revenue, but that can be later streamlined and improved upon in the private sector**.

Ultimately, **Space Race 2.0 has no losers**. The **breakthroughs happening in space exploration benefit us all**, and truly, a little friendly competition never hurt anyone (unless you count the egos bruised by those tweets).

#### Turn – a space race between private companies is preferable to a space race between countries – it increases innovation without the threat of an actual war since private companies do not have armies.

**Hyun-bin N.D.** [Kim, “Private companies spearhead global space race”, Korea Times. https://www.koreatimes.co.kr/www/tech/2021/08/768\_314662.html] //DebateDrills LC

The **competition in the global space industry is heating up**, with billionaire moguls making dramatic moves to spearhead the advancement of commercial space travel.  
  
The **commercialization of the space industry by the private sector is gaining momentum quickly**, **resulting in renewed interest in the public sector as well**, contrary to major space projects in the past which were led and run by governments only.  
  
The recent voyages into space of Amazon CEO Jeff Bezos' Blue Origin LLC, Sir Richard Branson's Virgin Galactic Holdings Inc. and Tesla CEO Elon Musk's Space Exploration Technologies Corp. (SpaceX) have attracted much public attention to the billionaires' hopes to commercialize space travel.  
  
**The industry has the potential for exponential growth in diverse sectors, including faster world travel via space, orbiting hotels, the establishment of bases on the moon and the colonization of other planets in the future**.

#### Turn – space wars are more likely when governments are the only ones with vested interest in space, because they’re the ones with military interests.

**Bender 18** [Bryan, “Space war is coming – and the US is not ready”, Futurism. 6 April 2018 https://www.politico.com/story/2018/04/06/outer-space-war-defense-russia-china-463067] //DebateDrills LC

W**ar is coming to outer space, and the Pentagon warns it is not yet ready**, following years of underinvesting while the military focused on a host of threats on Earth.

Russia and China are years ahead of the United States in developing the means to destroy or disable satellites that the U.S. military depends on for everything from gathering intelligence to guiding precision bombs, missiles and drones.

Now **the Pentagon is** trying to catch up — **pouring billions more dollars into hardening its defenses against anti-satellite weapons, training troops to operate in the event their space lifeline is cut, and honing ways to retaliate against a new form of combat that experts warn could affect millions of people**, cause untold collateral damage and spread to battlefields on Earth.

“We are now approaching a point where ‘Star Wars’ is not just a movie,” said Steve Isakowitz, CEO of The Aerospace Corp., a government-funded think tank that serves as the military’s leading adviser on space. He said **the U.S. can no longer afford to take its dominance for granted.**

#### All their impact scenarios are wrong either uniqueness is over the brink or there’s no impact

**Kramer & Myer 21** [Andrew E. Kramer and Steven Lee Myers, 6-15-2021, "Russia, Once a Space Superpower, Turns to China for Missions," New York Times, Mr. Kramer worked for The Associated Press in Portland, Ore.; for The Washington Post as a researcher and news aide; as a freelance reporter for The San Francisco Chronicle; and as a part-time reporter for The Ukiah Daily Journal, based in Ukiah, Calif. In 2017, Mr. Kramer shared with Times colleagues a Pulitzer Prize for international reporting for an investigative series on Russia’s covert projection of power. In 1999, he was part of a team at The Associated Press that was a finalist for the Pulitzer in international reporting. Mr. Kramer received a bachelor’s in history from the University of California at Santa Cruz and a master’s in history from Oxford University. Steven Lee Myers is the Beijing bureau chief for The New York Times. He joined The Times in 1989 and has previously worked as a correspondent in Moscow, Baghdad and Washington. He is the author of “The New Tsar: The Rise and Reign of Vladimir Putin,” published by Alfred A. Knopf in 2015. [https://www.nytimes.com/2021/06/15/world/asia/china-russia-space.html]//DebateDrillsWW](https://www.nytimes.com/2021/06/15/world/asia/china-russia-space.html%5d//DebateDrillsWW)

MOSCOW — Sixty-three years ago, the Soviet Union put the first satellite in space. Nearly four years later, it sent the first man into orbit, Yuri Gagarin. It fell behind NASA in the space race that followed, but even after the collapse of the Soviet Union, Russia remained a reliable space power, joining with the United States to build and operate the International Space Station for the last two decades. Now, the future of the Russian space program rests with the world’s new space power, China. **After years** of promises and some limited cooperation, **Russia and China** have begun **to draw up** ambitious plans for **missions that would directly compete with those of the United States** and its partners, ushering in a new era of space competition that could be as intense as the first. They have teamed up for a robotic mission to an asteroid in 2024. They are coordinating a series of lunar missions intended to build a permanent research base on the south pole of the moon by 2030. The first of those missions, a Russian spacecraft with the revived Soviet-era name Luna, is scheduled to launch as soon as October, aiming to locate ice that could provide water to future human visits. The budding new partnership reflects the geopolitics of the world today. China and Russia have grown increasingly close under their current leaders, Xi Jinping and Vladimir V. Putin, smoothing decades of mistrust between the countries and creating a potent, though unofficial, **alliance against** what they perceive as the **hegemonic** behavior of the **United States**. Space has become a natural extension of the two countries’ warming ties, given increasingly fraught relations with the United States. Russian officials have already signaled they may pull out of the International Space Station once the current agreement with its partners ends in 2024. The launch last year of SpaceX’s crew capsule had already ended Russia’s exclusive role ferrying American astronauts into orbit.

