### 1

#### Interpretation – the Affirmative must present a delineated enforcement mechanism for the Plan. There is no normal means since terms are negotiated contextually among member states.

WTO No Date "Whose WTO is it anyway?" <https://www.wto.org/english/thewto_e/whatis_e/tif_e/org1_e.htm> //Elmer

**When WTO rules impose disciplines** on countries’ policies, **that is the outcome of negotiations among WTO members.** The rules are **enforced** **by** the **members themselves** **under agreed procedures that they negotiated**, **including the possibility of trade sanctions**. But those sanctions are imposed by member countries, and authorized by the membership as a whole. This is quite different from other agencies whose bureaucracies can, for example, influence a country’s policy by threatening to withhold credit.

#### Violation: they don’t

#### Standards

#### 1] Shiftiness- They can redefine the 1AC’s enforcement mechanism in the 1AR which allows them to recontextualize their enforcement mechanism to wriggle out of DA’s since all DA links are predicated on type of enforcement i.e. sanctions bad das, domestic politics das off of backlash, information research sharing da if they put monetary punishments, or trade das.

#### 2] Real World - Policy makers will always specify how the mandates of the plan should be endorsed. It also means zero solvency, absent spec, states can circumvent the Aff’s policy since there is no delineated way to enforce the affirmative which means there’s no way to actualize any of their solvency arguments.

#### ESpec isn’t regressive or arbitrary- it’s an active part of the WTO is central to any advocacy about international IP law since the only uniqueness of a reduction of IP protections is how effective its enforcement is.

### 2

#### Strong current IP guarantees causes massive Pharma innovation.

* Answers Evergreening/Me-Too Drugs

Stevens and Ezell 20 Philip Stevens and Stephen Ezell 2-3-2020 "Delinkage Debunked: Why Replacing Patents With Prizes for Drug Development Won’t Work" <https://itif.org/publications/2020/02/03/delinkage-debunked-why-replacing-patents-prizes-drug-development-wont-work> (Philip founded Geneva Network in 2015. His main research interests are the intersection of intellectual property, trade, and health policy. Formerly he was an official at the World Intellectual Property Organization (WIPO) in Geneva, where he worked in its Global Challenges Division on a range of IP and health issues. Prior to his time with WIPO, Philip worked as director of policy for International Policy Network, a UK-based think tank, as well as holding research positions with the Adam Smith Institute and Reform, both in London. He has also worked as a political risk consultant and a management consultant. He is a regular columnist in a wide range of international newspapers and has published a number of academic studies. He holds degrees from the London School of Economics and Durham University (UK).)//Elmer

The **Current System** Has **Produced a Tremendous Amount of Life-Sciences Innovation** The frontier for biomedical innovation is seemingly limitless, and the challenges remain numerous—whether it comes to diseases that afflict millions, such as cancer or malaria, or the estimated 7,000 rare diseases that afflict fewer than 200,000 patients.24 And while certainly citizens in developed and developing nations confront differing health challenges, those challenges are increasingly converging. For instance, as of this year, analysts expect that **noncommunicable** diseases such as cardiovascular disease and diabetes will account for 70 percent of natural fatalities **in developing countries**.25 Citizens of low- and middle-income countries bear 80 percent of the world’s death burden from cardiovascular disease.26 Forty-six percent of Africans over 25 suffer from hypertension, more than anywhere else in the world. Similarly, 85 percent of the disease burden of cervical cancer is borne by individuals living in low- and middle-income countries.27 To develop treatments or cures for these conditions, novel biomedical innovation **will be needed from everywhere**. Yet tremendous progress has been made in recent decades. To tackle these challenges, the global pharmaceutical industry invested over **$1.36 trillion in R&D** in the decade from 2007 to 2016—and it’s expected that annual R&D investment by the global pharmaceutical industry will reach $181 billion by 2022.28 In no small part due to that investment, **943 new active substances have been introduced** globally over the prior 25 years.29 The U.S. Food and Drug Administration (FDA) has approved more than **500 new medicines since 2000** alone. And these medicines are getting to more individuals: Global medicine use **in 2020 will reach 4.5 trillion doses**, up 24 percent from 2015.30 Moreover, there are an estimated 7,000 new medicines under development globally (about half of them in the United States), with 74 percent being potentially first in class, meaning they use a new and unique mechanism of action for treating a medical condition.31 In the United States, over 85 percent of all drugs sold are generics (only 10 percent of U.S. prescriptions are filled by brand-name drugs).32 And while some assert that biotechnology companies focus too often on “me-too” drugs that compete with other treatments already on the market, the reality is many drugs currently under development are meant to tackle some of the **world’s most intractable diseases**, **including cancer and Alzheimer’s**.33 Moreover, such arguments miss that many of the drugs developed in recent years have in fact been first of their kind. For instance, in 2014, the FDA approved **41 new medicines** (at that point, the most since 1996) many of which were first-in-class medicines.34 In that year, 28 of the 41 drugs approved were considered biologic or specialty agents, and 41 percent of medicines approved were intended to treat rare diseases.35 Yet even when a new drug isn’t first of its kind, it can still produce benefits for patients, both through **enhanced clinical efficacy** (for instance, taking the treatment as a pill rather than an injection, with a superior dosing regimen, **or better treatment** for some individuals who don’t respond well to the original drug) and by generating competition that exerts downward price pressures. For example, a patient needing a cholesterol drug has a host of statins from which to choose, which is important because some statins produce harmful side effects for some patients. Similarly, patients with osteoporosis can choose from Actonel, Boniva, or Fosomax. Or take for example Hepatitis C, which until recently was an incurable disease eventually requiring a liver transplant for many patients. In 2013, a revolutionary new treatment called Solvadi was released that boosted cure rates to 90 percent. This was followed in 2014 by an improved treatment called Harvoni, which cures the Hepatitis C variant left untouched by Solvadi. Since then, an astonishing six new treatments for the disease have received FDA approval, opening up a wide range of treatment options that take into account patients’ liver and kidney status, co-infections, potential drug interactions, previous treatment failures, and the genotype of HCV virus.36 “If you have to have Hepatitis C, now is the time to have it,” as Douglas Dieterich, a liver specialist at the Icahn School of Medicine at Mount Sinai Hospital in New York, told the Financial Times. “We have these marvellous drugs we can treat you with right now, without side effects,” he added. “And this time next year, we’ll have another round of drugs available.”37 Moreover, the financial potential of this new product category has led to multiple competing products entering the market in quick succession, in turn placing downward pressure on prices.38 As Geoffrey Dusheiko and Charles Gore write in The Lancet, “The market has done its work for HCV treatments: after competing antiviral regimens entered the market, competition and innovative price negotiations have driven costs down from the initially high list prices in developed countries.”39 As noted previously, opponents of the current market- and IP-based system contend patents enable their holders to exploit a (temporary) market monopoly by inflating prices many multiples beyond the marginal cost of production. But rather than a conventional neoclassical analysis, an analysis based on “innovation economics” finds it is exactly this “distortion” that is required for innovation to progress. As William Baumol has pointed out, “Prices above marginal costs and price discrimination become the norm rather than the exception because … without such deviations from behaviour in the perfectly competitive model, innovation outlays and other unavoidable and repeated sunk outlays cannot be recouped.”40 Or, as the U.S. Congressional Office of Technology Assessment found, “Pharmaceutical R&D is a risky investment; therefore, high financial returns are necessary **to induce companies to invest** in researching new chemical entities.”41 This is also why, in 2018, the U.S. Congressional Budget Office estimated that because of high failure rates, biopharmaceutical **companies would need to earn a 61.8 percent rate of return on their successful new drug R&D projects in order to match a 4.8 percent after-tax rate of return on their investment**s.42 Indeed, **it’s the ability to recoup fixed costs, not just marginal** costs, through mechanisms such as patent protection that lies at the heart of all innovation-based industries and indeed all innovation and related economic progress. If companies could not find a way to pay for their R&D costs, and could only charge for the costs of producing the compound, **there would be no new drugs developed**, just as there would be no new products developed in any industry. Innovating in the life sciences remains expensive, risky, difficult, and uncertain. Just 1 in 5,000 drug candidates make it all the way from discovery to market.43 A 2018 study by the Deloitte Center for Health Solutions, “Unlocking R&D productivity: Measuring the return from pharmaceutical innovation 2018,” found that “the average cost to develop an asset [an innovative life-sciences drug] including the cost of failure, has increased in six out of eight years,” and that the average cost to create a new drug has risen to $2.8 billion.44 Related research has found the development of new drugs requires years of painstaking, risky, and expensive research that, for a new pharmaceutical compound, takes an average of 11.5 to 15 years of research, development, and clinical trials, at a cost of $1.7 billion to $**3.2 billion**.45 IP rights—including patents, copyrights, and data exclusivity protections—give innovators, whether in the life sciences or other sectors, the **confidence** to undertake the risky and expensive process of innovation, secure in the knowledge they’ll be able to capture a share of the gains from their efforts. And these gains are often only a small fraction of the true value created. For instance, Yale University economist William Nordhaus estimated inventors capture just 4 percent of the total social gains from their innovations; the rest spill over to other companies and society as a whole.46 Without adequate IP protection, private investors would never find it viable to fund advanced research because lower-cost copiers would be in a position to undercut the legitimate prices (and profits) of innovators, even while still generating substantial profits on their own.47 As the report “Wealth, Health and International Trade in the 21st Century” concludes, “Conferring robust intellectual property rights is, in the pharmaceutical and other technological-development contexts, **in the global public’s long-term interests.** Without adequate mechanisms for directly and indirectly securing the private and public funding of medicines and vaccines, research and development communities across the world will lose future benefits that would far outweigh the development costs involved.”48 Put simply, the current market- and IP-based life-sciences innovation system is producing life-changing biomedical innovation. As Jack Scannell, a senior fellow at Oxford University’s Center for the Advancement of Sustainable Medical Innovation has explained, “I would guess that one can buy today, at rock bottom generic prices, a set of small-molecule drugs that has greater medical utility than the entire set available to anyone, anywhere, at any price in 1995.” He continued, “Nearly all the generic medicine chest was created by firms who invested in R&D to win future profits that they tried pretty hard to maximize; short-term financial gain building a long-term common good.”49 For example, on September 14, 2017, the FDA approved Mvasi, the first biosimilar for Roche’s Avastin, a breakthrough anticancer drug when it came out in the mid-1990s for lung, cervical, and colorectal cancer.50 In other words, a medicine to treat forms of cancer that barely existed 20 years ago is now available as a generic drug today. It’s this dynamic that enables us to imagine a situation wherein drugs to treat diseases that aren’t available anywhere at any price today (for instance, treatments for Alzheimer’s or Parkinson’s) might be available as generics in 20 years. But that will only be the case if we preserve (and improve where possible) a life-sciences innovation system that is generally working. The current system does not require wholesale replacement by a prize-based system that—notwithstanding a meaningful success here or there—has produced nowhere near a similar level of novel biomedical innovation.

