# Loyola R2 Neg vs Solebury LM

# 1NC

## Offs

### CP

#### CP: “Member nations of the WTO” should declare medical inequality a national emergency on the basis of oppression and issue compulsory licenses for relevant medicines. Member nations should offer regulatory and legal assistance to nations filing a compulsory license.

The national emergency declaration matters because normally invocation of compulsory licenses requires an attempt to negotiate a voluntary license first. Invoking national emergency bypasses this

* The last plank is because a big criticism is that these countries (e.g. Rwanda) haven’t used CL as much because they lack the experience to invoke it.
* If countries can’t manufacture the medicine, they can import it from others who have CL. Means multiple actors is key

#### It’s goldilocks - protects patents while allowing urgent access – the perm or the aff shatters IP protections while the CP strikes an accepted balance

**Bacchus 2020** (James, Adjunct Fellow, Cato Institute, former U.S. Representative (D-FL), and former Chairman, World Trade Organization’s Appellate Body. “An Unnecessary Proposal: A WTO Waiver of Intellectual Property Rights for COVID-19 Vaccines,” *Cato* <https://www.cato.org/free-trade-bulletin/unnecessary-proposal-wto-waiver-intellectual-property-rights-covid-19-vaccines#balancing-ip-rights-access-medicines-not-new-wto> December 16, 2020)DR 21

As Jennifer Hillman of the Council on Foreign Relations observed, ordinarily the “inherent tension between the protection of intellectual property and the need to make and distribute affordable medicines” is “resolved through licensing, which allows a patent holder to permit others to make or trade the protected product—usually at a price and with some supervision from the patent holder to ensure control.”[7](https://www.cato.org/free-trade-bulletin/unnecessary-proposal-wto-waiver-intellectual-property-rights-covid-19-vaccines#_ednref7) But, in public health emergencies, it may be impossible to obtain a license. In such cases, “compulsory licenses” can be issued to local manufacturers, authorizing them to make patented products or use patented processes even though they do not have the permission of the patent holders.[8](https://www.cato.org/free-trade-bulletin/unnecessary-proposal-wto-waiver-intellectual-property-rights-covid-19-vaccines#_ednref8)

After years of debate, WTO members clarified in the Doha Ministerial Declaration in November 2001 that each WTO member “has the right to grant compulsory licenses and the freedom to determine the grounds upon which such licenses are granted.”[9](https://www.cato.org/free-trade-bulletin/unnecessary-proposal-wto-waiver-intellectual-property-rights-covid-19-vaccines#_ednref9) In August 2003, WTO members followed up on the 2001 declaration by adopting a waiver that allows poorer countries that do not have the capacity to make pharmaceutical products—and thus cannot benefit from compulsory licensing—to import cheaper generic drugs from countries where those drugs are protected by patent.[10](https://www.cato.org/free-trade-bulletin/unnecessary-proposal-wto-waiver-intellectual-property-rights-covid-19-vaccines#_ednref10) In such a case, both the importing and exporting countries are excused from what would otherwise be their obligations under the TRIPS Agreement. This waiver was transformed into an amendment in the WTO IP rules in 2017.[11](https://www.cato.org/free-trade-bulletin/unnecessary-proposal-wto-waiver-intellectual-property-rights-covid-19-vaccines#_ednref11)

Compulsory licensing of medicines is not popular with private drug manufacturers because it is a derogation from the customary workings of market‐​based capitalism. However, as these actions by WTO members in 2001, 2003, and 2017 illustrate, compulsory licensing is not a derogation from the balance **struck by the members of the WTO** between protecting IP rights and ensuring access to essential medicines. Rather, it is a crucial part of that balance. The balance struck in the WTO treaty includes the option of compulsory licensing during health emergencies.

Does a Novel Virus Present Novel Issues?

Now comes the COVID-19 crisis. In the debate over the proposed COVID-19 waiver, mostly we have heard the usual arguments, all of them reminiscent of the HIV/AIDS debate. The pharmaceutical companies in the global vaccine chase have been quick to express their opposition to the proposed waiver of IP rights for the pandemic’s duration. They have warned that allowing their COVID-19 vaccines to be copied without their permission through recourse to compulsory licensing “would undermine innovation and raise the risk of unsafe viruses.”[12](https://www.cato.org/free-trade-bulletin/unnecessary-proposal-wto-waiver-intellectual-property-rights-covid-19-vaccines#_ednref12)

The reaction of most nongovernmental health organizations and other global advocacy groups to these arguments is summed up in the Access Campaign’s response: “Since the start of the pandemic, pharmaceutical companies have continued with their ‘business‐​as‐​usual’ approaches either by maintaining rigid control over their proprietary IP rights or by pursuing secretive and monopolistic commercial deals and excluding countries affected by COVID-19.”[13](https://www.cato.org/free-trade-bulletin/unnecessary-proposal-wto-waiver-intellectual-property-rights-covid-19-vaccines#_ednref13)

What we have not heard in the waiver debate is any clear explanation from waiver advocates of why they believe that the right to compulsory licensing that they already possess will prove insufficient to ensuring access to COVID-19 vaccines.

In requesting a broad waiver of IP rights to COVID-19 vaccines, India and South Africa maintained that “many countries especially developing countries may face institutional and legal difficulties when using flexibilities available” under existing WTO rules. They also noted that a “particular concern for countries with insufficient or no manufacturing capacity” is that the 2017 amendment that permits countries that produce generic medicines under compulsory license to export all of those medicines to least‐​developed countries that lack their own manufacturing capabilities will lead to a “cumbersome and lengthy process.”[14](https://www.cato.org/free-trade-bulletin/unnecessary-proposal-wto-waiver-intellectual-property-rights-covid-19-vaccines#_ednref14)

India and South Africa did not offer any further explanation or any evidence to support these assertions. In an effort at an explanation, two Canadian university professors contended, “The TRIPS flexibilities are important policies but they are not perfect. Rules allowing compulsory licensing apply only on a case‐​by‐​case and product‐​by‐​product basis. This slows down the ability of countries to scale up production of needed COVID-19 products.”[15](https://www.cato.org/free-trade-bulletin/unnecessary-proposal-wto-waiver-intellectual-property-rights-covid-19-vaccines#_ednref15) But this is advocacy, not evidence. At the time, this point was purely prospective; it was a prejudgment before any COVID-19 vaccine had been given final approval or reached the market.

Before such a sweeping waiver of IP rights is taken up, it should first be demonstrated that the option of compulsory licensing and other flexibilities under the current trade rules will not suffice. At this point, the developed countries that have opposed the waiver are correct. There is no evidence of the need for such a waiver. Action by the WTO should be contemplated only if, and when, the current flexibilities in WTO rules prove to be inadequate. Should that happen, any such action should be no broader than necessary to address the global medical need.

At the heart of this emerging trade debate is a belief by many people worldwide that all medicines should be “global public goods.” There is little room in such a belief for consideration of any rights to IP. As one group of United Nations human rights experts expressed: “There is no room for … profitability in decision‐​making about access to vaccines, essential tests and treatments, and all other medical goods, services and supplies that are at the heart of the right to the highest attainable standard of health for all.”[16](https://www.cato.org/free-trade-bulletin/unnecessary-proposal-wto-waiver-intellectual-property-rights-covid-19-vaccines#_ednref16)

This view is myopic. **Subordinating IP rights temporarily** to pressing public needs during a pandemic or other global health emergency is one thing. Eliminating any consideration of “profitability” in all policymaking relating to “access to vaccines, essential tests and treatments, and all other medical goods, services and supplies” is quite another.[17](https://www.cato.org/free-trade-bulletin/unnecessary-proposal-wto-waiver-intellectual-property-rights-covid-19-vaccines#_ednref17) To be sure, there is a superficial moral appeal in such a view. But does this moral appeal hold up if such a “human rights” approach does not result in meeting those urgent public needs?

With the belief that medicines should be “public goods,” there is literally no support in some quarters for the application of the WTO TRIPS Agreement to IP rights in medicines. Any protection of the IP rights in such goods is viewed as a violation of human rights and of the overall public interest. This view, though, does not reflect the practical reality of a world in which many medicines would simply not exist if it were not for the existence of IP rights and the protections they are afforded.

Technically, IP rights are exceptions to free trade. A long‐​standing general discussion in the WTO has been about when these exceptions to free trade should be allowed and how far they should be extended. The continuing debate over IP rights in medicines is only the most emotional part of this overall conversation. Because developed countries have, historically, been the principal sources of IP rights, this lengthy WTO dispute has largely been between developed countries trying to uphold IP rights and developing countries trying to limit them. The debate over the discovery and the distribution of vaccines for COVID-19 is but the latest global occasion for this ongoing discussion.

