## 1

#### Cp text: The member nations of the WTO except the US ought to reduce Intellectual Property Protections

## 2

**US dominance is secured in biotech now, but China’s closing the gap fast – that allows geopolitical and economic advantages**

Scott **Moore** **2020** [(Director of the Penn Global China Program at the University of Pennsylvania. Previously, Moore was a Young Professional and Water Resources Management Specialist at the World Bank Group, and Environment, Science, Technology, and Health Officer for China at the U.S.) “China’s Role In The Global Biotechnology Sector And Implications For U.S. Policy” https://www.brookings.edu/wp-content/uploads/2020/04/FP\_20200427\_china\_biotechnology\_moore.pdf]TDI

EXECUTIVE SUMMARY Even by the standards of emerging technologies, **biotechnology has the potential to utterly transform geopolitics, economics**, and society in the 21st century. Yet while the United States has long been the world leader in most segments of the global biotechnology sector, **China is fast becoming a significant player**. This brief assesses the implications of China’s changing role in biotechnology for the United States, which span national security, data security, and economic competitiveness. On current trends the United States is likely to remain the world leader in most biotechnology areas. **However, the gap between China and the U.S. is narrowing in the biotechnology sector,** and U.S. policymakers must boost public investment, liberalize immigration and foreign student visa policies, and enact regulatory reforms to ensure America remains competitive. At the same time, areas like vaccine development and regulation of emerging technologies like synthetic biology present rich opportunities for Sino-U.S. cooperation. INTRODUCTION Thanks to extensive government funding for biomedical research, an unparalleled ability to translate basic research into commercial products and applications, and strong intellectual property protections, the United States has been the dominant global player in developing and commercializing biotechnology for decades.1 This dominance is reflected in the fact that United States accounted for almost half of all biotechnology patents filed worldwide from 1999 to 2013.2 However, in the intervening years, and just as in the case of artificial intelligence and other emerging technologies, other nations, including South Korea and Singapore, have invested heavily in developing their biotechnology sectors and industries. These efforts pale, however, in comparison to those of China, and the sheer size and scale of the Chinese biotechnology industry pose a range of economic, security, and regulatory issues for American policymakers. The determination of China’s one-party state to become a leading player in biotechnology is reflected by the rapid growth in investment in the sector. Some estimates claim that collectively, **China’s** central, local, and provincial **governments have invested over $100 billion in life sciences** research and development. Regardless of the true figure, official encouragement has led to a torrid place of investment. In just the two-year period from 2015 to 2017, venture capital and private equity investment in the sector totaled some $45 billion.3 The value of commercial deals concluded in the fields of biology, medicine and medical machine technology, meanwhile increased from 25.8 billion renminbi (RMB), or $3.6 billion, in 2011 to over 75 billion RMB ($10.6 billion) in 2017.4 Annual research and development expenditures by Chinese pharmaceutical firms, the foundation of the biotechnology sector, rose from some 39 billion RMB in 2014 ($5.5 billion) to over 53 billion RMB (US$7.5 billion) by 2017. Expenditure on new product development among these firms, an important indicator of future growth potential, increased from just over 40 billion RMB ($5.6 billion) to almost 60 billion ($8.4 billion).5 By Western standards, some of these figures are still low. Swiss drugmaker Roche, the world leader in biotechnology research and development, spent some $11 billion in 2018 alone.6 As these figures suggest, the development of China’s biotechnology sector paints a nuanced picture for U.S. policymakers. On one hand, the sector’s rapid growth, and high-level commitment to continued investment, means that China will inevitably become an increasingly important player in the global biotechnology sector, **with implications for national security, economic competitiveness, and regulation**. An executive from In-Q-Tel, the U.S. government’s inhouse national security venture capital fund, warned Congress in a November 2019 hearing, for example, that China “intends to own the biorevolution… and they are building the infrastructure, the talent pipeline, the regulatory system, and the financial system they need to do that.”7 The CEO of European drugmaker AstraZeneca has similarly opined that “Much of [China’s] innovation in the last three to four years has been ‘me too,’ but now on the horizon we can see firstin-class innovation.”8 Yet on the other hand, while China’s biotechnology sector will almost certainly continue to grow in scale, sophistication, and competitiveness, there is little reason to believe on current trends that the United States will lose its edge in the sector. Indeed, the biggest risk to the global competitiveness of the U.S. biotechnology industry likely comes from the prospect of declining public investment and reduced mobility for world-class researchers and industry professionals. Moreover, the COVID-19 crisis underscores both the importance of continued investment in biotechnology and the many challenges to promoting effective international cooperation on global health security. This brief first examines the key policies and actors in China’s biotechnology sector, then offers an assessment of the sector’s current capabilities and future trends, and finally further explores the implications of developments in Chinese biotechnology for U.S. policy.

**The aff’s waiving of IP doesn’t solve but it does give away sensitive national security information that allows China to lead ahead in biotech**

Josh **Rogin 4-8**. [(Washington Post Columnist covering National Security Issues.) “Opinion: The wrong way to fight vaccine nationalism” https://www.washingtonpost.com/opinions/global-opinions/the-wrong-way-to-fight-vaccine-nationalism/2021/04/08/9a65e15e-98a8-11eb-962b-78c1d8228819\_story.html ] TDI

Americans will not be safe from covid-19 until the entire world is safe. That basic truth shows why vaccine nationalism is not only immoral but also counterproductive. But the simplest solutions are rarely the correct ones, **and some countries are using the issue to advance their own strategic interests**. The Biden administration must reject the effort by some nations to turn our shared crisis into their opportunity. As the inequities of vaccine distribution worldwide grow, a group of more than 50 developing countries led by India and South Africa is pushing the World Trade Organization to dissolve all international intellectual property protections for pandemic-related products, which would include vaccine research patents, manufacturing designs and technological know-how. The Trump administration rejected the proposal to waive the agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) for the pandemic when it was introduced in October. Now, hundreds of nongovernmental organizations and dozens of Democratic lawmakers are pushing the Biden administration to support the proposal. But many warn **the move would result in the United States handing over a generation of advanced research** — much of it funded by the U.S. taxpayer — **to** our country’s greatest competitors, above all **China**. In Congress, there’s justified frustration with the United States’ failure to respond to China’s robust vaccine diplomacy, in which Beijing has conditioned vaccine offers to pandemic-stricken countries on their ignoring security concerns over Chinese telecom companies or abandoning diplomatic recognition of Taiwan. There’s also a lot of anger at Big Pharma among progressives for profiting from the pandemic. “We are in a race against time, and unfortunately Big Pharma is standing in the way of speedily addressing this problem,” Rep. Jan Schakowsky (D-Ill.), who supports the effort to waive intellectual property protections, told me in an interview. “I think the real security issue is that while the United States balks in making sure that we help ourselves, that these adversaries will just jump right in.” Schakowsky argued that alternative measures for helping poor countries manufacture vaccines are simply not moving fast enough to save lives and that the United States has a duty to respond. House Speaker Nancy Pelosi (D-Calif.) personally conveyed her support for the waiver to President Biden, Schakowsky said. But Big Pharma is just one piece of the puzzle. Countries such as India and South Africa have been trying to weaken WTO intellectual property protections for decades. **The mRNA technology that underpins the Pfizer and Moderna vaccines was funded initially by the Defense Advanced Research Projects Agency and has national security implications.** Inside the Biden administration, the National Security Council has already convened several meetings on the issue. The waiver is supported by many global health officials in the White House and at the U.S. Agency for International Development, who believe the United States’ international reputation is suffering from its perceived “America First” vaccine strategy. On Wednesday, U.S. Trade Representative Katherine Tai spoke with WTO Director General Ngozi Okonjo-Iweala about the waiver issue. USTR is convening its own interagency meetings on the issue, which many see as a move to reassert its jurisdiction over WTO matters. If and when this does get to Biden’s desk, he will also hear from national security officials who believe that waiving TRIPS would result in the forced transfer of national security-sensitive technology to China, **a country that strives to dominate the biotechnology** ***field*** as part of its Made in China 2025 strategy. **Once countries such as China have this technology, they will apply their mercantilist industrial models to ensure their companies dominate these strategically important industries, potentially erasing thousands of U.S. jobs.** “We would be delivering a competitive advantage to countries that are increasingly viewed as our adversaries, at taxpayer expense, when there are other ways of doing this,” said Mark Cohen, senior fellow at the University of California at Berkeley Law School. **A preferable approach would be to build more vaccine-manufacturing capacity** in the United States and then give those vaccines to countries in need, said Cohen. The U.S. pharmaceutical industry would surely benefit, but **that’s preferable to being dependent on other countries when the next pandemic hits.** “If there’s anything that the pandemic has taught us, it’s that we need to have a robust supply chain, for ourselves and for the world generally,” Cohen said. What’s more, it’s not clear that waiving the TRIPS agreement for the pandemic would work in the first place. Bill Gates and others involved in the current vaccine distribution scheme have argued that it would not result in more vaccines, pointing out that licensing agreements are already successfully facilitating cooperation between patent-holding vaccine-makers and foreign manufacturers. Critics respond that such cooperation is still failing to meet the urgent needs in the developing world. Vaccine equity is a real problem, but waiving intellectual property rights is not the solution. If the current system is not getting shots into the arms of people in poor countries, we must fix that for their sake and ours. But the pandemic and our responses to it have geopolitical implications, whether we like it or not. **That means helping the world and thinking about our strategic interests at the same time.**

**China will convert biotechnology gains to military advantages, undermining US primacy – specifically true in the context of vaccines**