#### **Reducing IP protections chills future investment – even the perception of wavering commitment scares off companies.**

Grabowski et al. ’15 (Harry; Professor Emeritus of Economics at Duke, and a specialist in the intersection of the pharmaceutical industry and government regulation of business; February 2015; “The Roles Of Patents And Research And Development Incentives In Biopharmaceutical Innovation”; Health Affairs; <https://www.healthaffairs.org/doi/10.1377/hlthaff.2014.1047>; Accessed: 8-31-2021; AU)

Patents and other forms of **intellectual property** **protection** play **essential roles** in encouraging innovation in biopharmaceuticals. As part of the “21st Century Cures” initiative, Congress is reviewing the policy mechanisms designed to accelerate the discovery, development, and delivery of new treatments. Debate continues about how best to balance patent and intellectual property incentives to encourage innovation, on the one hand, and generic utilization and price competition, on the other hand. We review the current framework for accomplishing these dual objectives and the important role of patents and regulatory exclusivity (together, the patent-based system), given the lengthy, costly, and risky biopharmaceutical research and development process. We summarize existing targeted incentives, such as for orphan drugs and neglected diseases, and we consider the pros and cons of proposed voluntary or mandatory alternatives to the patent-based system, such as prizes and government research and development contracting. We conclude that patents and regulatory exclusivity provisions are likely to remain the core approach to providing incentives for biopharmaceutical research and development. However, prizes and other voluntary supplements could play a useful role in addressing unmet needs and gaps in specific circumstances. Technological innovation is widely recognized as a key determinant of economic and public health progress. 1,2 Patents and other forms of intellectual property protection are generally thought to play essential roles in encouraging innovation in biopharmaceuticals. This is because the process of developing a new drug and bringing it to market is **long, costly, and risky**, and the costs of imitation are low. After a new drug has been approved and is being marketed, its **patents protect it** from competition from chemically identical entrants (or entrants infringing on other patents) for a period of time. **For firms** to have an **incentive** to **continue to invest** in innovative development efforts, they must have an **expectation** that they can **charge enough** during this period to **recoup** costs and make a profit. After a drug’s patent or patents expire, **generic rivals** can enter the market at **greatly reduced development cost** and prices, providing added consumer benefit but **eroding** the **innovator drug** company’s revenues. The Drug Price Competition and Patent Term Restoration Act of 1984 (commonly known as the Hatch-Waxman Act) was designed to balance innovation incentives and generic price competition for new drugs (generally small-molecule chemical drugs, with some large-molecule biologic exceptions) by extending the period of a drug’s marketing exclusivity while providing a regulatory framework for generic drug approval. This framework was later changed to encompass so-called biosimilars for large-molecule (biologic) drugs through the separate Biologics Price Competition and Innovation Act of 2009. Other measures have been enacted to provide research and development (R&D) incentives for antibiotics and drugs to treat orphan diseases and neglected tropical diseases. Discussion continues about whether current innovation incentives are optimal or even adequate, given evolving public health needs and scientific knowledge. For instance, the House Energy and Commerce Committee recently embarked on the “21st Century Cures” initiative, 3 following earlier recommendations by the President’s Council of Advisors on Science and Technology on responding to challenges in “propelling innovation in drug discovery, development, and evaluation.” 4 In this context, we discuss the importance of patents and other forms of intellectual property protection to biopharmaceutical innovation, given the unique economic characteristics of drug research and development. We also review the R&D incentives that complement patents in certain circumstances. Finally, we consider the pros and cons of selected voluntary (“opt-in”) or mandatory alternatives to the current patent- and regulatory exclusivity–based system (such as prizes or government-contracted drug development) and whether they could better achieve the dual goals of innovation incentives and price competition. The essential rationale for patent protection for biopharmaceuticals is that long-term benefits in the form of continued future innovation by pioneer or brand-name drug manufacturers outweigh the relatively short-term restrictions on imitative cost competition associated with market exclusivity. Regardless, the entry of other branded agents remains an important source of therapeutic competition during the patent term. Several economic characteristics make patents and intellectual property protection **particularly important** to **innovation incentives** for the biopharmaceutical industry. 5 The R&D process often takes more than a decade to complete, and according to a recent analysis by Joseph DiMasi and colleagues, per new drug approval (including failed attempts), it involves more than a **billion** dollars in out-of-pocket costs. 6 Only approximately one in eight drug candidates survive clinical testing. 6 As a result of the high risks of failure and the high costs, research and development must be funded by the **few successful, on-market products** (the top quintile of marketed products provide the dominant share of R&D returns). 7,8 Once a new drug’s patent term and any regulatory exclusivity provisions have expired, competing manufacturers are allowed to sell generic equivalents that require the investment of only several million dollars and that have a high likelihood of commercial success. **Absent intellectual property protections** that allow marketing exclusivity, innovative firms would be **unlikely** to make the costly and risky investments needed to bring a new drug to market. Patents confer the right to exclude competitors for a limited time within a given scope, as defined by patent claims. However, **they do not guarantee demand**, nor do they prevent competition from nonidentical drugs that treat the same diseases and fall outside the protection of the patents. New products may enter the same therapeutic class with common mechanisms of action but different molecular structures (for example, different statins) or with differing mechanisms of action (such as calcium channel blockers and angiotensin receptor blockers). 9 Joseph DiMasi and Laura Faden have found that the time between a first-in-class new drug and subsequent new drugs in the same therapeutic class has been dramatically reduced, from a median of 10.2 years in the 1970s to 2.5 years in the early 2000s. 10 Drugs in the same class compete through quality and price for preferred placement on drug formularies and physicians’ choices for patient treatment. Patents play an **essential role** in the economic “ecosystem” of **discovery and investment** that has developed since the 1980s. Hundreds of start-up firms, often backed by venture capital, have been launched, and a robust innovation market has emerged. 11 The value of these development-stage firms is largely determined by their proprietary technologies and the candidate drugs they have in development. As a result, the **strength of intellectual property protection** plays a **key role** in funding and partnership opportunities for such firms. Universities also play a key role in the R&D ecosystem because they conduct basic biomedical research supported by sponsored research grants from the National Institutes of Health (NIH) and the National Science Foundation (NSF). The Patent and Trademark Law Amendments Act of 1980 (commonly known as the Bayh-Dole Act) gave universities the right to retain title to patents and discoveries made through federally funded research. This change was designed to encourage technology transfer through industry licensing and the creation of start-up companies. Universities received only 390 patents for their discoveries in 1980, 12 compared to 4,296 in 2011, with biotechnology and pharmaceuticals being the top two technology areas (accounting for 36 percent of all university patent awards in 2012). 13