The primary justification for granting and protecting IP rights is that they are incentives for innovation, which is the main source for long‐​term economic growth and enhancements in the quality of human life. IP rights spark innovation by “enabling innovators to capture enough of the benefits of their own innovative activity to justify taking considerable risks.”[18](https://www.cato.org/free-trade-bulletin/unnecessary-proposal-wto-waiver-intellectual-property-rights-covid-19-vaccines#_ednref18) The knowledge from innovations inspired by IP rights spills over to inspire other innovations. The protection of IP rights promotes the diffusion, domestically and internationally, of innovative technologies and new know‐​how. Historically, the principal factors of production have been land, labor, and capital. In the new pandemic world, perhaps an even more vital factor is the creation of knowledge, which adds enormously to “the wealth of nations.” Digital and other economic growth **in the 21st century is increasingly** ideas‐​based and knowledge intensive. Without IP rights as incentives, there would be less new knowledge and thus less innovation.

In the short term, undermining private IP rights may accelerate distribution of goods and services—where the novel knowledge that went into making them already exists. But in the long term, undermining private IP rights would eliminate the incentives that inspire innovation, thus **preventing** the discovery and development of knowledge for new goods and services that the world needs. This widespread dismissal of the link between private IP rights and innovation is perhaps best reflected in the fact that although the United Nations Sustainable Development Goals for 2030 aspire to “foster innovation,” they make no mention of IP rights.[19](https://www.cato.org/free-trade-bulletin/unnecessary-proposal-wto-waiver-intellectual-property-rights-covid-19-vaccines#_ednref19)

As Stephen Ezell and Nigel Cory of the Information Technology and Innovation Foundation wrote, “A fundamental fault line in the debate over intellectual property pertains to the need to achieve a reasoned balance between access and exclusive rights.”[20](https://www.cato.org/free-trade-bulletin/unnecessary-proposal-wto-waiver-intellectual-property-rights-covid-19-vaccines#_ednref20) This fault line is much on display in the WTO rules on IP rights. These rules **recognize that “intellectual property rights are private rights”** and that rules and disciplines are necessary for “the provision of effective and appropriate means for the enforcement of trade‐​related intellectual property rights.”[21](https://www.cato.org/free-trade-bulletin/unnecessary-proposal-wto-waiver-intellectual-property-rights-covid-19-vaccines#_ednref21) Yet, where social and economic welfare is at stake, WTO members have sought to strike a balance in these rules between upholding IP rights and fulfilling immediate domestic needs.

#### Compulsory licensing solves access and spills over to distribution of green tech - empirics and past precedent

* AT: Can’t manufacture—can import from foreign firms
* AT: Prices still high—MNC’s lower price to avoid CL

**Zhuang 2017** (Wei, PhD from the University of Geneva, is currently an associate in the Geneva Office of Van Bael & Bellis. She assists governments in WTO dispute settlement proceedings and advises companies and governments in trade remedy investigations. Prior to joining Van Bael & Bellis, Wei worked in the Legal Affairs Division of the WTO as part of a Secretariat Team on a trade remedy dispute from beginning to end. In addition, she assisted the WTO Secretariat Team in an IP-related dispute, including by contributing to the preliminary rulings. Wei has also gained practical experience as a legal consultant at the United Nations (2010 – 2011), as a legal intern at the International Tribunal for the Law of the Sea (2009) and as an associate judicial officer at the Commission for Discipline Inspection (Muchuan Branch) in China. Wei was also a Marie Curie Fellow with the DISSETTLE (Dispute Settlement in Trade: Training in Law and Economics) Programme; a Visiting Fellow at the Lauterpacht Centre for International Law, University of Cambridge, and a Research Fellow at the Max Planck Institute for IP and Competition Law. Interpreting Patent-Related Flexibilities in the TRIIPS Agreement for Facilitating Innovation and Transfer of ESTs, chapter 6 of *Intellectual Property Rights and Climate Change* Cambridge University Press Pg. 298-304)DR 21

\*\*\*Note: EST= Environmentally Sound Technologies\*\*\*

Even though there are limits to their effectiveness, compulsory licences are considered a valuable tool for governments to facilitate access to medicines through the prevention of patent abuses as well as the “encouragement of domestic capacities for manufacturing pharmaceuticals”. 289 According to the UNDP Human Development Report (2001), after the adoption of the TRIPS Agreement, compulsory licences were initially mainly used in Canada, Japan, the UK and the United States for products such as pharmaceuticals – particularly as a remedy to address anti-competitive practices and prevent higher prices – while no compulsory licence was issued then in developing countries largely due to pressure from Europe and the United States and the fear of long and expensive litigation against the pharmaceutical industry.290 As demonstrated in Section 5.4.1.2, in order to address developing countries’ concern, the 2001 Doha Declaration explicitly reaffirmed the right of countries to issue compulsory licences where necessary, in the interests of public health.

In order to enable countries with insufficient manufacturing capacity in the pharmaceutical sector to benefit from the compulsory licensing system, the WTO General Council adopted the Decision of 30 August 2003 on the implementation of paragraph 6 of the Doha Declaration on the TRIPS Agreement and public health (the so-called paragraph 6 system).291 This decision essentially expanded the TRIPS flexibilities, involving two waivers: (1) with respect to the exporting country, a “waiver” of obligations to use the authorised compulsory licence predominantly for the supply of the domestic market under Article 31(f); and (2) with regard to the importing country, a waiver of the adequate remuneration requirement under Article 31(h) when remuneration is paid in the exporting Member. “Where a compulsory licence is granted by an exporting Member under the system set out in this Decision, adequate remuneration pursuant to Article 31(h) of the TRIPS Agreement shall be paid in that Member taking into account the economic value to the importing Member of the use that has been authorised in the exporting Member”. 292

In 2005, WTO Members agreed to make the waivers permanent by amending the TRIPS Agreement.293 With the approval of two-thirds of the WTO Members, the amendment entered into force on 23 January 2017. As the very first legal amendment to a WTO multilateral agreement, it was said to have shown that “[M]embers are determined to ensure the WTO’s trading system contributes to humanitarian and development goals”. 294 Likewise, such amendment could be extended to address other global concerns such as climate change in accordance with the WTO’s sustainable development objective and Articles 7 and 8 of the TRIPS Agreement.

In effect, the compulsory licensing system established within the WTO framework is not a panacea, but rather a legal guarantee of rights and ability to make effective use of compulsory licences. Since the adoption of the Doha Declaration, a number of developing countries (e.g., Thailand, Brazil, Ecuador, India and Indonesia) have issued compulsory licences to lower the price of patented medicines such as HIV/AIDS drugs.295 Additionally, in 2007, Rwanda became the first country without sufficient manufacturing capacities to use the WTO “paragraph 6 system” to import Apo-TriAvir from Apotex, a Canadian firm.296 Commentators note that since the Doha Declaration was adopted in 2001, the threat of compulsory licenceshas motivated multinational companies to “voluntarily make proactive efforts to realistically make their drugs accessible**”** either through dramatically lowering the price or by offering voluntary licences on favourable terms.297 Meanwhile, many countries have successfully used the threat of compulsory licences as leverage in drug price negotiations with pharmaceutical companies.298

The positive role of compulsory licences and the threat thereof in promoting access to medicines could inspire WTO Members to use the compulsory licensing instrument to pursue other public policy objectives such as mitigating climate change. Despite being public-health-specific, the Doha Declaration and the TRIPS Amendment set a welcome precedent in guaranteeing Members’ right and ability to make effective use of the compulsory licensing for the protection of other general public interests such as environmental protection. Bearing this in mind, the following sections examine the feasibility, opportunities and challenges of compulsory licences for EST transfer.

6.4.4.2 Compulsory Licences for Transfer of ESTs: Feasibilities and Opportunities

The TRIPS Agreement does not contain any explicit limitations on the grounds upon which compulsory licences may be granted.299 This is reaffirmed by Paragraph 5(b) of the Doha Declaration, emphasising that each Member has the right to grant compulsory licences upon the grounds it determines. As discussed in Section 1.1, climate change is “a common concern of mankind” and tackling climate change is clearly in the public interest. Thus, WTO Members have the power to grant compulsory licences for patented ESTs on the ground that such ESTs are needed to achieve climate change mitigation. This view has been endorsed by many commentators, considering that climate change mitigation could provide a valid ground for compulsory licence of ESTs.300

As previously demonstrated, read in accordance with the WTO’s sustainable development objective and Articles 7 and 8 of the TRIPS Agreement, Article 31 provides regulatory space for Members to use compulsory licences to facilitate the transfer of ESTs. Members’ right and discretion to use compulsory licences in the context of climate change is further supported by developed countries’ commitments to transfer ESTs under Article 4.5 of the UNFCCC which serve as a contextual element for the interpretation Article 31. Specially speaking, WTO Members not only enjoy great discretion to grant compulsory licences for EST patents on different grounds but also have certain flexibilities in applying the conditions for the granting of compulsory licences.