Mercy A. **Kuo 2017** [(Executive Vice President at Pamir Consulting.) “The Great US-China Biotechnology and Artificial Intelligence Race” <https://thediplomat.com/2017/08/the-great-us-china-biotechnology-and-artificial-intelligence-race/>] TDI

Trans-Pacific View author Mercy Kuo regularly engages subject-matter experts, policy practitioners, and strategic thinkers across the globe for their diverse insights into the U.S. Asia policy. This conversation with Eleonore Pauwels – Director of Biology Collectives and Senior Program Associate, Science and Technology Innovation Program at the Wilson Center in Washington D.C. – is the 104th in “The Trans-Pacific View Insight Series.” Explain the motivation behind Chinese investment in U.S. genomics and artificial intelligence (AI). With large public and private investments inland and in the U.S., China plans to become the next AI-Genomics powerhouse, which indicates that these technologies will soon converge in China. China’s ambition is to lead the global market for precision medicine, **which necessitates acquiring strategic tech**nological and human capital in both genomics and AI. And the country excels at this game. A sharp blow in this U.S.-China competition happened in 2013 when BGI purchased Complete Genomics, in California, with the intent to build its own advanced genomic sequencing machines, therefore securing a technological knowhow mainly mastered by U.S. producers. There are significant economic incentives behind China’s heavy investment in the increasing convergence of AI and genomics. This golden combination will drive precision medicine to new heights by developing a more sophisticated understanding of how our genomes function, leading to precise, even personalized, cancer therapeutics and preventive diagnostics, such as liquid biopsies. By one estimate, the liquid biopsy market is expected to be worth $40 billion in 2017. Assess the implications of iCarbonX of Shenzhen’s decision to invest US$100 million in U.S.-company PatientsLikeMe relative to AI and genomic data collection. iCarbonX is a pioneer in AI software that learns to recognize useful relationships between large amounts of individuals’ biological, medical, behavioral and psychological data. Such a data-ecosystem will deliver insights into how an individual’s genome is mutating over time, and therefore critical information about this individual’s susceptibilities to rare, chronic and mental illnesses. In 2017, iCarbonX invested $100 million in PatientsLikeMe, getting a hold over data from the biggest online network of patients with rare and chronic diseases. If successful, this effort could turn into genetic gold, making iCarbonX one of the wealthiest healthcare companies in China and beyond. The risk factor is that iCarbonX is handling more than personal data, but potentially vulnerable data as the company uses a smartphone application, Meum, for customers to consult for health advice. Remember that the Chinese nascent genomics and AI industry relies on cloud computing for genomics data-storage and exchange, creating, in its wake, new vulnerabilities associated with any internet-based technology. This phenomenon has severe implications. How much consideration has been given to privacy and the evolving notion of personal data in this AI-powered health economy? And is our cyberinfrastructure ready to protect such trove of personal health data from hackers and industrial espionage? In this new race, will China and the U.S. have to constantly accelerate their rate of cyber and bio-innovation to be more resilient? Refining our models of genomics data protection will become a critical biosecurity issue. Why is Chinese access to U.S. genomic data a national security concern? **Genomics** and computing research **is inherently dual-use, therefore a strategic advantage in a nation’s security arsenal.** Using AI systems to understand how the functioning of our genomes impacts our health **is of strategic importance for biodefense.** This knowledge will lead to increasing developments at the forefront of medical countermeasures, **including vaccines**, antibiotics, and targeted treatments relying on virus-engineering and microbiome research. Applying deep learning to genomics data-sets could help geneticists learn how to use genome-editing (CRISPR) to efficiently engineer living systems, but also to treat and, even “optimize,” human health, **with potential applications in military enhancements**. A $15 million partnership between a U.S. company, Gingko Bioworks, and DARPA aims to genetically design new probiotics as a protection for soldiers against a variety of stomach bugs and illnesses. China could be using the same deep learning techniques on U.S. genomics data to better comprehend how to develop, patent and manufacture tailored cancer immunotherapies in high demand in the United States. Yet, what if Chinese efforts venture into understanding how to impact key genomics health determinants relevant to the U.S. population? **Gaining access to increasingly large U.S. genomic data-sets gives China a knowledge advantage into leading the next steps in bio-military research.** Could biomedical data be used to develop bioweapons? Explain. Personalized medicine advances mean that personalized bio-attacks are increasingly possible. The combination of AI with biomedical data and genome-editing technologies will help us predict genes most important to particular functions. Such insights will contribute to knowing how a particular disease occurs, how a newly-discovered virus has high transmissibility, but also why certain populations and individuals are more susceptible to it. Combining host susceptibility information with pathogenic targeted design, **malicious actors could engineer pathogens that are tailored to overcome the immune system or the microbiome of specific populations.**

**Maintenance of the ILO is key to reduce a host of existential threats – establishes great-power peace.**

**Brands 18**. [(Hal Brands is a Henry Kissinger Distinguished Professor at Johns Hopkins University’s School of Advanced International Studies, Scholar at the American Enterprise Institute. “America’s Global Order Is Worth Fighting For, Bloomberg Opinion, Politics & Policy,” August 14, 2018, Bloomberg. <https://www.bloomberg.com/opinion/articles/2018-08-14/america-s-global-order-is-worth-fighting-for>] TDI

The first argument is **easily disposed** of. Yes, the postwar world has been **thoroughly imperfect**, featuring nuclear arms races, genocides, widespread poverty and other scourges. But the world has **always been** imperfect, and by **any** meaningful **comparison**, the last **seven decades** have been a **veritable golden age**. The **liberal international** economic order has led to an **explosion** of **domestic** and **global prosperity**: According to World Bank data, both U.S. and global **per capita** income have increased **roughly three-fold** (in inflation-adjusted terms) since 1960, with U.S. gross domestic product increasing nearly six-fold. The U.S. **system** of alliances and forward military deployments has **contributed critically** to the **longest period** of **great-power peace** in modern history, and **the incidence of war** and conquest **more broadly** have dropped **dramatically**. The number of **democracies** in the world has **increased** from perhaps a dozen during World War II to well over 100 today; **respect for basic** human rights has also reached **impressive levels**. As a **bevy of scholarship** has shown, the policies that the U.S. has **pursued** and the **international order** it has built have contributed **enormously** and **directly** to these **outcomes**. If the **liberal international order** can’t be considered a **smashing success**, no **international order** could be. The second critique is also overstated. It is true that Washington, like all great powers throughout history, has been willing to bend the rules to get its way. It is hard to reconcile Cold War-era interventions in Guatemala, Chile and other countries with a professed solicitude for human rights and democracy; the Iraq War of 2003 is only one instance in which the U.S. brushed aside the concerns of international organizations such as the U.N. Security Council. Likewise, when the U.S. government determined that the Bretton Woods system of monetary relations no longer suited its interests in the 1970s, it terminated that scheme and insisted on creating a more favorable one. But again, the proper standard here is not sainthood but reality. And the U.S. has **generally** enlisted its power in the **service** of **universal values** such as **democracy** and **human rights**; it has, more often than not, promoted **a positive-sum** international system in which **like-minded** nations can be **secure** and **wealthy**. This goes back to the very beginning of the liberal order: Washington did not seek to hold its defeated adversaries in subjugation after World War II; it rebuilt Japan and western Germany into thriving, democratic allies that became fierce economic competitors to the U.S. The U.S. has taken this approach not simply because it wanted to do good in the world — powerful as this motivation is — but because of a hard-headed desire to do good for itself. In an interdependent global environment, American officials have long calculated, the U.S. cannot divorce its own well-being from that of the wider world. And in contrast to how other great powers — Imperial Japan, for instance, or the Soviet Union — ruled their spheres of influence, American behavior has been positively enlightened. It is this relatively benign behavior that has convinced so many countries to tolerate American leadership — and it is the emergence of a darker form of U.S. hegemony under the Trump administration that so profoundly worries them today. As for the third critique, the premise is right, but the **conclusion** can easily **go too far**. It is always **dangerous** to become **so enraptured** by past **achievements** that one **loses sight** of the **need for adaptation** in **the future**. This is particularly true today, because the strength of the liberal order is being tested from within and without, by issues ranging from unequal burden-sharing among American allies to the ambivalence of the American people themselves. There is **little evidence** to suggest, however, that either American power or **the liberal order** it supports have **eroded** so **dramatically** that **Washington**’s postwar project cannot be **sustained**. Quite the contrary — the U.S. is likely to remain the **world’s strongest power** for **decades to come**.