#### **R&D’s key to innovation – otherwise, future pandemics.**

Marjanovic et al. ’20 (Sonja; Ph.D. at the University of Cambridge; May 2020; “How to Best Enable Pharma Innovation Beyond the COVID-19 Crisis”; RAND; <https://www.rand.org/pubs/perspectives/PEA407-1.html>; Accessed: 8-31-2021; AU)

As key actors in the healthcare innovation landscape, pharmaceutical and life sciences companies have been called on to **develop** medicines, vaccines and diagnostics for pressing public health challenges. The COVID-19 crisis is one such challenge, but there are many others. For example, MERS, SARS, Ebola, Zika and avian and swine flu are also **infectious diseases** that represent public health threats. Infectious agents such as anthrax, smallpox and tularemia could present threats in a **bioterrorism context**.1 The general threat to public health that is posed by **antimicrobial resistance** is also well-recognised as an area **in need of pharmaceutical innovation**. Innovating in response to these challenges does not always align well with pharmaceutical industry commercial models, shareholder expectations and competition within the industry. However, the expertise, networks and infrastructure that industry has within its reach, as well as public expectations and the moral imperative, make pharmaceutical companies and the wider life sciences sector an **indispensable partner** in the search for solutions that save lives. This perspective argues for the need to establish more sustainable and scalable ways of incentivising pharmaceutical innovation in response to infectious disease threats to public health. It considers both past and current examples of efforts to mobilise pharmaceutical innovation in high commercial risk areas, including in the context of current efforts to respond to the COVID-19 pandemic. In global pandemic crises like COVID-19, the urgency and scale of the crisis – as well as the spotlight placed on pharmaceutical companies – mean that contributing to the search for effective medicines, vaccines or diagnostics is **essential** for socially responsible companies in the sector. 2 It is therefore unsurprising that we are seeing industry-wide efforts unfold at unprecedented scale and pace. Whereas there is always scope for more activity, industry is currently **contributing in a variety of ways**. Examples include pharmaceutical companies donating existing compounds to assess their utility in the fight against COVID19; screening existing compound libraries in-house or with partners to see if they can be repurposed; accelerating trials for potentially effective medicine or vaccine candidates; and in some cases rapidly accelerating in-house research and development to discover new treatments or vaccine agents and develop diagnostics tests.3,4 Pharmaceutical companies are collaborating with each other in some of these efforts and participating in global R&D partnerships (such as the Innovative Medicines Initiative effort to accelerate the development of potential therapies for COVID-19) and supporting national efforts to expand diagnosis and testing capacity and ensure affordable and ready access to potential solutions.3,5,6 The **primary purpose** of such innovation is to benefit patients and wider population health. Although there are also reputational benefits from involvement that can be realised across the industry, there are likely to be relatively few companies that are ‘commercial’ winners. Those who might gain substantial revenues will be under pressure not to be seen as profiting from the pandemic. In the United Kingdom for example, GSK has stated that it does not expect to profit from its COVID-19 related activities and that any gains will be invested in supporting research and long-term pandemic preparedness, as well as in developing products that would be affordable in the world’s poorest countries.7 Similarly, in the United States AbbVie has waived intellectual property rights for an existing combination product that is being tested for therapeutic potential against COVID-19, which would support affordability and allow for a supply of generics.8,9 Johnson & Johnson has stated that its potential vaccine – which is expected to begin trials – will be available on a not-for-profit basis during the pandemic.10 Pharma is mobilising substantial efforts to rise to the COVID-19 challenge at hand. However, we need to consider **how** pharmaceutical **innovation** for **responding to emerging** infectious diseases can best be enabled beyond the current crisis. Many **public health threats (including** those associated with other infectious diseases, bioterrorism agents and antimicrobial resistance) **are urgently in need** of pharmaceutical innovation, even if their impacts are not as visible to society as COVID-19 is in the immediate term. The pharmaceutical industry has responded to previous public health emergencies associated with infectious disease in recent times – for example those associated with Ebola and Zika outbreaks.11 However, it has done so to a lesser scale than for COVID-19 and with contributions from fewer companies. Similarly, levels of activity in response to the threat of antimicrobial resistance are still low.12 There are **important policy questions** as to whether – and how – industry could engage with such public health threats to an even greater extent under **improved innovation conditions.**

#### Evolving superbugs trigger extinction.

Srivatsa ’17 (Kadiyali; specialist in pediatric intensive and critical care medicine in the UK. Invented the bacterial identification tool ‘MAYA’; 1-12-2017; "Superbug Pandemics and How to Prevent Them", American Interest; https://www.the-american-interest.com/2017/01/12/superbug-pandemics-and-how-to-prevent-them/, Accessed: 8-31-2021; AU)

It is by now no secret that the human species is locked in a race of its own making with “superbugs.” Indeed, if popular science fiction is a measure of awareness, the theme has pervaded English-language literature from Michael Crichton’s 1969 Andromeda Strain all the way to Emily St. John Mandel’s 2014 Station Eleven and beyond. By a combination of massive inadvertence and what can only be called stupidity, we must now invent new and effective antibiotics faster than deadly bacteria evolve—and regrettably, they are rapidly doing so with our help. I do not exclude the possibility that bad actors might deliberately engineer deadly superbugs.1 But even if that does not happen, humanity faces an existential threat largely of its own making in the absence of malign intentions. As threats go, this one is entirely predictable. The concept of a “black swan,” Nassim Nicholas Taleb’s term for low-probability but high-impact events, has become widely known in recent years. Taleb did not invent the concept; he only gave it a catchy name to help mainly business executives who know little of statistics or probability. Many have embraced the “black swan” label the way children embrace holiday gifts, which are often bobbles of little value, except to them. But the threat of inadvertent pandemics is not a “black swan” because its probability is not low. If one likes catchy labels, it better fits the term “gray rhino,” which, explains Michele Wucker, is a high-probability, high-impact event that people manage to ignore anyway for a raft of social-psychological reasons.2 A pandemic is a quintessential gray rhino, for it is no longer a matter of if but of when it will challenge us—and of how prepared we are to deal with it when it happens. We have certainly been warned. The curse we have created was understood as a possibility from the very outset, when seventy years ago Sir Alexander Fleming, the discoverer of penicillin, predicted antibiotic resistance. When interviewed for a 2015 article, “The Most Predictable Disaster in the History of the Human Race,” Bill Gates pointed out that one of the costliest disasters of the 20th century, worse even than World War I, was the Spanish Flu pandemic of 1918-19. As the author of the article, Ezra Klein, put it: “No one can say we weren’t warned. And warned. And warned. A pandemic disease is the most predictable catastrophe in the history of the human race, if only because it has happened to the human race so many, many times before.”3 Even with effective new medicines, if we can devise them, we must contain outbreaks of bacterial disease fast, lest they get out of control. In other words, we have a social-organizational challenge before us as well as a strictly medical one. That means getting sufficient amounts of medicine into the right hands and in the right places, but it also means educating people and enabling them to communicate with each other to prevent any outbreak from spreading widely. Responsible governments and cooperative organizations have options in that regard, but even individuals can contribute something. To that end, as a medical doctor I have created a computer app that promises to be useful in that regard—of which more in a moment. But first let us review the situation, for while it has become well known to many people, there is a general resistance to acknowledging the severity and imminence of the danger. What Are the Problems? Bacteria are among the oldest living things on the planet. They are masters of survival and can be found everywhere. Billions of them live on and in every one of us, many of them helping our bodies to run smoothly and stay healthy. Most bacteria that are not helpful to us are at least harmless, but some are not. They invade our cells, spread quickly, and cause havoc that we refer to generically as disease. Millions of people used to die every year as a result of bacterial infections, until we developed antibiotics. These wonder drugs revolutionized medicine, but one can have too much of a good thing. Doctors have used antibiotics recklessly, prescribing them for just about everything, and in the process helped to create strains of bacteria that are resistant to the medicines we have. We even give antibiotics to cattle that are not sick and use them to fatten chickens. Companies large and small still mindlessly market antimicrobial products for hands and home, claiming that they kill bacteria and viruses. They do more harm than good because the low concentrations of antimicrobials that these products contain tend to kill friendly bacteria (not viruses at all), and so clear the way for the mass multiplication of surviving unfriendly bacteria. Perhaps even worse, hospitals have deployed antimicrobial products on an industrial scale for a long time now, the result being a sharp rise in iatrogenic bacterial illnesses. Overuse of antibiotics and commercial products containing them has helped superbugs to evolve. We now increasingly face microorganisms that cannot be killed by antibiotics, antifungals, antivirals, or any other chemical weapon we throw at them. Pandemics are the major risk we run as a result, but it is not the only one. Overuse of antibiotics by doctors, homemakers, and hospital managers could mean that, in the not-too-distant future, something as simple as a minor cut could again become life-threatening if it becomes infected. Few non-medical professionals are aware that antibiotics are the foundation on which nearly all of modern medicine rests. Cancer therapy, organ transplants, surgeries minor and major, and even childbirth all rely on antibiotics to prevent infections. If infections become untreatable we stand to lose most of the medical advances we have made over the past fifty years.