As to the grounds for compulsory licensing, first, Members may issue compulsory licences for the lack of local working of certain EST patents. To the extent that local production of certain patented ESTs is needed to mitigate climate change, such local working requirements constitute a bona fide distinction rather than discrimination as to whether products are imported or locally produced in Article 27.1. As demonstrated in Section 6.4.2.2, some countries, such as Brazil, permit compulsory licences in cases where the invention is not (sufficiently) exploited locally.301

Second, Members may issue compulsory licences to address IP-related abuses and anti-competitive practices in the process of the transfer of ESTs. As pointed out by Reichman et al. (2008), compulsory licences for anticompetitive practices afford countries another set of options to facilitate the access to patented ESTs, “especially when foreign firms refuse to deal with local firms or refuse to make technologies available at prices that local firms can afford”. 302 In this case, compulsory licensing may proceed without prior negotiation efforts and the licensee may exploit the patent at issue regardless of the location of the predominant market.303

Third, WTO Members may consider climate change as a “national emergency or other circumstances of extreme urgency” within the meaning of Article 31(b), thereby permitting compulsory licensing for certain EST-related patents. The TRIPS Agreement neither defines the concept of “national emergency” or “other circumstances of extreme urgency” nor does it provide guidance for what is meant by these concepts. Again the Doha Declaration affirms that “[e]ach member has the right to determine what constitutes a national emergency or other circumstances of extreme urgency”, but added that “public health crises, including those relating to HIV/AIDS, tuberculosis, malaria and other epidemics, can represent a national emergency or other circumstances of extreme urgency”. 304 According to Correa (2002), the reference to “HIV/AIDS, tuberculosis, malaria and other epidemics” suggests that an “emergency” may not be restricted to a short-term problem, but can also be a long-lasting situation, and such recognition implies that “specific measures to deal with an emergency may be adopted and maintained as long as the underlying situation persists, without temporal constraints”. 305 The Rio+ 20 Outcome Document (A/RES/66/288) reaffirms that “climate change is one of the greatest challenges of our time” and stresses that combating climate change represents “an immediate and urgent global priority”. 306 The preamble of the 2015 Paris Agreement explicitly recognises that climate change poses an “urgent threat”. 307 Accordingly, WTO Members, in particular, those countries suffering the most from climate change, may well argue that climate change constitutes “a national emergency” or another circumstance of “extreme urgency” within the meaning of Article 31(b) of the TRIPS Agreement, therefore permitting compulsory licences for certain EST-related patents. No prior negotiations are needed for such licences, which would therefore promote rapid access to critical ESTs by the countries concerned.

Turning to the conditions for the granting of compulsory licences, although these conditions are strict, interpreting these clauses in their context in accordance with the WTO’s sustainable development objective and Articles 7 and 8 of the TRIPS Agreement would provide Members some policy space to facilitate the transfer of patented ESTs. As discussed in Section 6.4.3.1.1, the procedural requirement that a licence must be considered “on its individual merits” (Article 31(a)) does not prevent WTO Members from setting parameters for the granting of compulsory licences regarding certain categories of technologies that are needed to mitigate climate change. As discussed in Section 6.4.3.2.1, Article 31(h) embodies substantial flexibilities in determining the level of, and the basis upon which, adequate remuneration is paid and, in particular, the need for the transfer of ESTs could be an important consideration in establishing the level of compensation.

In general, compulsory licensing is seen as a means of ensuring easy access to, and wide dissemination of, ESTs throughout the world.308 The use of compulsory licences and the threat thereof to ensure the availability and affordability of essential medicines have provided a powerful precedent supporting that such licences could be used to facilitate access to essential ESTs.309 As is the case with essential medicines described above, not only compulsory licences are indispensable when an EST-patent holder refuses to transfer the essential technologies at all, but often the mere threat to impose a compulsory licence may compel the EST-patent holder to engage in voluntary licensing or lower the price of the patented ESTs.310 As mentioned in Section 6.4.2.1, using compulsory licences to facilitate access to ESTs have been recommended by Agenda 21 and incorporated into the US Clear Air Act. Therefore, countries, at least those with sufficient technological capabilities, can facilitate access to patented ESTs by using or threatening to use compulsory licences in accordance with the relevant rules set forth in the TRIPS Agreement.311

#### Diffusion occurs and solves climate. The issue is inexperience and lack of political will

* At: WTO backlash- CL for climate now, just from U.S.
* AT: Royalties- cheaper with them than making own
* AT: Can’t manufacture- CL lets them buy from foreign firms- Article 31

**Nanda 2010** (Nitya, research professional with more than two decades of experience in research, consulting and teaching. He has been involved with more than 40 research/consulting projects, and in about half of them as the principal investigator. Currently, he is Director at the Council for Social Development, New Delhi – a premier research institute working on issues of social development. Previously, he worked at the National Council of Applied Economic Research (NCAER), CUTS International, and The Energy and Resources Institute (TERI). During his tenure at TERI, he was also an adjunct faculty at the TERI School of Advanced Studies – a deemed university. He has about 120 research publications including in peer-reviewed journals and as book chapters and monographs. He has authored two books and edited four volumes. He has written several articles for various newspapers and magazines as well. Among his books, “Expanding Frontiers of Global Trade Rules: The Political Economic Dynamics of the International Trading System”, Routledge, London & New York, 2008 received wide acclaim. Currently, he is working on a book titled, “India’s Industrial Policy and Performance: Growth, Competition and Competitiveness”. He received his education at the Calcutta University and Jawaharlal Nehru University, New Delhi. “International Trade and Climate Change: Issues for South Asia. VIII+48. Kathmandu: South Asia Watch on Trade, Economics and Environment (SAWTEE). https://www.sawtee.org/publications/Discussion-Paper-13.pdf 2010)DR 21

Much of the discussion on technology transfer has been concerned with the issue of climate change mitigation. However, for developing countries, technology would probably be more important for adaptation. They will need technology in agriculture so that **crops can withstand the impacts of climate change**. They will need technology to deal with water stress, greater occurrence of existing diseases, and the arrival of new diseases.

The Intergovernmental Panel on Climate Change (IPCC) has listed the various hurdles to technology transfer, including high capital costs, limited access to capital, poor access to information, institutional and administrative difficulties in developing technology transfer contracts, lack of infrastructure to absorb riskier technologies, absence of economic incentives, and IPRs (Metz et al. 2000). Sale or licensing of intellectual property is an important component of transfer of technology in the international context.

Technologies protected by IPRs need to be licensed. The nature of the IPR regime is an issue in so far as it determines the terms of licensing. Therefore, there is a great likelihood of production and usage costs increasing because of payments made to obtain licences. In some case, the owner may just refuse to grant a licence altogether as such technologies are used as barriers to entry (Aoki and Small 2004). DuPont, for example, refused to grant licence for the production of chlorofluorocarbon substitutes to Korean and Indian firms that sought **to meet the phase-out requirements for ozone-depleting substances** (South Centre 2001). Such refusal can further dampen the diffusion of technology. Often, production of relevant goods that embody such technology is cheaper in developing countries even after payments of royalties. Given this context, it has been suggested that the issuance of compulsory licences can be a tool for faster diffusion of climate-friendly technologies (Barton 2007; Khor 2008).

4.3 Compulsory licensing. Compulsory licence, a statutorily created licence that allows others to pay a royalty and use an invention without the patentee’s permission, is an important feature of IPR law. It also includes the government authorizing itself to use an otherwise protected intellectual property without having to obtain the permission or authorization of a patent holder in cases of national emergency or use towards a public good. The issue of compulsory licensing becomes a case for consideration when a patent holder is not willing to share the technology with others voluntarily. Compulsory licensing introduces competition in the markets and hence makes the relevant goods and services cheaper.

The term compulsory licence does not figure as such in the WTO’s Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). However, it can be read into the provision of the Agreement on other use (of the patented subject matter) without authorization of the right holder. Exceptions to the rights of patent holders11 and principles on measures for preventing the abuse of IPRs by right holders or the resort to practices which unreasonably restrain trade or adversely affect the international transfer of technology also provide reasonable flexibility for resorting to the provision of compulsory licensing.12

In the US, 28 USC 1498 is the seminal legal provision relating to the government use of patents and copyrights. The process provided under this provision empowers the US government to use and authorize the use of a patent without any requirement to seek a licence or negotiate the use. It also entitles the patent right owner to compensation by fi ling a suit in the US Court of Federal Claims for recovery of his “reasonable and entire compensation”.