#### Current efforts to remove space debris check.

Weiner 21 (Weiner, Chloee. “New Effort to Clean up Space Junk Reaches Orbit.” NPR, NPR, 22 Mar. 2021, [www.npr.org/2021/03/21/979815691/new-effort-to-clean-up-space-junk-prepares-to-launch.)// DebateDrills](http://www.npr.org/2021/03/21/979815691/new-effort-to-clean-up-space-junk-prepares-to-launch.)//DD)  AY

A demonstration mission to test an idea to clean up space debris launched Monday morning local time from the Baikonur Cosmodrome in Kazakhstan. Known as ELSA-d, the mission will exhibit technology that could help capture space junk, the millions of pieces of orbital debris that float above Earth. The more than 8,000 metric tons of debris threaten the loss of services we rely on for Earth-bound life, including weather forecasting, telecommunications and GPS systems. The spacecraft works by attempting to attach itself to dead satellites and pushing them toward Earth to burn up in the atmosphere. ELSA-d, which stands for End-of-Life Services by Astroscale, will be carried out by a "servicer satellite" and a "client satellite" that launched together, according to Astroscale, the Japan-based company behind the mission. Using a magnetic docking technology, the servicer will release and try to "rendezvous" with the client, which will act as a mock piece of space junk. The mission, which will be run from the U.K., will carry out this catch and release process repeatedly over the course of six months. The goal is to prove the servicer satellite's ability to track down and dock with its target in varying levels of complexity. The spacecraft is not designed to capture dead satellites already in orbit, but rather future satellites that would be launched with compatible docking plates on them. Space junk has been a growing problem for years as human-made objects such as old satellites and spacecraft parts build up in low Earth orbit until they decay, deorbit, explode or collide with other objects, fragmenting into smaller pieces of waste. In 2019, for example, India blew apart one of its satellites orbiting Earth, creating hundreds of pieces of debris that threatened to collide with the International Space Station. According to a recent report by NASA, at least 26,000 of the millions of pieces of space junk are the size of a softball. Orbiting along at 17,500 mph, they could "destroy a satellite on impact." More than 500,000 pieces are a "mission-ending threat" because of their ability to impact protective systems, fuel tanks and spacecraft cabins. And the most common debris, more than 100 million pieces, is the size of a grain of salt and could puncture a spacesuit, "amplifying the risk of catastrophic collisions to spacecraft and crew," the report said. According to NASA, cleaning up space — and addressing the risks associated with debris — depend on preventing the accumulation of more waste and actively removing it. The development of other cleanup technologies has been underway for years. In 2016, Japan's space agency sent a 700-meter tether into space to try to slow down and redirect space junk. In 2018, a device called RemoveDebris successfully cast a net around a dummy satellite. The European Space Agency also plans to send a self-destructing robot into orbit in 2025, which the organization's former director general has referred to as a space "vacuum cleaner." These efforts could prove increasingly important as private space ventures like SpaceX continue to clutter low Earth orbit with a "mega-constellation" of satellites.

#### Non unique – there’s already existing space debris in the squo that would cause collision and war, the plan doesn’t solve. Either the aff’s impacts are true and the existing efforts to clean space fail and we go extinct because there’s nothing we can do and the aff does nothing, or space debris won’t cause extinction and the aff has no impacts.

Sample 16 (Sample, Ian. “Rise in Space Junk Could Provoke Armed Conflict Say Scientists.” The Guardian, Guardian News and Media, 22 Jan. 2016, www.theguardian.com/science/2016/jan/22/rise-in-space-junk-could-provoke-armed-conflict-say-scientists.)// DebateDrills AY

The steady rise in space junk that is floating around the planet could provoke a political row and even armed conflict, according to scientists, who warn that even tiny pieces of debris have enough energy to damage or destroy military satellites. Researchers said fragments of spent rockets and other hurtling hardware posed a “special political danger” because of the difficulty in confirming that an operational satellite had been struck by flying debris and had not fallen victim to an intentional attack by another nation. Space agencies in the US and Russia track more than 23,000 pieces of space junk larger than 10cm, but estimates suggest there could be half a billion fragments ranging from one to 10cm, and trillions of even smaller particles. The junk poses the greatest danger to satellites in low Earth orbit, where debris can slam into spacecraft at a combined speed of more than 30,000mph. This realm of space, which stretches from 100 to 1200 miles above the surface, is where most military satellites are deployed. In a report to be published in the journal Acta Astronautica, Vitaly Adushkin at the Russian Academy of Sciences in Moscow writes that impacts from space junk, especially on military satellites, posed a “special political danger” and “may provoke political or even armed conflict between space-faring nations. The owner of the impacted and destroyed satellite can hardly quickly determine the real cause of the accident.” Adushkin adds that in recent decades there have been repeated sudden failures of defence satellites which have never been explained. But there are only two possibilities, he claims: either unregistered collisions with space debris, or an aggressive action by an adversary. “This is a politically dangerous dilemma,” he writes. The warning comes after an incident in 2013 when a Russian satellite, Blits, was disabled after apparently colliding with debris created when China shot down one of its own old weather satellites in 2007. The Chinese used a missile to destroy its satellite, an act that demonstrated its anti-satellite capabilities, and left 3,000 more pieces of debris in orbit. Space junk threatens real-life Gravity incident, Congress hears Read more According to the report, the amount of debris cluttering low Earth orbit has risen dramatically in half a century of spacefaring. Without efforts to clean up the space environment, Adushkin warns of a “cascade process” in which chunks of debris crash into one another and produce ever more smaller fragments. Data in the study from the Russian space agency show that the International Space Station took evasive action five times in 2014 to avoid space debris. Even small flecks of paint that have flaked off spacecraft can be hazardous. Nasa’s space shuttle was struck by flying paint several times in orbit, forcing ground staff to replace some of the spaceship’s windows. The report follows a report commissioned by Nasa in 2011 which warned that the level of space junk was rising exponentially, and had reached a “tipping point” in the threat it posed to satellites and the International Space Station.