### 3

#### CP Text – The United States federal government ought to establish a global leadership role in production and distribution of medicines to solve Pandemic and Neglected Diseases and treatments by engaging in talks with NATO and the G-7 and expanding support of Medical Distribution Programs using a framework focusing on alleviating structural health disparities in nations in the Global South and encourage public-private partnerships and facilitate overseas licensing agreements without reducing intellectual property rights.

#### Solves 100% of the aff as well as their cap offense while avoiding innovation da.

### AT – Cap

#### Your Cap unsustainable card doesn’t actually say that- all it says is that we are in a climate crisis which actually flows neg. The rest is about income inequality and economic decline which we’ll answer below.

#### Growth turn:

#### It’s sustainable---robust environmental progress and increasing resource reserves prove---BUT, they can’t save the environment either.

Andrew McAfee 20, principal research scientist at MIT, codirector of the MIT Initiative on the Digital Economy at the MIT Sloan School of Management, Doctorate from Harvard Business School, two Master of Science and two Bachelor of Science degrees from MIT, "Don't Misunderstand Earth Day's Successes," Wired, 4-22-2020, https://www.wired.com/story/opinion-dont-misunderstand-earth-days-successes/

We should all be intensely grateful to the people who took to the streets exactly 50 years ago on the first Earth Day. The modern environmental movement that crystallized then has given us a cleaner, better planet. The pressure applied to governments and businesses on April 22, 1970, has not let up since, and it has yielded two huge victories.

The first is massive reductions in the amount of pollution we and our ecosystems have to endure. In the world’s richest countries, which are the ones where environmentalism has most taken hold, the air, land, and water are all much cleaner than they were 50 years ago. This is not because these countries have simply offshored degradation to poor nations. Germany, for example, has the world’s largest trade surplus, yet has seen steady reductions in air pollution in recent decades.

If globalization is not the reason rich countries are much cleaner now than they were half a century ago, then what is? Effective regulation. The United States established the EPA and greatly strengthened the Clean Air Act in 1970, added the Clean Water Act in 1972, and kept taking steps over the years to bring down all kinds of pollution.

Some of the most innovative and helpful of these steps are cap-and-trade systems that create markets for pollution. Companies can trade with each other for the right to pollute, but the overall total is set by the government and declines over time. Over the past 30 years cap-and-trade has proved to be both relatively cheap and highly effective; a triumph of smart environmentalism.

The other great triumph is the improved health of species and ecosystems that we had pushed to the brink. Throughout the 20th century, relentless hunting almost wiped out whales. A nearly global moratorium was finally passed 1982, thanks in part to the “Save the Whales” movement that started in the mid-1970s (no doubt helped by folk superstar Judy Collins’ 1970 hit “Farewell to Tarwathie,” which introduced many people to whales’ haunting songs).

Many other species, including wolves, bears, beavers, and deer, have also come back after being near extinction in America. They rebounded in large part because we limited when, where, and how they could be hunted, and we limited trade in wild animal products. It’s generally illegal, for example, to sell hunted meat in the US. For the past 50 years, the environmental movement has carried on the laudable traditions of conservationism, which got its start early in the 20th century as Americans reacted in shock and horror to the extinction of the passenger pigeon and near elimination of the bison and other iconic animals.

Paradoxically, the great victories over pollution and extinction highlight environmentalism’s greatest weakness: a continued hostility to economic growth. The “degrowth” movement, which started in the early 1970s, stressed that human populations and economies simply couldn’t continue to grow as they had in the decades leading up to Earth Day. As philosopher André Gorz put it in 1975, “Even at zero growth, the continued consumption of scarce resources will inevitably result in exhausting them completely. The point is not to refrain from consuming more and more, but to consume less and less—there is no other way of conserving the available reserves for future generations.”

This seemed like an obvious truth to many in the 1970s, especially when they saw that the use of many natural resources—fossil fuels, metals and minerals, fertilizer, and so on—had been increasing in lockstep with the size of the overall economy. Since these resources were finite, and since their consumption went hand-in-hand with growth, growth apparently had to stop.

Yet around the world, it didn’t. The pace has slowed down a bit since the inaugural Earth Day, but this is mainly because the years between 1945 and 1970 saw exceptionally fast growth as we rebuilt our societies after two world wars. Except for that 25-year stretch, economic growth since 1970 is the fastest the world has ever seen.

So how are natural resource stocks doing? Oil is a great indicator of the overall story (its recent pandemic-induced demand free fall notwithstanding). At present we have about 50 years of oil left, given projected consumption and known reserves. That sounds dire, until you realize that 40 years ago, we only had 30 years of oil left. How can this be? It’s certainly not because we’ve cut way back on oil demand; we consume almost 40 percent more oil now than we did in 1980.

It’s because we kept finding more supplies. The same is true for every other economically important natural resource. Proven reserves—the amount of the resource we know we can access—have increased as we keep developing better technologies for finding and accessing them. And because the supply-demand balance keeps getting more favorable, resource affordability increases. The world’s average worker can, with an hour of their labor, purchase a greater quantity of every important resource than was the case just a few decades ago.

We live on a finite planet, but an incredibly abundant one. It contains enough of everything we need for as long as we’ll be around. Especially since, in the decades and centuries to come, we clever humans will almost certainly figure out nuclear fusion or some other technology that gives us limitless clean energy and lets us ignore fossil fuels. In short, there’s no need to slam the brakes on our growth. This happy fact is deeply counterintuitive, and it trips a lot of people up. But the evidence is clear: Degrowth is unnecessary.

In fact, it’s a terrible idea. Recall that the countries that have cleaned up their environments the most since Earth Day are the richest ones. This is not a coincidence, as Indira Gandhi knew in 1972. In a speech given in Stockholm, she said “Are not poverty and need the greatest polluters?... The environment cannot be improved in conditions of poverty.” Prosperous people and societies can afford, in every sense of the word, to care about the state of the planet we all live on, and to improve it.

Economic growth does not irreversibly degrade and deplete the planet. Instead, economic growth yields more prosperous people, who demand to live in a better world—a world with less pollution and more healthy ecosystems. The 50 years since Earth Day have largely shown that they get what they want.

The Covid-19 recession has given us much cleaner air in cities around the world, but at a terrible cost. We don’t need to endure such hardship to reduce emissions from car traffic. If we just made pollution more expensive and energy and transport innovation cheaper (via subsidies or research funding), we’d get the same clean skies without any economic devastation at all.

We face no shortage of environmental challenges over the next 50 years. We continue to overhunt, overfish, and raze ecosystems in many parts of the world. More extinctions loom. And of course we have to reduce the greenhouse gas pollution that’s causing global warming. The good news is that, in the decades since Earth Day, we’ve put together an effective playbook for meeting these challenges. I hope the environmentalists of the coming half-century will study this playbook, and realize that it shuns degrowth rather than advocating it.

#### NETs link turns their impact.

Fred Krupp et al. 19. Nathaniel [Keohane](https://search-proquest-com.libproxy2.usc.edu/indexinglinkhandler/sng/au/Keohane,+Nathaniel/$N?accountid=14749), and Eric Pooley. \*President of Environmental Defense Fund, a United States-based nonprofit environmental advocacy group. \*\*Vice president for international climate at the Environmental Defense Fund. He used to be in academia at Yale University and served in the White House as special assistant to President Barack Obama. \*\*\*Senior Vice President, Strategy & Communications at the Environmental Defense Fund. 4-1-2019. "Less Than Zero: Can Carbon-Removal Technologies Curb Climate Change?" Foreign Affairs. https://search-proquest-com.libproxy2.usc.edu/docview/2186099162/594BA6C689D844ABPQ/13?accountid=14749/.