The US has a long history of compulsory licensing, which has been mostly used as an antitrust remedy in cases of patent abuses. In Besser Manufacturing, the court quoted compulsory licensing as “a well-recognized remedy where patent abuses are proved in antitrust actions and it is required for effective relief.”5 Similarly in the Glaxo Group case, the court stated that “mandatory selling on specifi ed terms and compulsory patent licensing at reasonable charges are recognized antitrust remedies.”6 The General Electric case is an interesting case in which the court required General Electric to issue “free” licences for light bulb patents to its competitors. 7 In the Microsoft Corporation case the district court endorsed compulsory licensing as “a remedy closely connected with the theory of liability in this case …. To ensure that no practices likely to result in monopolization….provisions plainly fall within public interest.”

There also exists a host of specific environmental and health legislation in the US that provide for the targeted licensing of specific technological applications to meet public health needs and specific environmental objectives like air pollution control. 42 USC Sec 7608 provides for mandatory licensing of air pollution prevention inventions under Title 42 (Public Health and Welfare) under the Clean Air Act. Mandatory patent licences have also been granted under Section 308 of the Clean Air Act.9 The defence sector has been one of the major consumers of the compulsory licenses issues by the US government.

In Europe, although compulsory licensing has not been as frequent as in the US, the IMS Health case is considered to be a landmark case in this regard. In this case, the European Court of Justice laid down certain conditions under which a compulsory licence can be granted.10 In the Regulation (EC) No 816/2006 of the European Parliament and of the Council of 17 May 2006 on compulsory licensing of patents relating to the manufacture of pharmaceutical products for export to countries with public health problems, prior negotiations in circumstances of national emergency and public noncommercial usage have been waived. In such cases, payment for a patent licence has been fixed at 4 percent of the remuneration given by the importing country.

Some South Asian countries too have legal provisions for compulsory licensing. Sections 84 and 92 of the Indian Patent Act 1970 (along with revisions) relate to the issuance of compulsory licences. The Act states that after three years from the date of sealing of a patent, an interested party may apply to the Controller for the grant of a compulsory license alleging that the reasonable requirements of the public with respect to the invention have not been satisfi ed or that the invention is not available at a reasonable price (CUTS 2006). Pakistan also has similar provisions. Under Sri Lanka’s Intellectual Property Act No 36 of 2003, compulsory licences can be issued only in extreme cases. This could be because Sri Lanka signed a bilateral agreement with the US in 1991 limiting the grounds for the use by Sri Lanka of compulsory licensing of patents.

Article 31 (c) of the TRIPS Agreement also provides that a country can use such a measure “to remedy a practice determined after judicial or administrative process to be anti-competitive”. Hence, countries can invoke their competition law where “abuse of dominance” is included as one of the anti-competitive practices and the source of dominance is an IPR. However, the provision also requires that the possibilities of obtaining a voluntary licence must be exhausted before a compulsory licence is sought. Similarly, Article 40 of the TRIPS Agreement dealing with control of anti-competitive practices in contractual licences provides that: “Nothing in this Agreement shall prevent Members from specifying in their legislation licensing practices or conditions that may in particular cases constitute an abuse of intellectual property rights having an adverse effect on competition in the relevant market.” Hence, refusal to give a licence along with under-servicing of the market can also be interpreted as an anti-competitive practice. The right of WTO members to make use of compulsory licences in the interest of public health has been explicitly recognized in the Doha Declaration on Public health and the August 2003 Decision by WTO members. Pursuant to these, the General Council of the WTO amended the TRIPS Agreement on 6 December 2005.13

A compulsory licence can be granted in cases such as meeting government requirements, abuse of patent rights, national emergency, public non-commercial use and technical advance of considerable economic significance over the existing patent. Accordingly, Thailand issued a compulsory licence in late 2006 for five years on Efavirenz, an AIDS drug patented by Merck. Brazil followed suit in 2007.

The TRIPS Agreement recognizes countries’ freedom to determine what constitutes national emergency in their context. While the flexibility rests with countries to determine when and in which cases compulsory licences can be used, in the absence of any specifications or directives, there is bound to be some confusion or conflict. To make use of the provisions for compulsory licensing for diffusion of climate-friendly technologies, first and foremost, climate change mitigation has to be treated as a public good. It is also important to lay down detailed guidelines and specifications to help a country identify a technology that can be eligible for the issuing of a compulsory licence. Similarly, eligibility criteria for the countries may be specified.

Under the World Intellectual Property Organization’s Development Agenda, some developing countries have talked about the use of compulsory licensing to promote greater access to technologies. However, developed countries, particularly, the US and the EU, have argued that compulsory licensing and its effects thereof would also send a strong signal to potential and current investors that their investment is not safe and welcome (WIPO 2005). Interestingly, it is not developing countries who invented the concept of compulsory licensing. As discussed above, it has been used on several occasions in the US and the EU. In particular, the US has been quite an enthusiastic user of it. However, the US and the EU feel that developing countries may not be “responsible” enough in its use.

The IPR issue is included in many regional and bilateral trade agreements—mostly of the North-North and North-South variety—as well. However, by and large, such agreements adopt higher standards of IPR protection, meaning that they will make compulsory licensing more difficult. The IPR-related provisions in the North American Free Trade Agreement (NAFTA) are similar to those of the TRIPS Agreement, which allows the use of compulsory licences without specifying the grounds for issuing them.

However, NAFTA also provides for detailed provisions on the rights of patent owners in the case of compulsory licensing, and since its coming into force, there has been a significant reduction of compulsory licences both in the US and Canada (Kommerskollegium 2008). Some bilateral trade agreements signed by the US have even more restrictive provisions. For example, four such bilateral agreements (US-Vietnam, US-Jordan, US-Singapore and US-Australia) limit the use of compulsory licensing to emergency situations, anti-trust remedies, and cases of public non-commercial use (Fink and Reichenmiller 2005).

The real effectiveness of compulsory licensing to promote transfer of technology, however, will depend on the market conditions of the relevant products and technologies. It is important that there are capable and willing fi rms to receive a compulsory licence. This will require a sufficient number of firms producing the same or similar products. Markets for climate-friendly products and technologies are unlikely to meet such conditions as they are highly concentrated. The concentration is even higher in particular segments of the industry (Sawhney 2006). If a firm remains a virtual monopoly for a sufficiently long period of time, then it becomes extremely difficult for any other firm to enter that industry. If there is no firm with adequate capability to receive a compulsory licence of some technology and use it, a mere legal provision for compulsory licensing is of little use.

The US is the world’s largest producer of environmental technologies and occupies about 33 percent share of the international market. The other major suppliers are the EU (particularly Germany) and Japan. The Office of Environmental Industries of the US proudly claims that developing nations simply do not have the technologies (Nanda 2008a). It is very likely that the situation would be quite similar in the case of technologies that relate to climate change mitigation.

In a recent study based on patenting between 1978 and 2003, it was found that innovation in climate change technologies is highly concentrated in three countries, namely Japan, Germany and the US, which accounts for two thirds of total climate innovations in 13 technologies (Dechezleprêtre et al. 2008). If developing countries need to make use of compulsory licensing in order to make these technologies better accessible, they will need domestic companies with manufacturing capabilities. However, they are unlikely to have such capabilities in most of these technologies.

Developing countries will find it difficult to make compulsory licences work in climate-friendly products and technologies, as most of them do not have much production capabilities. Indeed, production capacities are limited in developing countries also because they do not have access to the technologies. These products are very different from pharmaceutical products. For example, Bangladesh, an LDC, has capabilities to produce pharmaceutical products, but a relatively advanced developing country like India does not have much capability in climate change mitigation technologies.

#### Balancing patent protection with rapid transfer of green tech is the only way to solve climate change

**Probst et al. 2021** (Benedict Probst, University of Cambridge. PhD on economics of clean energy transition from the University of Cambridge. Simon Touboul, MINES Paris Tech, PSL University, Matthieu Glachant MINES ParisTech and Antoine Dechezleprête, OECD. “Global Trends in the Innovation and Diffusion of Climate Change Mitigation Technologies,” pre-print under review in *Nature Portfolio.* <https://www.researchsquare.com/article/rs-266803/v1> Last updated Feb. 2021)DR 21

After almost two decades (1995-2013) of increasing patenting rates in low-carbon technologies, our analysis shows an overall decline in CCMT-patenting trends since 2013. Low fossil-fuel and carbon prices, as well as lower private and public funding for low-carbon technologies after the financial crisis, have likely contributed to the decline. This decline is worrisome, particularly because a range of studies shows that the availability of low-carbon technologies is critical for mitigating dangerous climate change 33. While there is an overall decline in patenting, our analysis also shows that the least affected is the ICT-sector.

Over the last decade, the concentration of CCMT innovation in few (mostly high-income) countries has remained largely stable. This concentration indicates that existing climate policies and market forces have not led to a more diverse set of CCMT-inventing countries. Nonetheless, both China (ranked 5th in global CCMT inventions) and Taiwan (7th) have caught up substantially over the last decade. China is also the major recipient of CCMT from high-income countries, receiving 72% of transferred technologies from high to middle-income countries from 2013-2017. Yet, overall emerging economies remain less specialised in CCMT technologies than the global average. The lack of specialisation of emerging economies in CCMT also points towards a more fundamental challenge: many emerging economies may be hesitant to fully engage in a low-carbon transition if there are few jobs in the low-carbon sector of the economy to which existing jobs in high-carbon sectors can be shifted (e.g., coal mining).