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## 3

#### Bipartisan antitrust bills passing now but continued PC needed to pacify republicans.

Perlman 9/3 [Matthew; 9/3/21; “*Interest Groups Back Big Tech Antitrust Bills In House,*” LAW360, <https://www.law360.com/competition/articles/1418789/interest-groups-back-big-tech-antitrust-bills-in-house>] Justin

Law360 (September 3, 2021, 7:25 PM EDT) -- A contingent of public interest groups are urging leaders of the U.S. House of Representatives to advance a package of legislation aimed at reining in Big Tech companies through updates and changes to antitrust law, though free market advocates have been jeering many of the bills. A total of 58 public interest and consumer advocacy groups signed on to a letter Thursday asking House leaders to swiftly pass the package of six antitrust bills that the Judiciary Committee approved in late June after a marathon markup session. The proposals include legislation prohibiting large platform companies from acquiring competitive threats, preferencing their own services and using their control of multiple business lines to disadvantage competitors in other ways. The proposals would also impose interoperability and data portability requirements on large tech platforms, increase merger filing fees and boost enforcement by state attorneys general. Charlotte Slaiman, competition policy director for Public Knowledge, which signed on to the letter, said in a statement Thursday that the package charts a path toward putting "people back in control of the digital economy." "The broad range of groups supporting this package shows just how widespread the problem of Big Tech dominance is, and that these bills deserve a full vote in the House imminently," Slaiman said. The letter contends that America has a monopoly problem that is resulting in lower wages, reduced innovation and increased inequality, while also undermining the free press and perpetuating "racial, gender and class dominance." "Big Tech monopolies are at the center of many of these problems," the letter said. "Reining in these companies is an essential first step to reverse the damage of concentrated corporate power throughout our economy." The proposals followed a 16-month investigation by the House antitrust subcommittee into Amazon, Apple, Facebook and Google that resulted in a sprawling report from Democratic members calling for a range of reform measures to rein in the dominance of the companies. While consumer advocacy groups have largely supported the measures, the tech companies themselves and other interest groups have been highly critical, including a coalition of more than 25 right-leaning groups that sent a letter to Congress ahead of the markup hearing. The letter called the bills a "Trojan horse package" aimed at cynically using conservative anger over Big Tech, particularly at perceived censorship by social media platforms, to seek bipartisan support for "European-style over-regulation." For its part, Facebook has called the proposals a "poison pill for America's tech industry at a time our economy can least afford it" and said the bills underestimate the fierce competition the U.S. companies face from abroad. Apple and Google also raised concerns about the impact the bills would have on innovation, as well as on privacy and security. And Amazon has warned about the potential consequences of the proposals for both small businesses that sell on its platform and the consumers who use it to shop. Ending Platform Monopolies Act Thursday's letter said that the Ending Platform Monopolies Act would address "the most problematic aspects of the Big Tech companies" by allowing enforcers to break-up or separate pieces of the businesses when they create conflicts of interest that give the platforms an advantage over potential competitors and business users. A fact sheet from Public Knowledge accompanying the letter said that the bill is an important tool to help the antitrust agencies "protect consumers from mammoth platforms and to ensure compliance with other parts of the package." But during the markup hearing, ranking Republican committee member Rep. Jim Jordan of Ohio blasted the bill as a regulatory overreach, calling it "quite literally central planning" and arguing that it has significant ambiguities, which is bad for business. The Competitive Enterprise Institute argued in a June statement that the bill "kills the goose that lays the golden egg," and would actually result in small businesses being unable to access the large platforms, which in turn would focus on their own offerings instead. The Chamber of Progress has warned that the proposal could bar Amazon from offering its Prime services and its Amazon Basics private label products, since they would compete against other sellers on the platform. Other groups have also warned it could also force tech companies to divest popular apps, including Google's Maps and YouTube, Facebook's WhatsApp and Instagram and Apple's iMessage and FaceTime. American Innovation and Choice Online Act The American Innovation and Choice Online Act is aimed at barring the platform companies from preferencing their own products and services over those of rival businesses and from excluding or discriminating against rivals. Thursday's letter said this proposal would "promote innovation and competition" by preventing the platforms from protecting their monopolies. The right-leaning think tank American Enterprise Institute and others have argued that the bill could prevent Apple from pre-installing certain apps on its mobile phones, since that would advantage it over competing app developers. It could also prevent Google from integrating maps or customer reviews into search results, among other things. "At a minimum, the act would significantly disrupt these platforms' business models in ways that undermine consumer value," Daniel Lyons, a senior fellow for the group wrote in a blog post in June. Platform Competition and Opportunity Act The Platform Competition and Opportunity Act is aimed at preventing platform companies from acquiring potential or nascent competitors and its supporters argued in Thursday's letter that it would prevent the tech giants from enhancing or maintaining their market power. The bill would presumably have blocked Facebook's purchases of WhatsApp, Instagram and other services it has acquired, as well as a slew of deals by Google over the past two decades. Detractors have contended that this bill would limit investments in startups because it restricts their ability to be acquired by the larger technology firms, which they say is a key way for founders to benefit from their success. An American Enterprise Institute blog post from June argues that "opportunities for acquisition have been important drivers of innovation in tech" and also said the bill would prevent the tech companies from entering new areas of business to compete with each other. ACCESS Act The Augmenting Compatibility and Competition by Enabling Service Switching, or ACCESS Act, imposes requirements for the tech companies to make user data portable and able to be used by competing services. The bill's supporters argued in Thursday's letter that this prevents the tech giants from locking users into their services, since users can take their data with them and use it on other networks. Privacy and security implications have been flagged as potential problems for the proposal, with the Competitive Enterprise Institute saying in a statement in June that it's an "anti-privacy bill" that forces companies to turn over private user information to others. The group also said the bill would try to micromanage "complex, dynamic, and highly competitive markets" that are beyond understanding for most politicians and regulators. The American Enterprise Institute has also contended that the requirements would actually make rivals even more dependent on the incumbent platforms. Filing fees and state enforcement Of the antitrust bills approved by the House Judiciary Committee, the ones with the most bipartisan support appear to be the Merger Filing Fee Modernization Act and the State Antitrust Enforcement Venue Act, though it took a day of debate before the committee passed them. A Senate version of the filing fee bill passed that chamber in June as part of the U.S. Innovation and Competition Act. It would raise the fees merging parties pay when reporting large transactions, while lowering fees for smaller deals, in order to raise more resources for the antitrust agencies. Information Technology & Innovation Foundation argued in an August blog post that the legislation does not give Congress enough oversight over how the agencies will use the funds that it raises and called for the bill to include provisions requiring the money be used to hire more staff dedicated to antitrust enforcement. The Competitive Enterprise Institute also raised concerns about congressional oversight and contended that the bill would increase the cost of doing business at a time when the economy is sputtering. "U.S. consumers need innovative services and affordable products, not higher prices passed onto them by businesses avoiding new, unnecessary regulatory compliance costs," the group said in a June blog post. The state enforcement bill would prevent antitrust cases brought by state attorneys general from being transferred to a different venue by the Judicial Panel on Multidistrict Litigation, similar to protections afforded to federal enforcers. The bill is intended to prevent companies targeted by state-led enforcement actions from trying to move the cases to more favorable venues, and it also has an analog in the Senate. Information Technology & Innovation Foundation acknowledged in their August post that having cases included in multidistrict litigation can handicap state enforcers, but contended the changes should only apply to criminal matters and that the current version is wrong to block transfers of civil cases too. Thursday's letter from supporters of the bills said the proposals were carefully crafted to address the abusive practices of Big Tech, informed by the House antitrust subcommitee's sprawling investigation and "historic" 450-page report. "We believe that these bills will bring urgently needed change and accountability to these companies and an industry that most Americans agree is already doing great harm to our democracy," the letter said.

#### Aff requires negotiations that saps PC.

Pooley 21 [James; Former deputy director general of the United Nations’ World Intellectual Property Organization and a member of the Center for Intellectual Property Understanding; “Drawn-Out Negotiations Over Covid IP Will Blow Back on Biden,” Barron’s; 5/26/21; <https://www.barrons.com/articles/drawn-out-negotiations-over-covid-ip-will-blow-back-on-biden-51621973675>] Justin

The Biden administration recently announced its support for a proposal before the World Trade Organization that would suspend the intellectual property protections on Covid-19 vaccines as guaranteed by the landmark TRIPS Agreement, a global trade pact that took effect in 1995.

The decision has sparked furious debate, with supporters arguing that the decision will speed the vaccine rollout in developing countries. The reality, however, is that even if enacted, the IP waiver will have zero short-term impact—but could inflict serious, long-term harm on global economic growth. The myopic nature of the Biden administration’s announcement cannot be overstated.

Even if WTO officials decide to waive IP protections at their June meeting, it’ll simply kickstart months of legal negotiations over precisely which drug formulas and technical know-how are undeserving of IP protections. And it’s unthinkable that the Biden administration, or Congress for that matter, would actually force American companies to hand over their most cutting-edge—and closely guarded—secrets.

As a result, the inevitable foot-dragging will cause enormous resentment in developing countries. And that’s the real threat of the waiver—precisely because it won’t accomplish either of its short-term goals of improving vaccine access and facilitating tech transfers from rich countries to developing ones. It’ll strengthen calls for more extreme, anti-IP measures down the road.

Experts overwhelmingly agree that waiving IP protections alone won’t increase vaccine production. That’s because making a shot is far more complicated than just following a recipe, and two of the most effective vaccines are based on cutting-edge discoveries using messenger RNA.

As Moderna Chief Executive Stephane Bancel said on a recent earnings call, “This is a new technology. You cannot go hire people who know how to make the mRNA. Those people don’t exist. And then even if all those things were available, whoever wants to do mRNA vaccines will have to, you know, buy the machine, invent the manufacturing process, invent creation processes and ethical processes, and then they will have to go run a clinical trial, get the data, get the product approved and scale manufacturing. This doesn’t happen in six or 12 or 18 months.”

Anthony Fauci, the president’s chief medical adviser, has echoed that sentiment and emphasized the need for immediate solutions. “Going back and forth, consuming time and lawyers in a legal argument about waivers—that is not the endgame,” he said. “People are dying around the world and we have to get vaccines into their arms in the fastest and most efficient way possible.”

Those claiming the waiver poses an immediate, rather than long-term, threat to IP rights also misunderstand what the waiver will—and won’t—do.

The waiver petition itself is more akin to a statement of principle than an actual legal document. In fact, it’s only a few pages long.

As the Office of the United States Trade Representative has said, “Text-based negotiations at the WTO will take time given the consensus-based nature of the institution and the complexity of the issues involved.” The WTO director-general predicts negotiations will last until early December.

That’s a lot of wasted time and effort. The U.S. Trade Representative would be far better off spending the next six months breaking down real trade barriers and helping export our surplus vaccine doses and vaccine ingredients to countries in need.