When it comes to generating support for climate policy, a warranted sense of alarm is only half the battle. And the other half-a shared belief that the problem is solvable-is lagging far behind. The newfound sense of urgency is at risk of being swamped by collective despair. A scant six percent of Americans, according to the Yale study, believe that the world "can and will" effectively address climate change. With carbon dioxide emissions from fossil fuels having risen by an estimated 2.7 percent in 2018 and atmospheric concentrations of carbon dioxide, which will determine the ultimate extent of warming, at their highest level in some three million years, such pessimism may seem justified-especially with a climate change denier in the White House. But it is not too late to solve the global climate crisis. A decade of extraordinary innovation has made the greening of the global economy not only feasible but also likely. The market now favors clean energy: in many U.S. states, it is cheaper to build new renewable energy plants than to run existing coal-fired power plants. By combining solar power with new, efficient batteries, Arizona and other sunny states will soon be able to provide electricity at a lower cost per megawatthour than new, efficient natural gas plants. Local, regional, and federal governments, as well as corporations, are making measurable progress on reducing carbon pollution. Since 2000, 21 countries have reduced their annual greenhouse gas emissions while growing their economies; China is expected to see emissions peak by 2025, five years earlier than it promised as part of the negotiations for the Paris climate agreement in 2015. At the UN climate talks held late last year in Poland, countries agreed on rules for how to report progress on meeting emission-reduction commitments, an important step in implementing the Paris accord. What's more, an entirely new arsenal is emerging in the fight against climate change: negative emission technologies, or nets. Nets are different from conventional approaches to climate mitigation in that they seek not to reduce the amount of greenhouse gases emitted into the atmosphere but to remove carbon dioxide that's already there. These technologies range from the old-fashioned practice of reforestation to high-tech machines that suck carbon out of the sky and store it underground. The window of opportunity to combat climate change has not closed-and with a push from policymakers, nets can keep it propped open for longer. THE HEAT IS ON How much time is left to avoid climate catastrophe? The truth is that it is impossible to answer the question with precision. Scientists know that human activity is warming the planet but still don't fully understand the sensitivity of the climate system to greenhouse gases. Nor do they fully comprehend the link between average global warming and local repercussions. So far, however, most effects of climate change have been faster and more severe than the climate models predicted. The downside risks are enormous; the most recent predictions, ever more dire. The Paris agreement aims to limit the increase in global average temperatures above preindustrial levels to well below two degrees Celsius, and ideally to no more than 1.5 degrees Celsius. Going above those levels of warming would mean more disastrous impacts. Global average temperatures have already risen by about one degree Celsius since 1880, with two-thirds of that increase occurring after 1975. An October 2018 special report by the un's Intergovernmental Panel on Climate Change, a body of leading scientists and policymakers from around the world, found that unless the world implements "rapid and far-reaching" changes to its energy and industrial systems, the earth is likely to reach temperatures of 1.5 degrees Celsius above preindustrial levels sometime between 2030 and 2052. Limiting warming to that level, the ipcc found, would require immediate and dramatic cuts in carbon dioxide: roughly a 45 percent reduction in the next dozen years. Even meeting the less ambitious target of two degrees would require deep cuts in emissions by 2030 and sustained aggressive action far beyond then. The ipcc report also warns that seemingly small global temperature increases can have enormous consequences. For example, the half-degree difference between 1.5 degrees Celsius and two degrees Celsius of total warming could consign twice as many people to water scarcity, put ten million more at risk from rising sea levels, and plunge several hundred million more people into poverty as lower yields of key crops drive hunger across much of the developing world. At two degrees of warming, nearly all of the planet's coral reefs are expected to be lost; at 1.5 degrees, ten to 30 percent could survive. The deeper message of the IPCC report is that there is no risk-free level of climate change. Targets such as 1.5 degrees Celsius or two degrees Celsius are important political markers, but they shouldn't fool anyone into thinking that nature works so precisely. Just as the risks are lower at 1.5 degrees Celsius than at two degrees Celsius, so are they lower at two degrees Celsius than at 2.5 degrees Celsius. Indeed, the latter difference would be far more destructive, since the damages mount exponentially as temperatures rise. To manage the enormous risks of climate change, global emissions of greenhouse gases need to be cut sharply, and as soon as possible. That will require transforming energy, land, transport, and industrial systems so they emit less carbon dioxide. It will also require reducing short-lived climate pollutants such as methane, which stay in the atmosphere for only a fraction of the time that carbon dioxide does but have a disproportionate effect on near-term warming. Yet even that will not be enough. To stabilize the total atmospheric concentration of carbon dioxide and other greenhouse gases [GHGs], the world will have to reach net negative emissions-that is, taking more greenhouse gases out of the atmosphere than are being pumped into it. Achieving that through emission reductions alone will be extremely difficult, since some emissions, such as of methane and nitrous oxide from agriculture, are nearly impossible to eliminate. Countering the emissions that are hardest to abate, and bring concentrations down to safer levels, requires technologies that actually remove carbon dioxide from the atmosphere. That's where nets come in-not as a substitute for aggressive efforts to reduce greenhouse gas emissions but as a complement. By deploying technology that removes existing carbon dioxide from the atmosphere, while accelerating cuts in emissions, the world can boost its chances of keeping warming below two degrees and reduce the risk of catastrophe. Scientists and activists have tended to regard these technologies as a fallback option, to be held in reserve in case other efforts fail. Many fear that jumping ahead to carbon dioxide removal will distract from the critical need to cut pollution. But the world no longer has the luxury of waiting for emission-reduction strategies to do the job alone. Far from being a Plan B, nets must be a critical part of Plan A. What's more, embracing nets sooner rather than later makes economic sense. Because the marginal costs of emission reductions rise as more emissions are cut, it will be cheaper to deploy nets at the same time as emission-reduction technologies rather than waiting to exhaust those options first. The wider the solution set, the lower the costs. And the lower the costs, the easier it is to raise ambitions and garner the necessary political support. THE FUTURE IS NOW Even though removing carbon dioxide from the atmosphere may sound like the stuff of science fiction, there are already nets that could be deployed at scale today, according to a seminal report released by the National Academies of Sciences, Engineering, and Medicine in October 2018. One category involves taking advantage of carbon sinks-the earth's forests and agricultural soils, which have soaked up more carbon dioxide since the Industrial Revolution than has been released from burning petroleum. To date, the growth of carbon sinks has been inadvertent: in the United States, for example, as agriculture shifted from the rocky soils of the Northeast to the fertile Midwest, forests reclaimed abandoned farmland, breathing in carbon dioxide in the process. But this natural process can be improved through better forest management-letting trees grow longer before they are harvested and helping degraded forests grow back more quickly. The large-scale planting of trees in suitable locations around the world could increase carbon sinks further, a process that must go hand in hand with efforts to curb tropical deforestation and thereby continue to contain the vast amounts of carbon already stored in the earth's rainforests. Farmland provides additional potential for negative emissions. Around the world, conventional agricultural practices have reduced the amount of carbon in soils, decreasing their fertility in the process. Smarter approaches can reverse the process. Small and large landholders alike could add agricultural waste to soil, maximize the time that the soil is covered by living plants or mulch, and reduce tilling, which releases carbon dioxide. All these steps would decrease the amount of carbon that is lost from soil and increase the amount of carbon that is stored in it. The most technologically sophisticated net available in the near term is known as "bioenergy with carbon capture and storage," or BECCS. It is also the riskiest. Broadly defined, beccs involves burning or fermenting biomass, such as trees or crops, to generate electricity or make liquid fuel; capturing the carbon dioxide produced in the process; and sequestering it underground. It is considered a negative emission technology, and not a zero emission technology, because growing the biomass used in the process removes carbon from the atmosphere. What makes BECCS so exciting is its potential to remove significantly more carbon from the atmosphere than other approaches do. But it also brings challenges. For one, it is expensive: electricity generated from beccs could cost twice as much as that generated with natural gas, because biomass is an inefficient fuel source and capturing and sequestering carbon dioxide is costly. The technology would also require careful monitoring to ensure that the carbon dioxide pumped underground stays there and clear rules for legal liability in the event of leaks. But the fact that private companies have been successfully injecting carbon dioxide into depleted oil and gas reservoirs for decades offers good evidence that permanent storage is possible on a large scale. More worrying are the additional climate risks that BECCS poses. If BECCS drives demand for biomass and more of the carbon that is stored in the forest ecosystem is released as a result, it could end up raising the level of carbon in the atmosphere rather than reducing it. Another concern is competition for land: converting farms or forests to grow energy crops, something that the large-scale use of BEccs might require, could drive up the cost of food, reduce agricultural production, and threaten scarce habitats. These problems could be mitigated by using only biomass waste, such as residues from logging and agriculture, but that would reduce the potential scale. Although BEccs deserves consideration as part of the arsenal, these risks mean that its contribution will likely end up being smaller than some proponents claim. Taking all these land-based nets together, and factoring in the considerable economic, practical, and behavioral hurdles to bringing them to scale, the National Academies report concludes that by midcentury, nets could remove as much as five billion tons of carbon dioxide from the atmosphere annually. Given the significant risks involved, that estimate is probably too bullish. Even if it were not, that's still only half of the ten billion tons of carbon dioxide that will likely need to be removed each year to zero out the remaining greenhouse gas emissions, even with aggressive cuts. CLOSING THE GAP Removing from the atmosphere the balance of the carbon dioxide necessary will require perfecting technologies currently in development. Two deserve particular mention; both are full of promise, although neither is ready for widespread use. The first is called "direct air capture"- essentially, sucking carbon from the sky. The technology is already being tested in Canada, Iceland, Italy, and Switzerland at pilot plants where massive arrays of fans direct a stream of air toward a special substance that binds with the passing carbon dioxide. The substance is then either heated or forced into a vacuum to release the carbon dioxide, which is compressed and either stored or used as feedstocks for chemicals, fuels, or cement. These technologies are real-albeit prohibitively expensive in their current form. As a recent study led by David Sandalow of Columbia University's Center on Global Energy Policy concludes, taking them to scale means solving a variety of technological challenges to bring down the costs. Above all, these processes are highly energy intensive, so scaling them would require enormous amounts of low-carbon electricity. (A direct-air-capture facility powered by coal-fired electricity, for example, would generate more new carbon dioxide than it would capture.) These obstacles are serious, but the surprising progress of the past decade suggests that they can be overcome in the next one. The second technology, enhanced carbon mineralization, is even further from being realized, but it is full of even more possibility. Geologists have long known that when rock from the earth's mantle (the layer of the earth between its crust and its core) is exposed to the air, it binds with carbon dioxide to form carbon-containing minerals. The massive tectonic collisions that formed the Appalachian Mountains around 460 million years ago, for example, exposed subsurface rock to weathering that resulted in the absorption of substantial amounts of carbon dioxide from the atmosphere. That took tens of millions of years; enhanced carbon mineralization seeks to fast-forward the process. Scientists are exploring two ways to do this. In one approach, rocks would be brought to the surface to bind with carbon from the air. Such natural weathering already occurs in mine tailings, the waste left over from certain mining operations. But mimicking this process on a large scale-by grinding up large quantities of rock containing reactive minerals and bringing it to the earth's surface-would be highly energy intensive and thus costly, roughly on par with direct air capture. Another potential approach is pumping the carbon dioxide underground to meet the rock. As the National Academies report explains, carbon-dioxide-rich fluids injected into basalt or peridotite formations (two kinds of igneous rock that make up much of the earth's mantle) react with the rock, converting the dissolved carbon dioxide into solid carbon-containing minerals. Pilot projects in Iceland and the United States have demonstrated that this is possible. There is also evidence for how this could work in the natural world. Peridotite usually lies deep inside the earth, but some rock formations around the globe contain pockets of it on the surface. For example, scientists are studying how the surface-level peridotite in Oman's rock formations reacts with the air and absorbs large amounts of carbon. In theory, this approach offers nearly unlimited scale, because suitable rock formations are widespread and readily accessible. It would also be cheap, because it takes advantage of chemical potential energy in the rock instead of costly energy sources. And since the carbon dioxide is converted to solid rock, the effect is permanent, and it carries few of the side effects that other nets could bring. GETTING TO LESS These technologies do not come cheap. The National Academy of Sciences recommends as much as $1 billion annually in U.S. government funding for research on nets. And indeed, such funding should be an urgent priority. But to make these technologies economically viable and scale them rapidly, policymakers will also have to tap into a much more powerful force: the profit motive. Putting a price on carbon emissions creates an economic incentive for entrepreneurs to find cheaper, faster ways to cut pollution. Valuing negative emissions-for example, through an emission-trading system that awards credits for carbon removal or a carbon tax that provides rebates for them-would create an incentive for them to join the hunt for nets. Forty-five countries, along with ten U.S. states, have put in place some mechanism to price carbon. But only a handful of them offer rewards for converting land into forest, managing existing forests better, or increasing the amount of carbon stored in agricultural soils, and none offers incentives for other nets. What's needed is a carbon pricing system that not only charges those who emit carbon but also pays those who remove it. Such a system would provide new revenue streams for landowners who restored forest cover to their land and for farmers and ranchers who increased the amount of carbon stored in their soils. It would also reward the inventors and entrepreneurs who developed new, better technologies to capture carbon from the air and the investors and businesses that took them to scale. Without these incentives, those players will stay on the sidelines. By spurring innovation in lower-cost nets, incentives would also ease the way politically for an ambitious pollution limit-which, ultimately, is necessary for ensuring that the world meets it climate goals. Simply put, humanity's best hope is to promise that the next crop of billionaires will be those who figure out low-cost ways to remove carbon from the sky. The biggest hurdle for such incentives is the lack of a global market for carbon credits. Hope on that front, however, is emerging from an unlikely place: aviation. Currently responsible for roughly two percent of global greenhouse gases, aviation's emissions are expected to triple or quadruple by midcentury in the absence of effective policies to limit them. But in 2016, faced with the prospect that the eu would start capping the emissions of flights landing in and taking off from member states, the un body that governs worldwide air travel, the International Civil Aviation Organization, agreed to cap emissions from international flights at 2020 levels. The airline industry supported the agreement, hoping to avoid the messy regulatory patchwork that might result if the eu went ahead and states beyond the eu followed suit with their own approaches. The resulting program, called the Carbon Offsetting and Reduction Scheme for International Aviation (corsia), requires all airlines to start reporting emissions this year, and it will begin enforcing a cap in 2021. Once in full swing, at least 100 countries are expected to participate, covering at least three-quarters of the forecast increase in international aviation emissions. Airlines flying between participating countries will have two ways to comply: they can lower their emissions (for example, by burning less fuel or switching to alternative fuels), or they can buy emission-reduction credits from companies. Because the technologies for reducing airline emissions at scale are still a long way off, the industry will mostly choose the second option, relying on carbon credits from reductions in other sectors. It is estimated that over the first 15 years of corsia, demand for these credits will reach between 2.5 billion and 3.0 billion tons-roughly equal to the annual greenhouse gas emissions from the U.S. power and manufacturing sectors. With this new option to sell emission-reduction credits to airlines, there is a good possibility that a pot of gold will await companies that cut or offset their carbon emissions. In short, corsia could catalyze a global carbon market that drives investment in low-carbon fuels and technologies-including nets. To realize its promise, corsia must be implemented properly, and there are powerful forces working to see that it is not. Some countries, including ones negotiating on behalf of their state-owned companies, are trying to rig the system by allowing credits from projects that do not produce legitimate carbon reductions, such as Brazil's effort to allow the sale of credits from huge hydroelectric dams in the Amazon that have already been built and paid for (and thus do not represent new reductions). Allowing such credits into the system could crowd out potential rewards for genuine reductions. But there are also powerful, sometimes unexpected allies who stand to gain from a global carbon market that works. For example, some airlines are motivated to act out of a fear that millennials, concerned about their carbon footprint, may eventually begin to shun air travel. The new regulations, by creating demand for emission reductions and spurring investment in nets to produce jet fuel, could be the industry's best hope of protecting its reputation-and a critical step toward a broader global carbon market that moves nets from promising pilot projects to a gamechanging reality. Skeptics say that nets are too speculative and a possibility only, perhaps, in the distant future. It is true that these innovations are not fully understood and that not all of them will pan out. But no group of scholars and practitioners, no matter how expert, can determine exactly which technologies should be deployed and when. It is impossible to predict what future innovations will look like, but that shouldn't stop the world from pursuing them, especially when the threat is so grave. The fact remains that many nets are ready to be deployed at scale today, and they might make the difference between limiting warming to two degrees and failing to do so. Ultimately, climate change will be stopped by creating economic incentives that unleash the innovation of the private sector-not by waiting for the perfect technology to arrive ready-made, maybe when it's already too late. No one is saying that achieving all of this will be easy, but the road to climate stability has never been that. Hard does not mean impossible, however, and the transformative power of human ingenuity offers an endless source of hope.