Our findings indicate two important lessons: First, there is a dangerous downward trend in low-carbon inventions. It is particularly worrisome that the Paris Agreement does not appear to have reversed the downward trend in low-carbon patenting. Second, our findings underscore the need for more transfers to developing and emerging economies where most CO2-emissions increases are set to occur. While global transfers do not merely occur between industrialised countries, most of the transfers from high-income to middle-income countries go to China. Hence, transferring more technologies to other emerging economies – such as South Africa, Brazil, and Russia – is critical to mitigating climate change.

#### Short-term action to mitigate climate change solves extinction and nuclear war

**Pester 8/30/21** (Patrick, staff writer for Live Science. His background is in wildlife conservation and he has worked with endangered species around the world. Patrick holds a master's degree in international journalism from Cardiff University in the U.K. and is currently finishing a second master's degree in biodiversity, evolution and conservation in action at Middlesex University London. Citing **Luke Kemp, a research associate at the Centre for the Study of Existential Risk at the University of Cambridg**e in the United Kingdom AND **Michael Mann, PhD, distinguished professor of atmospheric science at Penn State**. “Could climate change make humans go extinct?” [https://www.livescience.com/climate-change-humans-extinct.html August 30](https://www.livescience.com/climate-change-humans-extinct.html%20August%2030), 2021)DR 21

According to Mann, a global temperature increase of 5.4 degrees Fahrenheit (3 degrees Celsius) or more could lead to a collapse of our societal infrastructure and massive unrest and conflict, which, in turn, could lead to a future that resembles some Hollywood dystopian films.

One way climate change could trigger a societal collapse is by creating food insecurity. Warming the planet has a range of negative impacts on food production, including increasing the water deficit and thereby reducing food harvests, [Live Science previously reported](https://www.livescience.com/58891-why-2-degrees-celsius-increase-matters.html). Food production losses can increase human deaths and drive economic loss and socio-political instability, among other factors, that may trigger a breakdown of our institutions and increase the risk of a societal collapse, according to a study published Feb. 21 in the journal [Climatic Change](https://go.redirectingat.com/?id=92X1590019&xcust=livescience_us_1191050396230939400&xs=1&url=https%3A%2F%2Flink.springer.com%2Farticle%2F10.1007%2Fs10584-021-02957-w&sref=https%3A%2F%2Fwww.livescience.com%2Fclimate-change-humans-extinct.html).

Related: [Has the Earth ever been this hot before?](https://www.livescience.com/65927-has-earth-been-this-hot-before.html)

Past extinctions and collapses

Kemp studies previous civilization collapses and the risk of climate change. Extinctions and catastrophes almost always involve multiple factors, he said, but he thinks if humans were to go extinct, climate change would likely be the main culprit.

"If I'm to say, what do I think is the biggest contributor to the potential for human extinction going towards the future? Then climate change, no doubt," Kemp told Live Science.

All of the major [mass-extinction events](https://www.livescience.com/mass-extinction-events-that-shaped-Earth.html) in Earth's history have involved some kind of climatic change, according to Kemp. These events include cooling during the Ordovician-[Silurian](https://www.livescience.com/43514-silurian-period.html) extinction about 440 million years ago that wiped out 85% of species, and warming during the [Triassic](https://www.livescience.com/43295-triassic-period.html)-[Jurassic](https://www.livescience.com/28739-jurassic-period.html) extinction about 200 million years ago that killed 80% of species, Live Science previously reported. And more recently, climate change affected the fate of early human relatives.

While [Homo sapiens](https://www.livescience.com/homo-sapiens.html) are obviously not extinct, "we do have a track record of other hominid species going extinct, such as [Neanderthals](https://www.livescience.com/28036-neanderthals-facts-about-our-extinct-human-relatives.html)," Kemp said. "And in each of these cases, it appears that again, climatic change plays some kind of role."

Scientists don't know why Neanderthals went extinct about 40,000 years ago, but climatic fluctuations seem to have broken their population up into smaller, fragmented groups, and severe changes in temperature affected the plants and animals they relied on for food, according to the [Natural History Museum](https://www.nhm.ac.uk/discover/who-were-the-neanderthals.html) in London. Food loss, driven by climate change, may have also led to a tiny drop in Neanderthal fertility rates, contributing to their extinction, [Live Science previously reported](https://www.livescience.com/65594-neanderthal-fertility-led-to-extinction.html).

Climate change has also played a role in the collapse of past human civilizations. A [300-year-long drought](https://www.livescience.com/38893-drought-caused-ancient-mediterranean-collapse.html), for example, contributed to the downfall of ancient Greece about 3,200 years ago. But Neanderthals disappearing and civilizations collapsing do not equal human extinction. After all, humans have survived climate fluctuations in the past and currently live all over the world despite the rise and fall of numerous civilizations.

Homo sapiens have proven themselves to be highly adaptable and able to cope with many different climates, be they hot, cold, dry or wet. We can use resources from many different plants and animals and share those resources, along with information, to help us survive in a changing world, according to the [Smithsonian’s National Museum of Natural History](https://humanorigins.si.edu/research/climate-and-human-evolution/climate-effects-human-evolution).

Related: [How would just 2 degrees of warming change the planet?](https://www.livescience.com/58891-why-2-degrees-celsius-increase-matters.html)

Today, we live in a global, interconnected civilization, but there's reason to believe our species could survive its collapse. A study published on July 21 in the journal [Sustainability](https://www.mdpi.com/2071-1050/13/15/8161/htm) identified countries most likely to survive a global societal collapse and maintain their complex way of life. Five island countries, including New Zealand and Ireland, were chosen as they could remain habitable through agriculture, thanks to their relatively cool temperatures, low weather variability and other factors that make them more resilient to climate change.

New Zealand would be expected to hold up the best with other favorable conditions, including a low population, large amounts of good quality agricultural land and reliable, domestic energy. So, even if climate change triggers a global civilization collapse, humans will likely be able to keep going, at least in some areas.

Turning on ourselves

The last scenario to consider is climate-driven conflict. Kemp explained that in the future, a scarcity of resources that diminish because of **climate change could** potentially create conditions for wars that threaten humanity. "There's reasons to be concerned that as water resources dry up and scarcity becomes worse, and the general conditions of living today become much, much worse, then suddenly, the threat of potential nuclear war becomes much higher," Kemp said.

Put another way, climate change impacts might not directly cause humans to go extinct, but it could lead to events that seriously endanger hundreds of millions, if not billions, of lives. A 2019 study published in the journal [Science Advances](https://advances.sciencemag.org/content/5/10/eaay5478) found that a nuclear conflict between just India and Pakistan, with a small fraction of the world's nuclear weapons, could kill 50 million to 125 million people in those two countries alone. Nuclear war would also change the climate, such as through temperature drops as burning cities fill the atmosphere with smoke, threatening food production worldwide and potentially causing mass starvation.

What's next?

While avoiding complete extinction doesn't sound like much of a climate change silver lining, there is reason for hope. Experts say it isn't too late to avoid the worst-case scenarios with significant cuts to greenhouse gas emissions.

"It is up to us," Mann said. "If we fail to reduce carbon emissions substantially in the decade ahead, we are likely committed to a worsening of already dangerous extreme weather events, inundation of coastlines around the world due to melting ice and rising sea level, more pressure on limited resources as a growing global population competes for less food, water and space due to climate change impacts. If we act boldly now, we can avoid the worst impacts."

### Case

#### Case Framework – the role of the ballot is to determine whether the plan is a good idea through evaluation of consequences.