#### Antitrust is key to the DIB – brink is now.

Sitaraman 20 [Ganesh; Vanderbilt University Law School; “The National Security Case for Breaking Up Big Tech,” Knight First Amendment Institute at Columbia; 3/12/20; <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3537870>] brett // Re-Cut Justin

Concentration in the tech sector also threatens the defense industrial base due to higher costs, lower quality, less innovation, and even corruption and fraud.71 Each of these dynamics has already been a problem for America’s over-consolidated defense industrial base. As technology becomes more and more central to defense and national security, it is likely that these same dynamics will replicate themselves with big tech companies. This will become a national security threat, both directly, in terms of the quality and speed of procurement, and indirectly, by reducing innovation and functionally redirecting defense budgets from research spending to higher monopoly profits.72 Conventional economic theory suggests that monopolists have the ability to increase prices and reduce quality because consumers are captive.73 When it comes to defense spending, the Government Accountability Office commented in 2019 that “competition is the cornerstone of a sound acquisition process and a critical tool for achieving the best return on investment for taxpayers.”74 At the same time, the GAO observed that “portfolio-wide cost growth has occurred in an environment where awards are often made without full and open competition.”75 Indeed, it found that 67 percent of 183 major weapons systems contracts had no competition and almost half of contracts went to a handful of firms. Of course, consolidation also means that the Defense Department is in a symbiotic relationship with these big contractors. Some startup executives wanting to sell to the government thus see the Pentagon as “a bad customer, one that is heavily skewed in favor of larger, traditional players,” and they don’t feel like they can break into the sector.76 Standard stories about political economy and capture also suggest that these firms will have outsized power over government.77 As Frank Kendall, the former head of acquisitions at the Pentagon, has said, “With size comes power, and the department’s experience with large defense contractors is that they are not hesitant to use this power for corporate advantage.”78 In the defense context, that means monopolists retain power (and profits), even if they overcharge taxpayers and risk the safety of military personnel in the field. In an important article in The American Conservative on concentration in the defense sector, researchers Matt Stoller and Lucas Kunce argue that contractors with de facto monopoly at the heart of their business models threaten national security. They write that one such contractor, TransDigm, buys up companies that supply the government with rare but essential airline parts and then hike up the prices, effectively holding the government “hostage.”79 They also point to L3, a defense contractor that had ambitions to be a “Home Depot” for the Pentagon, as its former CEO put it. L3’s de facto monopoly over certain products, according to Stoller and Kunce, means that it continues to receive lucrative government contracts, even after admitting in 2015 that it knowingly supplied defective weapons sights to U.S. forces.80 Consolidation also threatens U.S. defense capacity. The decline of competition, according to a 2019 Pentagon report, leaves the military vulnerable to “sole source suppliers, capacity shortfalls, a lack of competition, a lack of workforce skills, and unstable demand.”81 With a limited number of producers, there is less talent and knowhow available in the country if there is a need to build capacity rapidly.82 In 2018, the Defense Department released a report on vulnerable items in the military supply chain, including numerous items in which only one or two domestic companies (and, in some cases, zero domestic companies) produced the essential goods.83 How did the United States lose so much of its industrial base? The combination of consolidation and global integration is part of the story. As Stoller and Kunce argue, companies consolidated in the 1980s and 1990s while shifting emphasis from production and R&D to Wall Street-demanded profits. Globalization then allowed them to shift production overseas at a lower cost. The result was to gut America’s domestic industrial base—and, in many cases, to shift it to China, which engaged in a decades-long strategic plan to develop its own industrial base. The result, in the words of the 2018 Defense Department report, is that “China is the single or sole supplier for a number of specialty chemicals used in munitions and missiles.” In other areas too, the risks of losing access to critical resources are real. Describing the problem of limited carbon fiber sources, the same Pentagon report notes, “[a] sudden and catastrophic loss of supply would disrupt DoD missile, satellite, space launch, and other defense manufacturing programs. In many cases, there are no substitutes readily available.”84 As technology becomes more integral to the future of national security, it is hard to see how big tech will not simply go the way of the big defense contractors. Corporate mottos not to “be evil” are long gone,85 and big tech companies spend millions on conventional Washington, D.C., lobbying efforts.86 Over time, as contracts move to tech behemoths, there will no longer be competitive alternatives, and the Pentagon will likely be locked into relationships with big tech companies—just as they currently are with big defense contractors.87 Some commentators suggest that robust antitrust policies are a problem because only a small number of tech companies can contract for defense projects.88 But there is another way to look at it: The goal should be to encourage competition in the tech sector so that there are multiple contractors available. As former secretary of homeland security Michael Chertoff has said, defending the antitrust case against Qualcomm, “a single-source national champion creates an unacceptable risk to American security—artificially concentrating vulnerability in a single point. ... We need competition and multiple providers, not a potentially vulnerable technological monoculture.”89 The consequence of consolidation in tech is that taxpayers will likely see higher bills even as innovation slows due to reduced competition. Worse still, every taxpayer dollar that goes to monopoly profits—whether in the form of higher prices or fraud and corruption—is a dollar that is not going toward innovation for the future. A concentrated defense sector means not only less innovation due to the lack of competition in the sector; it means that funding that could have been available for innovation instead gets redirected via monopoly profits to the pockets of big tech executives and shareholders.

#### That solves extinction through great power war.

Marks 19 [Michael; Former Senior Policy Advisor to the Under Secretary for Security Assistance, Science and Technology at the U.S. Department of State; "Strengthen US Industry To Counter National Security Challenges," American Military News; 10/10/19; <https://americanmilitarynews.com/2019/10/strengthen-us-industry-to-counter-national-security-challenges/>] Justin

While U.S. defense budgets have recently been on the rise, it is likely that we will see a spending decline in the coming years as competition for non-defense federal budget dollars increases and deficits grow. The United States, therefore, must take action to ensure that we maintain our technological edge against our adversaries by empowering the private sector to provide cost-effective innovation for America’s defense. Since the end of the Second World War the U.S. has relied on qualitative superiority over its potential adversaries, especially those like the Soviet Union/Russia and China, who enjoyed comparative quantitative advantages. These qualitative advantages were vital to maintaining global stability and helped enable our nation to become the preeminent global economy, but they have been eroded over the last few decades. In 1960, the U.S. share of global research and development (R&D) spending stood at 69%. U.S. defense-related R&D alone accounted for 36% of total global expenditures. Soon thereafter other nations recognized the need to increase their R&D expenditures and build their own defense industrial bases to compete with the United States. From 2000-2016, China’s share of global R&D rose from 4.9% to 25.1% while the U.S. share of global R&D dropped to 28%. U.S. defense-related R&D meanwhile now makes up a mere 4% of global R&D spending. There can be no doubt that Russia and China are determined to challenge America’s qualitative advantage. From the rebirth of Russian military power under Vladimir Putin to the ever-growing Chinese military prowess across the board, their efforts show no sign of slowing down. Russia has been and continues to undergo a major modernization of its armed forces. For example, they are in the midst of a ten-year program to build hundreds of new nuclear missiles and have set a goal of modernizing 70% of the Russian Ground Force’s equipment by 2020. One of the most frightening examples of Russia’s resurgence is its development of a hypersonic missile that could be ready for combat as early as 2020. Worryingly, the US is currently unable to defend against this type of missile. To accompany these developments came the emergence in 2017 of Russia as the world’s second-largest arms producer, ready and able to support nations hostile to US interests. China, on the other hand, used to be a country that only manufactured cheap products and knockoffs, but that is no longer true. Technology development and innovation figure prominently in all of China’s national planning goals, with plans to make the country the global leader in science and innovation and the preeminent technological and manufacturing power by 2049, the 100th anniversary of the Chinese communist revolution. This, of course, has huge implications for China’s military capability. The country now has the second-largest national defense budget behind the U.S. and wants to be Asia’s preeminent military power. Beijing is developing next-generation fighter jets, ICBMs and shorter-range ballistic missiles, as well as advanced naval vessels. The People’s Liberation Army has reached a critical point of confidence and now feel they can match competitors like the United States in combat. This has implications for the security of Taiwan, Japan, other US allies in the region as well as to America itself. To make matters worse, there are a growing number of experts that see China developing asymmetric technologies, combined with conventional and nuclear systems that could create an existential threat to the U.S. pacific based assets. It is in the wake of these growing threats to our national security American industry will likely be expected to shoulder an even larger responsibility concerning investment in defense-related R&D. One of the ways we can empower companies to make these additional investments and lead next-generation defense innovation is to allow commonsense mergers between important defense and aerospace companies. Horizontal consolidation eliminates the redundancy of enormous fixed costs, leading to savings passed down to customers. Mergers can also create economies of scale and existing synergies that help the combined company realize access to larger numbers of engineers and innovators, while keeping costs low and improving the timeline for taking a product from concept to development. FA recent example of how this can work is the proposed Raytheon and United Technologies merger. The two parties project that the new combined company will employ more than 60,000 engineers, hold over 38,000 patents and invest approximately $8 billion per year in research and development. This will allow the development of new, critical technologies more quickly and efficiently than either company could on its own. Such private sector investments in innovation will be critical in the face of the growing challenges to American military dominance. America’s R&D advantage, crucial to maintaining military superiority, is increasingly at risk. As China and Russia continue to challenge America’s military dominance and pressures on the defense budget continue to mount, the federal government will likely turn more and more to contractors and commercial companies to develop next-generation defense capabilities. Strengthening U.S. industry, therefore, will be critical to countering our national security challenges.