#### No transition---centuries of history prove societies can’t and won’t shift fast enough.

Rogelio Luque-Lora 21, MSci in History and Philosophy of Science from the University of Cambridge, M.A. in Natural Sciences from the University of Cambridge, “Engaging imaginaries, rejecting utopias: The case for technological progress and political realism to sustain material wellbeing,” Political Geography, Vol. 86, 02-21-2021, https://doi.org/10.1016/j.polgeo.2021.102358

Gómez-Baggethun is right to suspect that the modern myth of progress has theological origins. In fact, it is largely a product of the Christian conception of human history as an inherently meaningful story that has salvation as its end point. Without the belief that there is a teleological coherence to the history of humanity, and that salvation (whether the Christian version of the Kingdom of God on Earth, or the humanist faith in an emancipated and harmonious future) is an earthly event that lies ahead of the present, the idea of progress is groundless. In cultures that are not historically steeped in Western monotheism, the belief that humanity is inexorably marching toward a better state of affairs is largely absent (Gray, 2007, pp. 29–39). Where Gómez-Baggethun's reading of progress misses the mark is in limiting its scope to technology. The central tenet of modern belief in progress is that ethics and politics advance in line with the growth of knowledge, so that as scientific and technological understandings accrue, so too do humans increasingly learn to arrange their societies in rational and ethical ways (Gray, 2002).