#### 1] Don’t let them weigh the sum total of their impact—they only get to weigh the unique amount solved by the affirmative. Filter the debate through scope of solvency—there’s no impact to root cause if they don’t solve it

#### 2] No performative or methodological offense, only offense from the plan—reject it cuz it explodes predictable limits, spiking out of neg ground making any discussion qualitatively worse

#### Evaluate consequences

Christopher A. Bracey 6, Associate Professor of Law, Associate Professor of African & African American Studies, Washington University in St. Louis, September, Southern California Law Review, 79 S. Cal. L. Rev. 1231, p. 1318

Second, reducing conversation on race matters to an ideological contest allows opponents to elide inquiry into whether the results of a particular preference policy are desirable. Policy positions masquerading as principled ideological stances create the impression that a racial policy is not simply a choice among available alternatives, but the embodiment of some higher moral principle. Thus, the "principle" becomes an end in itself, without reference to outcomes. Consider the prevailing view of colorblindness in constitutional discourse. Colorblindness has come to be understood as the embodiment of what is morally just, independent of its actual effect upon the lives of racial minorities. This explains Justice Thomas's belief in the "moral and constitutional equivalence" between Jim Crow laws and race preferences, and his tragic assertion that "Government cannot make us equal [but] can only recognize, respect, and protect us as equal before the law." [281](http://web.lexis-nexis.com/universe/document?_m=cd9713b340d60abd42c2b34c36d8ef95&_docnum=9&wchp=dGLbVzz-zSkVA&_md5=9645fa92f5740655bdc1c9ae7c82b328) For Thomas, there is no meaningful difference between laws designed to entrench racial subordination and those designed to alleviate conditions of oppression. Critics may point out that colorblindness in practice has the effect of entrenching existing racial disparities in health, wealth, and society. But in framing the debate in purely ideological terms, opponents are able to avoid the contentious issue of outcomes and make viability determinations based exclusively on whether racially progressive measures exude fidelity to the ideological principle of colorblindness. Meaningful policy debate is replaced by ideological exchange, which further exacerbates hostilities and deepens the cycle of resentment.

#### Focus on large scale catastrophes is good and they outweigh – appeals to social costs, moral rules, and securitization play into cognitive biases and flawed risk calculus – 2020 is living proof

Weber 20 (ELKE U. WEBER is Gerhard R. Andlinger Professor in Energy and the Environment and Professor of Psychology and Public Affairs at Princeton University.), November-December 2020 Issue, "Heads in the Sand," Foreign Affairs, <https://www.foreignaffairs.com/articles/2020-10-13/heads-sand> mvp

We are living in a time of crisis. From the immediate challenge of the COVID-19 pandemic to the looming existential threat of climate change, the world is grappling with massive global dangers—to say nothing of countless problems within countries, such as inequality, cyberattacks, unemployment, systemic racism, and obesity. In any given crisis, the right response is often clear. Wear a mask and keep away from other people. Burn less fossil fuel. Redistribute income. Protect digital infrastructure. The answers are out there. What’s lacking are governments that can translate them into actual policy. As a result, the crises continue. The death toll from the pandemic skyrockets, and the world makes dangerously slow progress on climate change, and so on.

It’s no secret how governments should react in times of crisis. First, they need to be nimble. Nimble means moving quickly, because problems often grow at exponential rates: a contagious virus, for example, or greenhouse gas emissions. That makes early action crucial and procrastination disastrous. Nimble also means adaptive. Policymakers need to continuously adjust their responses to crises as they learn from their own experience and from the work of scientists. Second, governments need to act wisely. That means incorporating the full range of scientific knowledge available about the problem at hand. It means embracing uncertainty, rather than willfully ignoring it. And it means thinking in terms of a long time horizon, rather than merely until the next election. But so often, policymakers are anything but nimble and wise. They are slow, inflexible, uninformed, overconfident, and myopic.

Why is everyone doing so badly? Part of the explanation lies in the inherent qualities of crises. Crises typically require navigating between risks. In the COVID-19 pandemic, policymakers want to save lives and jobs. With climate change, they seek a balance between avoiding extreme weather and allowing economic growth. Such tradeoffs are hard as it is, and they are further complicated by the fact that costs and benefits are not evenly distributed among stakeholders, making conflict a seemingly unavoidable part of any policy choice. Vested interests attempt to forestall needed action, using their money to influence decision-makers and the media. To make matters worse, policymakers must pay sustained attention to multiple issues and multiple constituencies over time. They must accept large amounts of uncertainty. Often, then, the easiest response is to stick with the status quo. But that can be a singularly dangerous response to many new hazards. After all, with the pandemic, business as usual would mean no social distancing. With climate change, it would mean continuing to burn fossil fuels.

But the explanation for humanity’s woeful response to crises goes beyond politics and incentives. To truly understand the failure to act, one must turn to human psychology. It is there that one can grasp the full impediments to proper decision-making—the cognitive biases, emotional reactions, and suboptimal shortcuts that hold policymakers back—and the tools to overcome them.

AVOIDING THE UNCOMFORTABLE

People are singularly bad at predicting and preparing for catastrophes. Many of these events are “black swans,” rare and unpredictable occurrences that most people find difficult to imagine, seemingly falling into the realm of science fiction. Others are “gray rhinos,” large and not uncommon threats that are still neglected until they stare you in the face (such as a coronavirus outbreak). Then there are “invisible gorillas,” threats in full view that should be noticed but aren’t—so named for a psychological experiment in which subjects watching a clip of a basketball game were so fixated on the players that they missed a person in a gorilla costume walking through the frame. Even professional forecasters, including security analysts, have a poor track record when it comes to accurately anticipating events. The COVID-19 crisis, in which a dystopic science-fiction narrative came to life and took everyone by surprise, serves as a cautionary tale about humans’ inability to foresee important events.

Not only do humans fail to anticipate crises; they also fail to respond rationally to them. At best, people display “bounded rationality,” the idea that instead of carefully considering their options and making perfectly rational decisions that optimize their preferences, humans in the real world act quickly and imperfectly, limited as they are by time and cognitive capacity. Add in the stress generated by crises, and their performance gets even worse.

Because humans don’t have enough time, information, or processing power to deliberate rationally, they have evolved easier ways of making decisions. They rely on their emotions, which serve as an early warning system of sorts: alerting people that they are in a positive context that can be explored and exploited or in a negative context where fight or flight is the appropriate response. They also rely on rules. To simplify decision-making, they might follow standard operating procedures or abide by some sort of moral code. They might decide to imitate the action taken by other people whom they trust or admire. They might follow what they perceive to be widespread norms. Out of habit, they might continue to do what they have been doing unless there is overwhelming evidence against it.

Not only do humans fail to anticipate crises; they also fail to respond rationally to them.

Humans evolved these shortcuts because they require little effort and work well in a broad range of situations. Without access to a real-time map of prey in different hunting grounds, for example, a prehistoric hunter might have resorted to a simple rule of thumb: look for animals where his fellow tribesmen found them yesterday. But in times of crisis, emotions and rules are not always helpful drivers of decision-making. High stakes, uncertainty, tradeoffs, and conflict—all elicit negative emotions, which can impede wise responses. Uncertainty is scary, as it signals an inability to predict what will happen, and what cannot be predicted might be deadly. The vast majority of people are already risk averse under normal circumstances. Under stress, they become even more so, and they retreat to the familiar comfort of the status quo. From gun laws to fossil fuel subsidies, once a piece of legislation is in place, it is hard to dislodge it, even when cost-benefit analysis argues for change.

### Cap

#### Tech innovation undergirded by profit motives are driving the Second Machine Age, which dematerializes capitalism and makes growth a sustainable necessity

This ev is v v v long but it’s amazing – answers basically every aff arg

McAfee, 19—cofounder and codirector of the MIT Initiative on the Digital Economy at the MIT Sloan School of Management, former professor at Harvard Business School and fellow at Harvard’s Berkman Center for Internet and Society (Andrew, “Looking Ahead: The World Cleanses Itself This Way,” *More from Less: The Surprising Story of How We Learned to Prosper Using Fewer Resources—and What Happens Next*, Chapter 14, pg 278-292, Kindle, dml)

The decreases in resource use, pollution, and other exploitations of the earth cataloged in the preceding chapters are great news. But are they going to last? It could be that we're just living in a pleasant interlude between the Industrial Era and another rapacious period during which we massively increase our footprint on our planet and eventually cause a giant Malthusian crash.

It could be, but I don't think so. Instead, I think we're going to take better care of our planet from now on. I'm confident that the Second Machine Age will mark the time in our history when we started to progressively and permanently tread more lightly on the earth, taking less from it and generally caring for it better, even as we humans continue to become more numerous and prosperous. The work of Paul Romer, who shared the 2018 Nobel Prize in economics, is one of the sources of this confidence.

Growth Mindset

Romer's largest contribution to economics was to show that it's best not to think of new technologies as something that companies buy and bring in from the outside, but instead as something they create themselves (the title of his most famous paper, published in 1990, is "Endogenous Technological Change"). These technologies are like designs or recipes; as Romer put it, they’re "the instructions that we follow for combining raw materials." This is close to the definitions of technology presented in chapter 7.

Why do companies invent and improve technologies? Simply, to generate profits. They come up with instructions, recipes, and blueprints that will let them grow revenues or shrink costs. As we saw repeatedly in chapter 7, capitalism provides ample incentive for this kind of tech progress.

So far, all this seems like a pretty standard argument for how the first two horsemen work together. Romer's brilliance was to highlight the importance of two key attributes of the technological ideas companies come up with as they pursue profits. The first is that they're nonrival, meaning that they can be used by more than one person or company at a time, and that they don't get used up. This is obviously not the case for most resources made out of atoms—I can't also use the pound of steel that you've just incorporated into the engine of a car—but it is the case for ideas and instructions. The Pythagorean theorem, a design for a steam engine, and a recipe for delicious chocolate chip cookies aren't ever going to get "used up" no matter how much they're used.