## Case

Reject their rotb – impact justified

Both are

Rotj – eval the consequences of a policy action

A] anything else is arbitrary, self serving and impact justified

Ow on education and real world application

U can weigh knowledge but u also have to weigh it against the aff

Ow on fairness bcs u can no link out of disads, no core generic we can read

#### Existential threats outweigh – all life has infinite value and extinction eliminates the possibility for future generations – err negative, because of innate cognitive biases

GPP 17 (Global Priorities Project, Future of Humanity Institute at the University of Oxford, Ministry for Foreign Affairs of Finland, “Existential Risk: Diplomacy and Governance,” Global Priorities Project, 2017, <https://www.fhi.ox.ac.uk/wp-content/uploads/Existential-Risks-2017-01-23.pdf>,

1.2. THE ETHICS OF EXISTENTIAL RISK In his book Reasons and Persons, Oxford philosopher Derek Parfit advanced an influential argument about the importance of avoiding extinction: I believe that if we destroy mankind, as we now can, this outcome will be much worse than most people think. Compare three outcomes: (1) Peace. (2) A nuclear war that kills 99% of the world’s existing population. (3) A nuclear war that kills 100%. (2) would be worse than (1), and (3) would be worse than (2). Which is the greater of these two differences? Most people believe that the greater difference is between (1) and (2). I believe that the difference between (2) and (3) is very much greater. ... The Earth will remain habitable for at least another billion years. Civilization began only a few thousand years ago. If we do not destroy mankind, these few thousand years may be only a tiny fraction of the whole of civilized human history. The difference between (2) and (3) may thus be the difference between this tiny fraction and all of the rest of this history. If we compare this possible history to a day, what has occurred so far is only a fraction of a second.65 In this argument, it seems that Parfit is assuming that the survivors of a nuclear war that kills 99% of the population would eventually be able to recover civilisation without long-term effect. As we have seen, this may not be a safe assumption – but for the purposes of this thought experiment, the point stands. What makes existential catastrophes especially bad is that they would “destroy the future,” as another Oxford philosopher, Nick Bostrom, puts it.66 This future could potentially be extremely long and full of flourishing, and would therefore have extremely large value. In standard risk analysis, when working out how to respond to risk, we work out the expected value of risk reduction, by weighing the probability that an action will prevent an adverse event against the severity of the event. Because the value of preventing existential catastrophe is so vast, even a tiny probability of prevention has huge expected value.67 Of course, there is persisting reasonable disagreement about ethics and there are a number of ways one might resist this conclusion.68 Therefore, it would be unjustified to be overconfident in Parfit and Bostrom’s argument. In some areas, government policy does give significant weight to future generations. For example, in assessing the risks of nuclear waste storage, governments have considered timeframes of thousands, hundreds of thousands, and even a million years.69 Justifications for this policy usually appeal to principles of intergenerational equity according to which future generations ought to get as much protection as current generations.70 Similarly, widely accepted norms of sustainable development require development that meets the needs of the current generation without compromising the ability of future generations to meet their own needs.71 However, when it comes to existential risk, it would seem that we fail to live up to principles of intergenerational equity. Existential catastrophe would not only give future generations less than the current generations; it would give them nothing. Indeed, reducing existential risk plausibly has a quite low cost for us in comparison with the huge expected value it has for future generations. In spite of this, relatively little is done to reduce existential risk. Unless we give up on norms of intergenerational equity, they give us a strong case for significantly increasing our efforts to reduce existential risks. 1.3. WHY EXISTENTIAL RISKS MAY BE SYSTEMATICALLY UNDERINVESTED IN, AND THE ROLE OF THE INTERNATIONAL COMMUNITY In spite of the importance of existential risk reduction, it probably receives less attention than is warranted. As a result, concerted international cooperation is required if we are to receive adequate protection from existential risks. 1.3.1. Why existential risks are likely to be underinvested in There are several reasons why existential risk reduction is likely to be underinvested in. Firstly, it is a global public good. Economic theory predicts that such goods tend to be underprovided. The benefits of existential risk reduction are widely and indivisibly dispersed around the globe from the countries responsible for taking action. Consequently, a country which reduces existential risk gains only a small portion of the benefits but bears the full brunt of the costs. Countries thus have strong incentives to free ride, receiving the benefits of risk reduction without contributing. As a result, too few do what is in the common interest. Secondly, as already suggested above, existential risk reduction is an intergenerational public good: most of the benefits are enjoyed by future generations who have no say in the political process. For these goods, the problem is temporal free riding: the current generation enjoys the benefits of inaction while future generations bear the costs. Thirdly, many existential risks, such as machine superintelligence, engineered pandemics, and solar geoengineering, pose an unprecedented and uncertain future threat. Consequently, it is hard to develop a satisfactory governance regime for them: there are few existing governance instruments which can be applied to these risks, and it is unclear what shape new instruments should take. In this way, our position with regard to these emerging risks is comparable to the one we faced when nuclear weapons first became available. Cognitive biases also lead people to underestimate existential risks. Since there have not been any catastrophes of this magnitude, these risks are not salient to politicians and the public. 72 This is an example of the misapplication of the availability heuristic, a mental shortcut which assumes that something is important only if it can be readily recalled. Another cognitive bias affecting perceptions of existential risk is scope neglect. In a seminal 1992 study, three groups were asked how much they would be willing to pay to save 2,000, 20,000 or 200,000 birds from drowning in uncovered oil ponds. The groups answered $80, $78, and $88, respectively.73 In this case, the size of the benefits had little effect on the scale of the preferred response. People become numbed to the effect of saving lives when the numbers get too large. 74 Scope neglect is a particularly acute problem for existential risk because the numbers at stake are so large. Due to scope neglect, decision-makers are prone to treat existential risks in a similar way to problems which are less severe by many orders of magnitude. A wide range of other cognitive biases are likely to affect the evaluation of existential risks.75

#### Capitalism is self-correcting and sustainable – war and environmental destruction are not profitable and innovation solves their impacts

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Democratic capitalism is a system built for survival. It has adapted successfully to shocks of every kind, to upheavals in technology and economics, to political revolutions and world wars. Capitalism has been able to do this because, unlike communism or socialism or feudalism, it has an inner dynamic akin to a living thing. It can adapt and refine itself in response to the changing environment. And it will evolve into a new species of the same capitalist genus if that is what it takes to survive. In the panic of 2008—09, many politicians, businesses, and pundits forgot about the astonishing adaptability of the capitalist system. Predictions of global collapse were based on static views of the world that extrapolated a few months of admittedly terrifying financial chaos into the indefinite future. The self-correcting mechanisms that market economies and democratic societies have evolved over several centuries were either forgotten or assumed defunct. The language of biology has been applied to politics and economics, but rarely to the way they interact. Democratic capitalism’s equivalent of the biological survival instinct is a built-in capacity for solving social problems and meeting material needs. This capacity stems from the principle of competition, which drives both democratic politics and capitalist markets. Because market forces generally reward the creation of wealth rather than its destruction, they direct the independent efforts and ambitions of millions of individuals toward satisfying material demands, even if these demands sometimes create unwelcome by-products. Because voters generally reward politicians for making their lives better and safer, rather than worse and more dangerous, democratic competition directs political institutions toward solving rather than aggravating society’s problems, even if these solutions sometimes create new problems of their own. Political competition is slower and less decisive than market competition, so its self-stabilizing qualities play out over decades or even generations, not months or years. But regardless of the difference in timescale, capitalism and democracy have one crucial feature in common: Both are mechanisms that encourage individuals to channel their creativity, efforts, and competitive spirit into finding solutions for material and social problems. And in the long run, these mechanisms work very well. If we consider democratic capitalism as a successful problem-solving machine, the implications of this view are very relevant to the 2007-09 economic crisis, but diametrically opposed to the conventional wisdom that prevailed in its aftermath. Governments all over the world were ridiculed for trying to resolve a crisis caused by too much borrowing by borrowing even more. Alan Greenspan was accused of trying to delay an inevitable "day of reckoning” by creating ever-bigger financial bubbles. Regulators were attacked for letting half-dead, “zombie” banks stagger on instead of putting them to death. But these charges missed the point of what the democratic capitalist system is designed to achieve. In a capitalist democracy whose raison d’etre is to devise new solutions to long-standing social and material demands, a problem postponed is effectively a problem solved. To be more exact, a problem whose solution can be deferred long enough is a problem that is likely to be solved in ways that are hardly imaginable today. Once the self-healing nature of the capitalist system is recognized, the charge of “passing on our problems to our grand-children”—whether made about budget deficits by conservatives or about global warming by liberals—becomes morally unconvincing. Our grand-children will almost certainly be much richer than we are and will have more powerful technologies at their disposal. It is far from obvious, therefore, why we should make economic sacrifices on their behalf. Sounder morality, as well as economics, than the Victorians ever imagined is in the wistful refrain of the proverbially optimistic Mr. Micawber: "Something will turn up."