Contrary to Gómez-Baggethun's assertions, technological progress is a fact. Throughout their history, humans have increasingly learnt to manipulate the environment around them to serve their interests. The reason for this is that scientific knowledge grows cumulatively: past discoveries are not necessarily lost with the advent of new knowledge, but rather can be built upon or thrown into question by these new understandings. In contrast, any historical ‘gains’ in politics and ethics (placed between inverted commas to reflect that such evaluations will depend on the particular values of each generation) are easily undone by regime and cultural changes. It is progress in ethics and politics, not in technology, that is a myth.

Viewed in this light, Gómez-Baggethun's assertion that utopias are concrete and plausible if they are scientifically informed, while saying nothing about how assumed radical social change may come about, begs the question of why scientific plausibility is given categorical priority over social and political feasibility. Gómez-Baggethun's analysis fits within a broader tradition; the belief that humans can radically remake the world at will commonly presents itself as having the authority of science (Gray, 2007, p. 20). An historically and politically informed view may well reveal degrowth to be utopian, in the true sense of being a projection into the future of an unrealisable society (Gray, 2007, pp. 20–29).

There are no historical examples of humans showing the intelligence or will to voluntarily restructure their societies in the measure that would be required for a global shift to degrowth, let alone at the speed required to avert the climatic changes and ecological collapses predicted for this century. Further complicating things for advocates of degrowth, no contemporary democratic state has been able to survive without sustaining economic growth over the medium and long terms (Gray, 1992, p. 83). Recently, Gray (2019) has written,

The trouble is that Green proposals involve a drop in material living standards for large numbers of people, and any such fall will be unsustainable in political terms. Macron's tax on petrol fuelled the rise of the gilets jaunes in France, while the principal beneficiary of Hilary Clinton's election pledge to shut down the coal industry has been Donald Trump. When Green policies impose heavy costs on the poor and the working majority – as they often do – the result is a popular blowback.

Gómez-Baggethun's mistake here is to think that degrowth is feasible simply because it is desirable. In political terms, the evidence suggests that it is unfeasible. To resist these facts and to consider degrowth to be the only realistic imaginary reflects a pseudo-religious faith in humans' willingness and ability to convert to an ecological worldview and to radically adjust their institutions accordingly.

#### We’re past tipping points---only tech solves---the Aff causes dictatorship.

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Today’s best-case ecological scenario was a horror story just three decades ago. In 1993, Bill Clinton declared that global warming presented such a profound threat to civilization that the U.S. would have to bring its “emissions of greenhouse gases to their 1990 levels by the year 2000.” Instead, we waited until 2020 to do so; in the interim, humanity burned more carbon than it had since the advent of agriculture. Now, it will take a historically unprecedented, worldwide economic transformation to freeze warming at “only” 2 degrees — a level of temperature rise that will turn “once in a century” storms into annual events, drown entire island nations, and render major cities in the Middle East uninhabitable in summertime (at least for those whose lifestyles involve “walking outdoors without dying of heatstroke”). This is what passes for a utopian vision in 2021. If we confine ourselves to mere optimism — and assume that every Paris Agreement signatory meets its current pledged target for decarbonization — then warming will hit 2.4 degrees by century’s end.

The reality of our ecological predicament invites denial of our political one. Put simply, it is hard to reconcile the scale of the climate crisis with the limits of contemporary American politics. Delusions rush in to fill the gap. Among these is the fantasy of national autonomy; the notion that the United States can save the planet or destroy it, depending on the precise timeline of its domestic decarbonization. A rapid energy transition in the U.S. is a vital cause, not least for its potential to expedite similar transformations abroad. But the battle for a sustainable planet will be won or lost in the developing world. Although American consumption played a central role in the history of the climate crisis, it is peripheral to the planet’s future: Over the coming century, U.S. emissions are expected to account for only 5 percent of the global total.

There is also the delusion of “de-growth’s” viability. The fact that there is no plausible path for global economic expansion that won’t entail climate-induced death and displacement has led some environmentalists to insist on global stagnation. Yet there is neither a mass constituency for this project, nor any reason to believe that there will be any time soon. Freeze the status-quo economy in amber, and you’ll condemn nearly half of humanity to permanent poverty. Divide existing GDP into perfectly even slices, and every person on the planet will live on about $5,500 a year. American voters may express a generalized concern about the climate in surveys, but they don’t seem willing to accept even a modest rise in gas prices — let alone a total collapse in living standards — to address the issue. Meanwhile, any Chinese or Indian leader who attempted to stymy income growth in the name of sustainability would be ousted in short order. It’s conceivable that one could radically reorder advanced economies in a manner that enabled living standards to rise even as GDP fell; Americans might well find themselves happier and more secure in an ultra-low-carbon communal economy in which individual car ownership is heavily restricted, and housing, healthcare, and myriad low-carbon leisure activities are social rights. But nothing short of an absolute dictatorship could affect such a transformation at the necessary speed. And the specter of eco-Bolshevism does not haunt the Global North. Humanity is going to find a way to get rich sustainably, or die trying.

Thus, the chasm between the ecologically necessary and the politically possible can only be bridged by technological advance. And on that front, the U.S. actually has the resources to make a decisive contribution to global decarbonization — and some political will to leverage those resources. Unfortunately, due to some combination of fiscal superstitions and misplaced priorities, the Biden administration’s proposed investments in green innovation remain paltry. An American Jobs Plan with much higher funding for green R&D is both imminently winnable and environmentally imperative. U.S. climate hawks should make securing such legislation a top priority.

The choice before us is techno-optimism or barbarism.

If governments are forced to choose between increasing income growth in the present, and mitigating temperature rise in the future, they are going to pick the former. We’ll get cheap, lab-grown Kobe beef before we get a U.S. Senate willing to tax meat, and steel plants powered by “green hydrogen” before we get anarcho-primitivism with Chinese characteristics.

The question is whether we’ll get such breakthroughs before it’s too late.

Techno-optimism has its hazards, but the progress we’ve made toward decarbonization has come largely through technological innovation. When India canceled plans to construct 14 gigawatts of new coal-fired power stations in 2019, it did not do so in deference to international pressure or domestic environmental movements, but rather to the cost-competitiveness of solar energy. The same story holds across Asia’s developing countries: Thanks to a ninefold reduction in the cost of solar energy over the past decade, the number of new coal plants slated for construction in the region has fallen by 80 percent. Meanwhile, the road to an electric-car revolution was cleared by a collapse in the cost of lithium batteries, the challenge of powering cities with solar energy on cloudy days was eased by a 70 percent drop in the price of utility-scale batteries, and wind power grew 40 percent cheaper. Our species remains lackluster at solidarity and self-government, but we’ve got a real knack for building cool shit.

The technological progress of the past decade was not sufficient to compensate for tepid climate policy. But real techno-utopianism has never been tried: As of 2019, global spending on clean energy R&D totaled $22 billion a year, or 3 percent of the Pentagon’s annual budget. Increasing spending on such research — while expediting cost-reductions in existing technologies by deploying them en masse — should be twin priorities of American climate policy.

The preconditions for green industrialization can be made in America.

The United States has more fiscal capacity and better-financed research universities than any nation on the planet. And, for all the pathologies of our politics, public investment in green tech inspires far weaker opposition than many less-indispensable climate policies. In fact, late last year, with Republicans controlling the Senate and Donald Trump in the White House, the U.S. increased funding for zero-emission technology R&D by $35 billion. America does not have sovereignty over enough humans to save the planet by slashing our domestic emissions. But we just might have the resources and political economy necessary to help the developing world save us all.

#### Regulated cap solves everything better.

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However, things are more complicated than the arguments above would suggest, and the benefits of capitalism, especially for the world's poorest and most vulnerable people, are in fact myriad and significant. In addition, as we will see in this section, many experts argue that capitalism is not the fundamental cause of the previously described problems but rather an essential component of the best solutions to them and of the best methods for promoting our goals of health, well-being, and justice.