The second important aspect of corporate technologies is that they're partially excludable. This means that companies can kind of prevent others from using them. They do this by keeping the technologies secret (such as the exact recipe for Coca-Cola), filing for patents and other intellectual-property protection, and so on. However, none of these measures is perfect (hence the words partially and kind of). Trade secrets leak. Patents expire, and even before they expire, they must describe the invention they're claiming and so let others study it.

Partial excludability is a beautiful thing. It provides strong incentives for companies to create useful, profit-enhancing new technologies that they alone can benefit from for a time, yet it also ensures that the new techs will eventually "spill over"—that with time they’ll diffuse and get adopted by more and more companies, even if that's not what their originators want.

Romer equated tech progress to the production by companies of nonrivalrous, partially excludable ideas and showed that these ideas cause an economy to grow. What's more, he also demonstrated that this idea-fueled growth doesn't have to slow down with time. It's not constrained by the size of the labor force, the amount of natural resources, or other such factors. Instead, economic growth is limited only by the idea-generating capacity of the people within a market. Romer called this capacity "human capital" and said at the end of his 1990 paper, "The most interesting positive implication of the model is that an economy with a larger total stock of human capital will experience faster growth."

This notion, which has come to be called "increasing returns to scale," is as powerful as it is counterintuitive. Most formal models of economic growth, as well as the informal mental ones most of us walk around with, feature decreasing returns—growth slows down as the overall economy gets bigger. This makes intuitive sense; it just feels like it would be easier to experience 5 percent growth in a $1 billion economy than a $1 trillion one. But Romer showed that as long as that economy continued to add to its human capital—the overall ability of its people to come up with new technologies and put them to use—it could actually grow faster even as it grew bigger. This is because the stock of useful, nonrivalrous, nonexcludable ideas would keep growing. As Romer convincingly showed, economies run and grow on ideas.

The Machinery of Prosperity

Romer's ideas should leave us optimistic about the planetary benefits of digital tools—hardware, software, and networks—for three main reasons. First, countless examples show us how good these tools are at fulfilling the central role of technology, which is to provide "instructions that we follow for combining raw materials." Since raw materials cost money, profit-maximizing companies are particularly keen to find ways to use fewer of them. So they use digital tools to come up with beer cans that use less aluminum, car engines that use less steel and less gas, mapping software that removes the need for paper atlases, and so on and so on. None of this is done solely for the good of the earth—it's done for the pursuit of profit that's at the heart of capitalism—yet it benefits the planet by, as we've seen, causing us to take less from it.

Digital tools are technologies for creating technologies, the most prolific and versatile ones we've ever come up with. They're machines for coming up with ideas. Lots of them. The same piece of computer-aided design software can be used to create a thinner aluminum can or a lighter and more fuel-efficient engine. A drone can be used to scan farmland to see if more irrigation is needed, or to substitute for a helicopter when filming a movie. A smartphone can be used to read the news, listen to music, and pay for things, all without consuming a single extra molecule.

In the Second Machine Age, the global stock of digital tools is increasing much more quickly than ever before. It's being used in countless ways by profit-hungry companies to combine raw materials in ways that use fewer of them. In advanced economies such as America's, the cumulative impact of this combination of capitalism and tech progress is clear: absolute dematerialization of the economy and society, and thus a smaller footprint on our planet.

The second way Romer's ideas about technology and growth are showing up at present is via decreased excludability. Pervasive digital tools are making it much easier for good designs and recipes to spread around the world. While this is often not what a company wants—it wants to exclude others from its great cost-saving idea— excludability is not as easy as it used to be.

This isn't because of weaker patent protection, but instead because of stronger digital tools. Once one company shows what's possible, others use hardware, software, and networks to catch up to the leader. Even if they can't copy exactly because of intellectual-property restrictions, they can use digital tools to explore other means to the same end. So, many farmers learn to get higher yields while using less water and fertilizer, even though they combine these raw materials in different ways. Steve Jobs would certainly have preferred for Apple to be the only provider of smartphones after it developed the iPhone, but he couldn't maintain the monopoly no matter how many patents and lawsuits he filed. Other companies found ways to combine processors, memory, sensors, a touch screen, and software into phones that satisfied billions of customers around the world.

The operating system that powers most non-Apple smartphones is Android, which is both free to use and freely modifiable. Google's parent company, Alphabet, developed and released Android without even trying to make it excludable; the explicit goal was to make it as widely imitable as possible. This is an example of the broad trend across digital industries of giving away valuable technologies for free.

The Linux operating system, of which Android is a descendant, is probably the best-known example of free and open-source software, but there are many others. The online software repository GitHub maintains that it's "the largest open source community in the world" and hosts millions of projects. The Arduino community does something similar for electronic hardware, and the Instructables website contains detailed instructions for making equipment ranging from air-particle counters to machine tools, all with no intellectual-property protection. Contributors to efforts such as these have a range of motivations (Alphabet's goals with Android were far from purely altruistic—among other things, the parent of Google wanted to achieve a quantum leap in mobile phone users around the world, who would avail themselves of Google Search and services such as YouTube), but they're all part of the trend of technology without excludability, which is great news for growth.

As we saw in chapter 10, smartphone use and access to the Internet are increasing quickly across the planet. This means that people no longer need to be near a decent library or school to gain knowledge and improve their abilities. Globally, people are taking advantage of the skill-building opportunities of new technologies. This is the third reason that the spread of digital tools should make us optimistic about future growth: these tools are helping human capital grow quickly.

The free Duolingo app, for example, is now the world's most popular way to learn a second language. Of the nearly 15 billion Wikipedia page views during July of 2018, half were in languages other than English. Google's chief economist, Hal Varian, points out that hundreds of millions of how-to videos are viewed every day on YouTube, saying, "We never had a technology before that could educate such a broad group of people anytime on an as-needed basis for free."

Romer's work leaves me hopeful because it shows that it's our ability to build human capital, rather than chop down forests, dig mines, or burn fossil fuels that drives growth and prosperity. His model of how economies grow also reinforces how well capitalism and tech progress work together, which is a central point of this book. The surest way to boost profits is to cut costs, and modern technologies, especially digital ones, offer unlimited ways to combine and recombine materials—to swap, slim, optimize, and evaporate—in cost-reducing ways. There's no reason to expect that the two horsemen of capitalism and tech progress will stop riding together anytime soon. Quite the contrary. Romer's insights reveal that they're likely to gallop faster and farther as economies grow.

Our Brighter, Lighter Future

The world still has billions of desperately poor people, but they won't remain that way. All available evidence strongly suggests that most will become much wealthier in the years and decades ahead. As they earn more and consume more, what will be the impact on the planet?

The history and economics of the Industrial Era lead to pessimism on this important question. Resource use increased in lockstep with economic growth throughout the two centuries between James Watt's demonstration of his steam engine and the first Earth Day. Malthus and Jevons seemed to be right, and it was just a question of when, not if, we'd run up against the hard planetary limits to growth.

But in America and other rich countries something strange, unexpected, and wonderful happened: we started getting more from less. We decoupled population and economic growth from resource consumption, pollution, and other environmental harms. Malthus's and Jevons's ideas gave way to Romer's, and the world will never be the same.

This means that instead of worrying about the world's poor becoming richer, we should instead be helping them upgrade economically as much and as quickly as possible. Not only is it the morally correct thing to do, it's also the smart move for our planet. As today’s poor countries get richer, their institutions will improve and most will eventually go through what Ricardo Hausmann calls "the capitalist makeover of production." This makeover doesn't enslave people, nor does it befoul the earth.

As today’s poor get richer, they'll consume more, but they'll also consume much differently from earlier generations. They won't read physical newspapers and magazines. They'll get a great deal of their power from renewables and (one hopes) nuclear because these energy sources will be the cheapest. They’ll live in cities, as we saw in chapter 12; in fact, they already are. They'll be less likely to own cars because a variety of transportation options will be only a few taps away. Most important, they'll come up with ideas that keep the growth going, and that benefit both humanity and the planet we live on.

Predicting exactly how technological progress will unfold is much like predicting the weather: feasible in the short term, but impossible over a longer time. Great uncertainty and complexity prevent precise forecasts about, for example, the computing devices we’ll be using thirty years from now or the dominant types of artificial intelligence in 2050 and beyond.

But even though we can't predict the weather long term, we can accurately forecast the climate. We know how much warmer and sunnier it will be on average in August than in January, for example, and we know that global average temperatures will rise as we keep adding greenhouse gases to the atmosphere. Similarly, we can predict the "climate" of future technological progress by starting from the knowledge that it will be heavily applied in the areas where it can affect capitalism the most. As we've seen over and over, tech progress supplies opportunities to trim costs (and improve performance) via dematerialization, and capitalism provides the motive to do so.