#### Free market capitalism has drastically improved the world.

Empirical education in child mortality and increase in life expectancy, development of tech innovation in the private market k2 medical advances, food production increased with agriculture tech green revolution, also decreased armed conflicts

Feyman 14 Yevgeniy [adjunct fellow at the Manhattan Institute. He writes on health care policy, entitlement reform, and the Affordable Care Act. His research has focused on a variety of topics, including the physician shortage, the cost of health care reform, and consumer-directed health care. Feyman was previously the deputy director of health policy at the Manhattan Institute and is currently a research assistant in the department of health policy at the Harvard T.H. Chan School of Public Health] “The Golden Age Is Now” May 23, 2014. IB

In How Much Have Global Problems Cost the World? Lomborg and a group of economists conclude that, with a few exceptions, the world is richer, freer, healthier, and smarter than it’s ever been. These gains have coincided with the near-universal rejection of statism and the flourishing of capitalist principles. At a time when political figures such as New York City mayor Bill de Blasio and religious leaders such as Pope Francis frequently remind us about the evils of unfettered capitalism, this is a worthwhile message. The doubling of human life expectancy is one of the most remarkable achievements of the past century. Consider, Lomborg writes, that “the twentieth century saw life expectancy rise by about 3 months for every calendar year.” The average child in 1900 could expect to live to just 32 years old; now that same child should make it to 70. This increase came during a century when worldwide economic output, driven by the spread of capitalism and freedom, grew by more than 4,000 percent. These gains occurred in developed and developing countries alike; among men and women; and even in a sense among children, as child mortality plummeted. Why are we living so much longer? Massive improvements in public health certainly played an important role. The World Health Organization’s global vaccination efforts essentially eradicated smallpox. But this would have been impossible without the innovative methods of vaccine preservation developed in the private sector by British scientist Leslie Collier. Oral rehydration therapies and antibiotics have also been instrumental in reducing child mortality. Simply put, technological progress is the key to these gains—and market economies have liberated, and rewarded, technological innovation. People are not just living longer, but better—sometimes with government’s help, and sometimes despite it. Even people in the developing countries of Africa and Latin America are better educated and better fed than ever before. Hundreds of thousands of children who would have died during previous eras due to malnutrition are alive today. Here, we can thank massive advancements in agricultural production unleashed by the free market. In the 1960s, privately funded agricultural researchers bred new, high-yield strains of corn, wheat, and various other crops thanks to advances in molecular genetics. Globalization helped spread these technologies to developing countries, which used them not only to feed their people, but also to become export powerhouses. This so-called “green revolution” reinforced both the educational progress (properly nourished children tend to learn more) and the life-expectancy gains (better nutrition leads to better health) of the twentieth century. These children live in a world with fewer armed conflicts, netting what the authors call a “peace dividend.” Globalization and trade liberalization have surely contributed to this more peaceful world (on aggregate). An interdependent global economy makes war costly. Of course, problems remain. As Lomborg points out, most foreign aid likely does little to boost economic welfare, yet hundreds of billions of dollars in “development assistance” continue to flow every year from developed countries to the developing world. Moreover, climate change is widely projected to intensify in the second half of the twenty-first century, and will carry with it a significant economic cost. But those familiar with the prior work of the “skeptical environmentalist” understand that ameliorating these effects over time could prove wasteful. Lomborg notes that the latest research on climate change estimates a net cost of 0.2 to 2 percent of GDP from 2055 to 2080. The same report points out that in 2030, mitigation costs may be as high as 4 percent of GDP. Perhaps directing mitigation funding to other priorities—curing AIDS for instance—would be a better use of the resources. Lomborg’s main message? Ignore those pining for the “good old days.” Thanks to the immense gains of the past century, there has never been a better time to be alive.

#### Empirics outweigh everything – they take into account every factor, which predictive evidence can’t.

#### Rejection of capitalism causes massive transition wars

Harris 03. Lee, Analyst – Hoover Institution and Author of The Suicide of Reason, “The Intellectual Origins of America-Bashing”, Policy Review, January, http://www.hoover.org/publications/policyreview/3458371.html

This is the immiserization thesis of Marx. And it is central to revolutionary Marxism, since if capitalism produces no widespread misery, then it also produces no fatal internal contradiction: If everyone is getting better off through capitalism, who will dream of struggling to overthrow it? Only genuine misery on the part of the workers would be sufficient to overturn the whole apparatus of the capitalist state, simply because, as Marx insisted, the capitalist class could not be realistically expected to relinquish control of the state apparatus and, with it, the monopoly of force. In this, Marx was absolutely correct. No capitalist society has ever willingly liquidated itself, and it is utopian to think that any ever will. Therefore, in order to achieve the goal of socialism, nothing short of a complete revolution would do; and this means, in point of fact, a full-fledged civil war not just within one society, but across the globe. Without this catastrophic upheaval, capitalism would remain completely in control of the social order and all socialist schemes would be reduced to pipe dreams.

#### Extinction

Nyquist 5. J.R. renowned expert in geopolitics and international relations, WorldNetDaily contributing editor, “The Political Consequences of a Financial Crash,” February 4, www.financialsense.com/stormw...2005/0204.html

Should the United States experience a severe economic contraction during the second term of President Bush, the American people will likely support politicians who advocate further restrictions and controls on our market economy – guaranteeing its strangulation and the steady pauperization of the country. In Congress today, Sen. Edward Kennedy supports nearly all the economic dogmas listed above. It is easy to see, therefore, that the coming economic contraction, due in part to a policy of massive credit expansion, will have serious political consequences for the Republican Party (to the benefit of the Democrats). Furthermore, an economic contraction will encourage **the formation of anti-capitalist majorities and a turning away from the free market system. The danger here is not merely economic. The political left openly favors the collapse of America’s strategic position abroad. The withdrawal of the United States from the Middle East, the Far East and Europe would catastrophically impact an international system that presently allows 6 billion people to live on the earth’s surface in relative peace. Should anti-capitalist dogmas overwhelm the global market and trading system that evolved under American leadership, the planet’s economy would contract and untold millions would die of starvation. Nationalistic totalitarianism, fueled by a politics of blame, would once again bring war to Asia and Europe.** But **this time the war would be waged with mass destruction weapons** and the United States would be blamed because it is the center of global capitalism. Furthermore, **if the anti-capitalist party gains power in Washington, we can expect to see policies of appeasement and unilateral disarmament enacted. American appeasement and disarmament, in this context, would be an admission of guilt before the court of world opinion. Russia and China,** above all, **would exploit this** admission **to justify aggressive wars, invasions and mass destruction attacks**. A future financial crash, therefore, must be prevented at all costs.

#### Independently profit motive key to effective resource management

Fitzmaurice 15. Matthew, CEO, EcoAlpha Asset Management LLC. “ONLY CAPITALISM CAN SAVE THE PLANET,” Ensla. 3/23/2015. http://ensia.com/voices/only-capitalism-can-save-the-planet/

Here’s the thing, though: where there are problems to be solved, there’s money to be made. And where there’s money to be made, we awaken one of the world’s most powerful forces for change: capitalism. ¶ Of course capitalism has played a starring role in distressing the planet’s resources. Historically, the combination of unchecked industry, a readiness to externalize costs and a relentless thirst for growth have plundered and polluted the earth. It’s not a debate, but simple fact that our population size and economies cannot continue on their present trajectories without exhausting the world’s resources. Yet, a rapidly expanding global middle class — increasingly urbanized and hungry for protein — threatens further and accelerating distress. ¶ The hopeful news is that businesses, with their almost singular focus on economic self-interest, and governments, motivated by a variety of interests, are beginning to recognize and address in earnest these inevitable problems. ¶ Today, the businesses that develop practical and affordable solutions to burdened resource problems will end up being the world’s most profitable companies. No longer can they be considered “sustainability” businesses. They are everyday businesses with a long view, targeting problems that are not going away. That’s smart business. Burdened resources have become a strong economic driver for businesses of all sizes, in all industries everywhere to spend and change — and one that will only grow in scope and intensity over time. ¶ The companies that provide effective solutions to burdened resources will provide superior risk-adjusted returns to their investors as business and governments accelerate their solutions spending out of their own economic self-interest. And because the products, technologies and services these companies provide are common solutions to global problems — and are therefore exponentially repeatable — these investments will have amplified positive impact on global resource scarcity issues. ¶ Too often people have a narrow view of these solutions, thinking only of solar panels and windmills. But solutions are enormously diverse: They include, among many others, agricultural drones that monitor soil conditions, smart irrigation technology that delivers water only where and when it’s really needed, more efficient distributed energy generation and component suppliers that make cars use less gas. ¶ We face a new reality in which our economic self-interest and the long-term well-being of the planet are coming into alignment.¶ As a whole, the human race has a poor track record when it comes to altruism. Although there are a great many saints among us who spend — and even sacrifice — their lives to help others, most of us are hard pressed to take care of ourselves and our families. We have a much better track record when it comes to investing money in our own self- interest, which has fueled the unprecedented innovation, economic and life-expectancy growth of the past century. ¶ In the past, many people who invested in sustainable solutions were motivated principally by conscience, willing to accept reduced returns in order to invest their money in a way that was consistent with their beliefs and convictions — be they religious, social or environmental. Now, however, we face a new reality in which our economic self-interest and the long-term well-being of the planet are coming into alignment. Because we have to face the reality of burdened resources, there’s money in it. ¶ Recently, some asset managers have based investments on environmental, social and governance screening, betting that good corporate citizens are inherently better-managed companies, which will therefore be more profitable over time. Increasingly, however, ESG screening is becoming more pervasive and will likely over time become commonplace, robbing this sort of screening as a differentiator when making investment decisions. ¶ The primary goal for investing in sustainable solutions is to achieve superior risk-adjusted returns. Companies that provide solutions to the issues of burdened resources will be the recipients of a massive global spend cycle, no matter one’s motivation. The fact that one’s investment is also part of the solution rather than the problem is worth getting excited about. Self-interest is what moves markets. According to McKinsey’s report, How to make Green Growth the new normal, “In order to mobilize the US$3 trillion a year that will be needed to build a resource-efficient growth model, investing in the markets of the future needs to be seen as possessing superior risk-return characteristics.”¶ No government subsidy or charity case can move the needle for long. Only capitalism has the power to retool industries, reshape economies and rebuild infrastructure across the planet. It’s a big part of what got us into this mess, but it’s also what will get us out.