To see where the defenders of capitalism are coming from, consider an analogy involving a response to a pandemic: if a country administered a rushed and untested vaccine to its population that ended up killing people, we would not say that vaccines were the problem. Instead, the problem would be the flawed and sloppy policies of vaccine implementation. Vaccines might easily remain absolutely essential to the correct response to such a pandemic and could also be essential to promoting health and flourishing, more generally.

The argument is similar with capitalism according to the leading mainstream arguments in favor of it: Capitalism is an essential part of the best society we could have, just like vaccines are an essential part of the best response to a pandemic such as COVID-19. But of course both capitalism and vaccines can be implemented poorly, and can even do harm, especially when combined with other incorrect policy decisions. But that does not mean that we should turn against them—quite the opposite. Instead, we should embrace them as essential to the best and most just outcomes for society, and educate ourselves and others on their importance and on how they must be properly designed and implemented with other policies in order to best help us all. In fact, the argument in favor of capitalism is even more dramatic because it claims that much more is at stake than even what is at stake in response to a global pandemic—what is at stake with capitalism is nothing less than whether the world's poorest and most vulnerable billion people will remain in conditions of poverty and oppression, or if they will instead finally gain access to what is minimally necessary for basic health and wellbeing and become increasingly affluent and empowered. The argument in favor of capitalism proceeds as follows:

Premise 1. Development and the past. Over the course of recorded human history, the majority of historical increases in health, wellbeing, and justice have occurred in the last two centuries, largely as a result of societies adopting or moving toward capitalism. Capitalism is a relevant cause of these improvements, in the sense that they could not have happened to such a degree if it were not for capitalism and would not have happened to the same degree under any alternative noncapitalist approach to structuring society. The argument in support of this premise relies on observed relationships across societies and centuries between indicators of degree of capitalism, wealth, investments in public goods, and outcomes for health, wellbeing, and justice, together with econometric analysis in support of the conclusion that the best explanation of these correlations and the underlying mechanism is that large increases in health, wellbeing, and justice are largely driven by increasing investments in public goods. The scale of increased wealth necessary to maximize these investments requires capitalism. Thus, as capitalist societies have become dramatically wealthier over the past hundred years (and wealthier than societies with alternative systems), this has allowed larger investments in public goods, which simply has not been possible in a sustained way in societies without the greater wealth that capitalism makes possible. Important investments in public goods include investments in basic medical knowledge, in health and nutrition programs, and in the institutional capacity and know-how to regulate society and capitalism itself. As a result, capitalism is a primary driver of positive outcomes in health and wellbeing (such as increased life expectancy, lowered child and maternal mortality, adequate calories per day, minimized infectious disease rates, a lower percentage and number of people in poverty, and more reported happiness);5 and in justice (such as reduced deaths from war and homicide; higher rankings in human rights indices; the reduced prevalence of racist, sexist, homophobic opinions in surveys; and higher literacy rates).6 These quantifiable positive consequences of global capitalism dramatically outweigh the negative consequences (such as deaths from pollution in the course of development), with the result that the net benefits from capitalism in terms of health, wellbeing, and justice have been greater than they would have been under any known noncapitalist approach to structuring society.7

Premise 2. Economics, ethics, and policy. Although capitalism has often been ill-regulated and therefore failed to maximize net benefits for health, wellbeing, and justice, it can become well-regulated so that it maximizes these societal goals, by including mechanisms identified by economists and other policy experts that do the following:

* optimally8 regulate negative effects such as pollution and monopoly power, and invest in public goods such as education, basic healthcare, and fundamental research including biomedical knowledge (more generally, policies that correct the failures of free markets that economists have long recognized will arise from “externalities” in the absence of regulation);9
* ensure equity and distributive justice (for example, via wealth redistribution);10
* ensure basic rights, justice, and the rule of law independent of the market (for example, by an independent judiciary, bill of rights, property rights, and redistribution and other legislation to correct historical injustices due to colonialism, racism, and correct current and historical distortions that have prevented markets from being fair);11 and
* ensure that there is no alternative way of structuring society that is more efficient or better promotes the equity, justice, and fairness goals outlined above (by allowing free exchange given the regulations mentioned).12

To summarize the implication of the first two premises, well-regulated capitalism is essential to best achieving our ethical goals—which is true even though capitalism has certainly not always been well regulated historically. Society can still do much better and remove the large deficits in terms of health, wellbeing, and justice that exist under the current inferior and imperfect versions of capitalism.

Premise 3. Development and the future. If the global spread of capitalism is allowed to continue, desperate poverty can be essentially eliminated in our lifetimes. Furthermore, this can be accomplished faster and in a more just way via well-regulated global capitalism than by any alternatives. If we instead opt for less capitalism, less growth, and less globalization, then desperate poverty will continue to exist for a significant portion of the world's population into the further future, and the world will be a worse and less equitable place than it would have been with more capitalism. For example, in a world with less capitalism, there would be more overpopulation, food insecurity, air pollution, ill health, injustice, and other problems. In part, this is because of the factors identified by premise 1, which connect a turn away from capitalism with a turn away from continuing improvements in health, wellbeing, and justice, especially for the developing world. In addition, fertility declines are also a consequence of increased wealth, and the size of the population is a primary determinant of food demand and other environmental stressors.13 Finally, as discussed at length in the next section of the essay, capitalism can be naturally combined with optimal environmental regulations.14 Even bracketing anything like optimal regulation, it remains true that sufficiently wealthy nations reduce environmental degradation as they become wealthier, whereas developing nations that are nearing peak degradation will remain stuck at the worst levels of degradation if we stall growth, rather than allowing them to transition to less and less degradation in the future via capitalism and economic growth.15 In contrast, well-regulated capitalism is a key part of the best way of coping with these problems, as well as a key part of dealing with climate change, global food production, and other specific challenges, as argued at length in the next section. Here it is important to stress that we should favor well-regulated capitalism that includes correct investments in public goods over other capitalist systems such as the neoliberalism of the recent past that promoted inadequately regulated capitalism with inadequate concern for externalities, equity, and background distortions and injustices.16

Conclusion. Therefore, we should be in favor of capitalism over noncapitalism, and we should especially favor well-regulated capitalism, which is the ethically optimal economic system and is essential to any just basic structure for society.

This argument is impressive because, as stated earlier in the essay, it is based on evidence that is so striking that it leads a bipartisan range of open-minded thinkers and activists to endorse well-regulated capitalism, including many of those who were not initially attracted to the view because of a reasonable concern for the societal ills with which we began. To better understand why such a range of thinkers could agree that well-regulated capitalism is best, it may help to clarify some things that are not assumed or implied by the argument for it, which could be invoked by other bad arguments for capitalism.

One thing the argument above does not assume is that health, wellbeing, or justice are the same thing as wealth, because, in fact, they are not. Instead, the argument above relies on well-accepted, measurable indicators of health and wellbeing, such as increased lifespan; decreased early childhood mortality; adequate nutrition; and other empirically measurable leading indicators of health, wellbeing, and justice.17 Similarly, the argument that capitalism promotes justice, peace, freedom, human rights, and tolerance relies on empirical metrics for each of these.18

Furthermore, the argument does not assume that because these indicators of health, wellbeing, and justice are highly correlated with high degrees of capitalism, that therefore capitalism is the direct cause of these good outcomes. Rather, the analyses suggest instead that something other than capitalism is the direct cause of societal improvements (such as improvements in knowledge and technology, public infrastructure, and good governance), and that capitalism is simply a necessary condition for these improvements to happen.19 In other words, the richer a society is, the more it is able to invest in all of these and other things that are the direct causes of health, wellbeing, and justice. But, to maximize investment in these things societies need well-regulated capitalism.

As part of these analyses, it is often stressed that current forms of capitalism around the world are highly defective and must be reformed in the direction of well-regulated capitalism because they lack investments in public goods, such as basic knowledge, healthcare, nutrition, other safety nets, and good governance.20 In this way, an argument for a particular kind of progressive reformism is an essential part of the analyses that lead many to endorse the more general argument for well-regulated capitalism.

Although these analyses are nuanced, and appropriately so, it remains the case that the things that directly lead to health, wellbeing, and justice require resources, and the best path toward generating those resources is well-regulated capitalism. And on the flip side, according to the analyses behind premise 1 described above, an anti-capitalist system would not produce the resources that are needed, and would thus be a disaster, especially for the poorest billion people who are most desperately in need of the resources that capitalism can create and direct, to escape from extreme poverty.21