#### Ineffective resource management degrades public health, kills global air quality, and causes tensions over water scarcity in South Asia—culminates in extinction

Thompson 13. Thomas, President of Analytics Inc., a financial research and economic analysis firm. Citing Wang Shucheng, China’s former minister of water resources. “Choking on China,” Foreign Affairs. 6/8/2013. https://www.foreignaffairs.com/articles/china/2013-04-08/choking-china

The dangers of China’s environmental degradation go well beyond the country’s borders, as pollution threatens global health more than ever. Chinese leaders have argued that their country has the right to pollute, claiming that, as a developing nation, it cannot sacrifice economic growth for the sake of the environment. In reality, however, China is holding the rest of the world hostage -- and undermining its own prosperity.¶ According to the World Bank, only one percent of China’s 560 million urban residents breathe air considered safe by EU standards. Beijing’s levels of PM2.5s -- particles that are smaller than 2.5 micrometers in diameter and can penetrate the gas exchange regions of the lungs -- are the worst in the world. Beijing’s 2012 March average reading was 469 micrograms of such particles per cubic meter, which compares abysmally with Los Angeles’ highest 2012 reading of 43 micrograms per cubic meter.¶ Such air pollution contributed to 1.2 million premature deaths in China in 2010, according to the Global Burden of Disease Study. The unrelenting pace of construction of coal-fired power plants is only making matters worse. In his recent monograph, Climate Change: The China Problem, environmental scholar Michael Vandenbergh writes, “On average, a new coal-powered electric plant large enough to serve a city the size of Dallas opens in China every seven to ten days.” The lack of widespread coal-washing infrastructure and scrubbers at Chinese industrial facilities exacerbates the problem.¶ Carbon dioxide emissions from cars in China are also growing exponentially, replacing coal-fired power plants as the major source of pollution in major Chinese cities. Deutsche Bank estimates that the number of passenger cars in China will reach 400 million by 2030, up from today’s 90 million. And the sulfur levels produced by diesel trucks in China are at least 23 times worse than those in the United States. Acid rain, caused by these emissions, has damaged a third of China’s limited cropland, in addition to forests and watersheds on the Korean Peninsula and in Japan. This pollution reaches the United States as well, sometimes at levels prohibited by the U.S. Clean Water Act. In 2006, researchers at the University of California–Davis discovered that almost all of the harmful particulates over Lake Tahoe originated in China. The environmental experts Juli Kim and Jennifer Turner note in their essay “China’s Filthiest Export” that “by the time it reaches the U.S., mercury transforms into a reactive gaseous material that dissolves easily in the wet climates of the Pacific Northwest.” At least 20 percent of the mercury entering the Willamette River in Oregon most likely comes from China. Black carbon soot from China also threatens to block sunlight, lower crop yields, heat the atmosphere, and destabilize weather throughout the Pacific Rim.¶ China’s use of fresh water resources also threatens those beyond its borders. As Mark Twain reportedly said, in reference to California in the late nineteenth century, “Whiskey is for drinking; water is for fighting over.” The sentiment holds true in modern-day Asia as well. Asia’s per capita fresh water availability is less than half the global average. China and India, for example, are home to 40 percent of the world’s population but make do with ten percent of the world’s fresh water. China is guzzling and polluting this limited resource at an alarming rate. The country has dammed every major river on the Tibetan plateau, including the Mekong, the Salween, the Brahmaputra, the Yangtze, the Yellow, the Indus, the Sutlej, the Shweli, and the Karnali, and there are large-scale plans to dam others. Of the 50,000 largest dams in the world, more than half are in China. As a result, China now controls the river water supply to 13 nearby countries but so far has refused to sign any treaties or cooperate with other countries on water issues. Beijing also voted against the UN attempt to regulate water sharing in the region. China’s former minister of water resources, Wang Shucheng, described China’s water policy as “fight for every drop of water or die.” This philosophy, combined with China’s unabated pursuit of economic development, will have profoundly destabilizing consequences

for the region, both politically and environmentally.¶ Unfortunately for China, compromising the environment and health in pursuit of economic growth is not a sustainable strategy. The threat of water scarcity and the adverse domestic health effects of pollution darken China’s future. Pollution-related illnesses are soaring. A recent social media campaign led by locals and international activities shed light on the growing phenomena of “cancer villages” -- areas where water pollution is so bad that it has led to a sharp rise in diseases like stomach cancer. China’s own Ministry of Environmental Protection has concluded that 70 percent of the country’s major waterways are heavily polluted. According to Scott Moore of the Sustainability Science Program at Harvard’s Kennedy School of Government, pollutants have even seeped into the country’s subsurfaces, with more than half of monitored wells deemed unsafe to use for drinking water. The China Geological Survey now estimates that 90 percent of China’s cities depend on polluted groundwater supplies. Water that has been purified at treatment plants is often recontaminated en route to homes. China has plundered its groundwater reserves, drilling massive underground tunnels that have even caused some cities to literally sink.¶ China has also completely botched its waste-removal efforts. Eighty percent of the East China Sea, one of the world’s largest fisheries, is now unsuitable for fishing, according to Elizabeth C. Economy, a China and environmental expert at the Council on Foreign Relations. Most Chinese coastal cities pump at least half of their waste directly into the ocean, which causes red tides and coastal fish die-offs. According to the World Wildlife Fund, the country is now the largest polluter of the Pacific Ocean.¶ The economic costs of pollution have been the focus of various government-backed studies in China. A recent study by the Chinese Academy of Environmental Planning found that environmental damage to forests, wetlands, and grasslands shaved 3.5 percent off China’s 2012 GDP. The World Bank puts the total cost of China’s environmental degradation in the late 1990s at between 3.5 and 8 percent of GDP. China’s pollution problem is holding back its economy -- and poisoning its own people and the rest of the world in the process. The international community should push China to realize that if it continues to ravage the environment, it will be unable to secure its future health and prosperity -- or avoid a global disaster.

#### Extinction outweighs

-precautionary principle= default

**Jablonowski 10**

**(Mark, April, Lecturer in Economics at the University of Hartford, “Implications of Fuzziness for the Practical Management of High-Stakes Risks,” International Journal of Computational Intelligence Systems, Vol.3, No. 1, JKS)**

**“Danger” is an inherently fuzzy concept. Considerable knowledge imperfections surround** both **the probability of high-stakes exposures, and the assessment of their acceptability.** **This is due to the complex and dynamic nature of risk in the modern world**. ¶ **Fuzzy thresholds for danger are most effectively established based on natural risk standards. This means that risk levels are acceptable only to the degree they blend with natural background levels**. This concept reflects an evolutionary process that has supported life on this planet for thousands of years. By adhering to these levels, **we can help assure ourselves of thousands more.** While the level of such risks is yet to be determined, **observation suggest that the degree of human-made risk we routinely subject ourselves to is several orders of magnitude higher.** ¶ Due to the fuzzy nature of risk, we can not rely on statistical techniques. **The fundamental problem with catastrophe remains, in the long run, there may be no long run**. That is, **we can not rely on results “averaging out” over time.** With such risks, **only precautionary avoidance** (based on the minimax’ing of the largest possible loss) **makes sense. Combined with reasonable natural thresholds, this view allows a very workable approach to achieving safe progress**.

#### Cap sustainable and their alt cant overcome it

Peck and Theodore, 19

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Neoliberal, Neoliberalism, Neoliberalization: What’s in a Name?

That neoliberalism remains a circulating if contestable term, after decades of fitful and fickle usage, might be considered an achievement of sorts. Repeatedly disowned, denigrated, and dismissed, it nevertheless refuses to go away— at least circumstantial evidence, perhaps, that there is indeed “some there there.” This is not the place to revisit the extended genealogy of this troubled signifier and its contested historical geography (see Peck 2010; Cahill et al. 2018), except to observe that its turbulent fortunes, perhaps especially in the period since the Wall Street crash of 2008, have been revealing, while at the same time adding new layers of mystification and puzzlement to what has been a never-less-than-checkered history. What was to be a particularly heavyhanded reboot of this history began in the thick of that last crisis, a little over a decade ago. Perhaps unsurprisingly, the Wall Street crash was at the time widely interpreted as both a comprehensive repudiation and a system failure of neoliberalism by key figures on the left, from Eric Hobsbawm to Naomi Klein, who read the moment as terminal for the rolling project of financial deregulation and for the small-state consensus more generally, a view that was echoed by center-left economists such as Joseph Stiglitz and, although not in so many words, by the likes of Paul Krugman. Rather more surprisingly, there were also some mainstream politicians on the right and left flanks of the center ground, from France’s Nicolas Sarkozy to Australia’s Kevin Rudd, who in this uniquely disorientating context were moved to utter the hitherto unspeakable term, albeit only to declare its graceless exit (see Erlanger 2008; Rudd 2009). A common refrain across much of the commentary at the time, when real economies around the world and the credibility of those charged with their stewardship were both in freefall, was that the much-maligned state would be (had to be) making a comeback—in its own way echoing the arch-neoliberal conceits of governmental withdrawal and free-market governance, as if the state had ever really gone away. Projects of neoliberalization, it has been fairly clear all along to those willing to see, have never been synonymous with a simple diminution, or withdrawal, of the state, but instead have been variously concerned with its capture and reuse, albeit in the context of a generalized assault on social-welfarist or leftarm functions, coupled with an expansion of right-arm roles and capacities in areas like policing and surveillance, incarceration and social control, and the military. Nevertheless, this kind of state project was widely believed to have met its end a decade ago in the Wall Street meltdown.

What followed certainly did not align with the script of a terminal, once-and-for-all collapse of neoliberalism represented (again, somewhat misleadingly) as a bracketable “era” of free-market governance. As if to affirm Thatcher’s premature dismissal that there was “no alternative” to market rule, what followed in the wake of the financial crisis was, far from a retreat of neoliberalism, more like an audacious exercise in doubling down. Longterm austerity measures were (re)imposed in nations rich and poor, including those countries once regarded as the tutelary “heartlands” of the project, and its proving grounds, the United States and the United Kingdom. A new generation of structural adjustment programs targeted not only populations across the global South but also Greece, Detroit, and elsewhere. There were sustained, if scattergun, assaults on many of the old targets—public services, public budgets, and public servants; social movements and labor unions; social security, socialized healthcare, and public-education systems; and undeserving classes, the poor, and racialized others. And all the while, financial and corporate elites got away with slaps on the wrist, if that, only to be compensated in due course with yet more deregulation and further rounds of tax cuts. This unapologetic mutation of late neoliberalism, back as it were from its own grave, may have been shorn of anything approaching credible claims to moral leadership and intellectual authority, but in this reconstituted form it would present a yet more brutal face in its dogged defenses of political power and institutional dominance, soon to be coupled with brazen reassertions of the manifestly dubious case for corporate liberty, financial freedom, and social-state retrenchment.

#### Technocapitalism key to CCS

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Dane. “Ethics of Climate Engineering: Chemical Capture of Carbon Dioxide from Air” International Journal for Philosophy of Chemistry Vol 24. Page 55-77. <http://hyle.org/journal/issues/24-1/scott.pdf>

DAC of carbon and storage (DACCS) seemed to many a tantalizing technological fix for climate change, but it proved to be far too expensive. Prior to the publication of Carbon Engineering’s 2018 results, the definitive study of the costs of industrial-scale DAC estimated the price to be $1000 US dollars per metric ton of CO2 (House et al. 2011). To put this number in perspective, it would cost approximately $1.2 trillion to capture the CO2 emitted by coal-fired power plants in the United States during 2017, approximately 1.2 billion metric tons (US Energy Information Administration 2018). A central problem DAC must overcome is the ‘net carbon problem’ (ibid.). The concentration of CO2 in ambient air is extremely small, approximately 400 parts per million (Burrows 2018). Consequently, large industrial machines must move massive amounts of air through the process to capture enough CO2 for the technique to work. These industrial machines, and other parts of the operation, require much energy. Energy, of course costs money, and depending on the source of energy, the operation will add more or less CO2 to the atmosphere. An accurate assessment of this technique for climate engineering would require a full accounting of the CO2 added to the atmosphere during the operation and for the full lifecycle of the plant. These numbers will not be available until experiments are run at larger scales for longer times.

Carbon Engineering estimates that their technique would lower costs from the 2011 study from $1000 to the range of $94 to $232 per metric ton of CO2 (Keith et al. 2018). They were able to accomplish this by developing a new chemical process and by repurposing existing industrial technologies to run it. Their approach uses arrays of large fans to move massive amounts of air over a chemical solution to capture CO2 . They describe the chemistry as involving two connected loops: “The first loop captures CO2 from the atmosphere using an aqueous solution with ionic concentrations of roughly 1.0 M OH− , 0.5 M CO3 2−, and 2.0 M K+ . In the second loop, CO3 2− is precipitated by reaction with Ca2+ to form CaCO3 while the Ca2+ is replenished by dissolution of Ca(OH)2 . The CaCO3 is calcined to liberate CO2 producing CaO, which is hydrated or ‘slaked’ to produce Ca(OH)2” (ibid.). They produce synthetic fuel by a conventional process commonly used in the oil industry, which reacts CO2 with H2 to produce fuel. Carbon Engineering is currently seeking funding to test their chemical processes and technologies at larger scales.

It is important to note that the company is not currently pursuing plans to capture carbon and store it, for example, in geologic formations. Their research focuses on producing ‘carbon-neutral’ synthetic fuels, which is only possible if the electricity used to drive the process is generated from a noncarbon producing source, such as a hydroelectric plant. Further, it should also be noted that the current process uses some natural gas, which researchers hope to replace with electricity and make the process carbon neutral. That said, David Keith notes that the company could adapt their technique for producing ‘carbon neutral’ fuels to be used as a negative emissions technology. However, Keith remarks that, “[carbon storage] wouldn’t give Carbon Engineering any product to sell, and there are no buyers stepping up to front the effort, for now” (Meyer 2018). For Climate Engineering’s technique to realize any potential for climate engineering, a market for removing carbon from the atmosphere and ‘permanently’ storing it would have to exist. However, this might be an instance where a proof of concept technology could help create a market for the service it could someday provide. Once negative emissions technologies are seen as a possible way to make vast fortunes, while also providing a vital social benefit, it is easy to imagine that the political will to create a market for CCS will somehow emerge – especially with powerful advocates like Bill Gates leading the way.

Carbon Engineering is pioneering a potentially multibillion-dollar industry that might someday serve as a technological fix for the climate crisis. One journalist notes that “[Carbon Engineering] could […] make Harvard superstar physicist David Keith, Microsoft co-founder Bill Gates, and oil sands magnate Norman Murray Edwards [another powerful financial backer] more money than they could ever dream of” (Vidal 2018). If Carbon Engineering continues to attract wealthy and politically influential backers like Bill Gates and Norman Murray Edwards, the creation of a CCS industry could transform the landscape of climate change politics. This could be a mixed blessing: the promise alone of cost-effective CCS could create a moral hazard, which, as will be explained, could lead to an ethical dilemma for scientists considering CCS research.

#### That’s the ONLY POSSIBLE way to solve warming

Moniz 9/23/19 - 13th Secretary of Energy (2013 to 2017) and is the founder and CEO of the Energy Futures Initiative

Fredd Krupp is president of the Environmental Defense Fund, Ernest Moniz, “Cutting Climate Pollution Isn’t Enough — We Also Need Carbon Removal,” Text, TheHill, September 23, 2019, <https://thehill.com/opinion/energy-environment/462609-cutting-climate-pollution-isnt-enough-we-also-need-carbon-removal>.

It has been almost four years since the Paris climate agreement was signed. But as leaders gather in New York this week for the United Nations Climate Change Summit, the world remains far off track from meeting the Paris objective of limiting global warming to well below 2 degrees Celsius -- and pursuing efforts at 1.5 degrees.

To meet that target, the world must achieve a 100 percent clean economy — one that produces net zero emissions, or no more climate pollution than can be removed from the atmosphere — soon after mid-century, with the United States and other advanced economies reaching that milestone no later than 2050. It’s a daunting but doable task.

The consequences of falling short are enormous. This year, the U.S. government’s fourth National Climate Assessment documented the huge economic and social impacts of unchecked warming. The Pentagon has repeatedly warned of the impacts on national security and our troops.

Achieving a 100 percent clean economy will require a swift transition to renewables and other zero-carbon energy sources. But we also need to face the reality that meeting the Paris target will require taking carbon out of the atmosphere at massive scale. In part, that’s because eliminating emissions will be very challenging for some sectors, especially the transportation industry and agriculture. Removing carbon from the atmosphere would also bring concentrations down, helping to stabilize the climate at safer levels. So, the push for clean energy must be supplemented by a suite of technologies known as carbon dioxide removal (CDR).

It is not a question of what we’d prefer. It’s a question of insurmountable math.

The crucial role carbon removal must play is becoming more widely recognized. The 2018 Intergovernmental Panel on Climate Change report stressed the importance of carbon removal, and the U.S. National Academies of Sciences, Engineering and Medicine late last year estimated that ten billion tons of CO2 will need to be pulled from the atmosphere annually by 2050, and double that by 2100. For context, today’s global emissions are less than 40 billion tons per year. If the 10 billion tons of CO2 from CDR were stored underground, that would be roughly double the world’s annual oil production.

The good news is that there are a surprisingly large number of promising pathways for carbon dioxide removal. Nature-based approaches include reforestation and forest management as well as agricultural practices that increase carbon stored in soils. Some of the attendant challenges include competition for land and permanence of the carbon sequestration.

Technological approaches include direct air capture — machines that actually suck carbon from the air — and technologically-enhanced natural processes, such as plants genetically modified with deep roots to fix carbon in the soil; enhanced mineralization, which uses certain reactive rocks to bind with carbon from the air; and accelerated ocean uptake in phytoplankton. These technologies are immature and require considerable research, development and demonstration to ensure viability and affordability at very large scale.

Despite the urgency, there is no dedicated federal effort to develop these crucial technologies; existing programs are piecemeal and largely focused on sequestering emissions from industrial and electricity generating sources.

The National Academies recommended the rapid establishment of a robust, focused, scalable and accelerated federal research program spanning the Departments of Energy and Agriculture, the National Oceanic and Atmospheric Administration and the National Science Foundation, among others. Such a program would encompass the full range of technological pathways that can remove CO2 from the environment. ‘’Clearing the Air,’’ an analysis of CDR’s value and a proposed plan to deploy it, has been completed by the Energy Futures Initiative. Over the next decade, the program scale would be about a billion dollars a year.

Carbon dioxide removal is not a magic bullet. We must do everything we can to deploy innovative low- and zero-carbon methods to generate electricity, heat homes, fuel vehicles, and power industry, creating new economic opportunities in the process. Tackling the climate crisis also requires placing a declining limit and a price on carbon pollution, as well as a significant increase in energy technology innovation and deployment across the board.

But CDR is also not a “Plan B.” It is a critical part of any “Plan A” for climate, a necessary complement to emission reduction. It can provide more flexibility and optionality in policy planning, which could ease the transition to a carbon-neutral economy while minimizing transition costs and providing greater assurance that science-based climate goals can be met in a timely manner. It would eventually enable a net negative global economy that could bring the atmospheric carbon concentrations down — and global temperatures with it.

We have delayed meaningful action for far too long. As a result, the scale and urgency of the challenge is such that we cannot simply work on doing better in the future. We need to correct what we did in the past. Carbon removal is the enabler.