As a result, the Second Enlightenment will continue as we move deeper into the twenty-first century. I'm confident that it will accelerate as digital technologies continue to improve and multiply and global competition continues to increase. We’ll see some of the most striking examples of slim, swap, evaporate, and optimize in exactly the places where the opportunities are biggest. Here are a few broad predictions, spanning humanity's biggest industries.

Manufacturing. Complex parts will be made not by the techniques developed during the Industrial Era, but instead by three- dimensional printing. This is already the case for some rocket engines and other extremely expensive items. As 3-D printing improves and becomes cheaper, it will spread to automobile engine blocks, manifolds and other complicated arrangements of pipes, airplane struts and wings, and countless other parts. Because 3-D printing generates virtually no waste and doesn't require massive molds, it accelerates dematerialization.

We'll also be building things out of very different materials from what we're using today. We're rapidly improving our ability to use machine learning and massive amounts of computing power to screen the huge number of molecules available in the world. Well use this ability to determine which substances would be best for making flexible solar panels, more efficient batteries, and other important equipment. Our search for the right materials to use has so far been slow and laborious. That's about to change.

So is our ability to understand nature's proteins, and to generate new ones. All living things are made out of the large biomolecules known as proteins, as are wondrous materials such as spiders' silk. The cells in our bodies are assembly lines for proteins, but we currently understand little about how these assembly lines work—how they fold a two-dimensional string of amino acids into a complicated 3-D protein. But thanks to digital tools, we're learning quickly. In 2018, as part of a contest, the AlphaFold software developed by Google DeepMind correctly guessed the structure of twenty-five out of forty-three proteins it was shown; the second-place finisher guessed correctly three times. DeepMind cofounder Demis Hassabis says, "We [haven't] solved the protein-folding problem, this is just a first step... but we have a good system and we have a ton of ideas we haven't implemented yet." As these good ideas accumulate, they might well let us make spider-strength materials.

Energy. One of humanity's most urgent tasks in the twenty-first century is to reduce greenhouse gas emissions. Two ways to do this are to become more efficient in using energy and, when generating it, to shift away from carbon-emitting fossil fuels. Digital tools will help greatly with both.

Several groups have recently shown that they can combine machine learning and other techniques to increase the energy efficiency of data centers by as much as 30 percent. This large improvement matters for two reasons. First, data centers are heavy users of energy, accounting for about 1 percent of global electricity demand. So efficiencies in these facilities help. Second, and more important, these gains indicate how much the energy use of all our other complicated infrastructures— everything from electricity grids to chemical plants to steel mills—can be trimmed. All are a great deal less energy efficient than they could be. We have both ample opportunity and ample incentive now to improve them.

Both wind and solar power are becoming much cheaper, so much so that in many parts of the world they're now the most cost-effective options, even without government subsidies, for new electrical generators. These energy sources use virtually no resources once they're up and running and generate no greenhouse gases; they're among the world champions of dematerialization.

In the decades to come they might well be joined by nuclear fusion, the astonishingly powerful process that takes place inside the sun and other stars. Harnessing fusion has been tantalizingly out of reach for more than half a century—the old joke is that it's twenty years away and always will be. A big part of the problem is that it's hard to control the fusion reaction inside any human- made vessel, but massive improvements in sensors and computing power are boosting hope that fusion power might truly be only a generation away.

Transportation. Our current transportation systems are chronically inefficient. Most vehicles aren't used much of the time, and even when they’re in use, they're not nearly full. Now that we have technologies that let us know where every driver, passenger, piece of cargo, and vehicle is at all times, we can greatly increase the utilization and efficiency of every element of transportation.

Renting instead of owning transportation is a likely consequence of this shift. Instead of owning cars, which typically sit idle more than 90 percent of the time, more people will choose to access transportation as needed. We're already seeing this with car-hailing companies such as Uber and Lyft. These services are quickly spreading around the world, and expanding to cover more modes of transportation, from motorbikes to bicycles to electric scooters. They're also moving into commercial applications such as long- and short-haul trucking. As this shift continues, we’ll need fewer tons of steel, aluminum, plastic, gasoline, and other resources to move the world's people and goods around.

We might also experience less congestion and gridlock as we try to get around. Bikes and scooters take up little space compared to cars, so streets can accommodate many more of them. Technology also gives us the ability to implement many forms of "congestion pricing," which has been shown to reduce gridlock by making car access to busy streets expensive enough that people use other options. The most intriguing future transportation platform of all might be the sky. The same technologies that power today's small drones can be scaled up to build "air taxis" with as many as eight propellers and no pilot. Such contraptions sound like science fiction today, but they might be carrying us around by midcentury.

Agriculture. As we saw in chapter 5, leading farms have demonstrated an ability to increase their tonnage of output year after year while decreasing their use of inputs such as land, water, and fertilizer. This trend toward optimization will continue thanks to a set of innovations under the label precision agriculture. The precision comes from many sources, including better sensors of plant and animal health, soil quality and moisture, and so on; the ability to deliver fertilizer, pesticides, and water just where they're needed; and machinery that adapts itself to each plant or animal. All these varieties of precision will combine to allow traditional farms to generate more from less.

So will changes to the genomes of plants and animals. DNA modifications will increase disease and drought tolerance, expand where crops can be grown, and allow us to get more of what we want from each crop or herd. As we saw in chapter 9, they'll also allow us to take better care of vulnerable populations such as infants in poor countries by creating golden rice and other nutrition enhancers. We'll also be able to make much more precise and targeted genetic modifications thanks to a new crop of gene-editing tools that are large improvements over their more scattershot predecessors. Opposition to genetically modified organisms is fierce in some quarters, but isn't based on reason or science. This opposition will, one hopes, fade.

Throughout human history, just about all farming has been done in fields. For some crops, this is now changing. Agriculture has moved indoors, where parameters such as light, humidity, fertilizer, and even the composition of the atmosphere can be precisely monitored and controlled. In everything from urban buildings to shipping containers, crops are now being grown with progressively less labor and fewer material inputs. These completely contained farms will spread and help reduce the planetary footprint of our agriculture.

These examples aren't intended to be comprehensive, and I don't have precise estimates of how likely each innovation is, or when it's most likely to occur. I offer them only to indicate how broad and exciting are the possibilities offered by the two horsemen of capitalism and technological progress, and how they’ll continue to dematerialize our consumption and let us increase our prosperity while treading more lightly on our planet.

#### No limits to growth---their models ignore key feedback effects.

Lynch 16—President of Strategic Energy and Economic Consulting, Director of Asian Energy and Security at the Center for International Studies at MIT, and a Lecturer at Tufts and Vienna University [Michael, *The “peak oil” scare and the coming oil flood*, p. 63-74]

More recently, there has been a clamor about "peak everything" based on the idea that, well, everything is finite and we 're using it up, so it is "running out." Or at least, production must peak. Or, as one physicist [END OF PAGE 63] points out, eventually human energy production will generate as much heat as the sun does-eventually being 1400 years.

Flat Earth

Colin Campbell, in the famed (well, famous in the IEA's offices) debate at the IEA in 1997, compared resource optimists to the conservative Spanish court that opposed the visionary, Columbus, and has since referred to those, like Adelman and me, who disagreed with him as "flat-earth economists." Albert Bartlett later explained that the term actually meant that economists thought the earth had two dimensions and thus was infinite, containing equivalently infinite resources.

But this description ignores two important variables: capital and knowledge. Additional investment can often increase the production of renewables like agricultural products and nonrenewables like minerals and oil in the same amount of space, as can better technology. Neo-Malthusians tend to ignore this factor and argue that the rate of technological advance (and greater scientific knowledge) has diminished or disappeared, as described in Chapter 7.

The argument is somewhat specious and relies in part the question of the finiteness of resources, discussed earlier-or a static measure of resources and dynamic view of consumption, as in The Limits to Growth.

HOW LONG?

Perhaps the most important factor that raises skepticism is the fact that at least some exponential alarmists fear the distant future. Any number of pundits have looked at long-term forecasts of economic and/or technological development and characterized them as foolish. We have no flying cars, nuclear power is not too cheap to meter, and no one is eating Soylent Green. On the other hand, most of these were not serious forecasting efforts, but rather off-the-cuff remarks (or the equivalent), and those making them were not particularly serious about achieving them within a specific time frame. And we do eat Soylent Green already; only we call it tofu and vegemite. (Read the book, it wasn't people.)

NEWTON'S FIRST LAW

The biggest mistakes have come from an apparent source: extrapolation of a trend endlessly, as if there were no feedback or other variables [END PAGE 64] involved. Jay Forrester, the inventor of Systems Dynamics, which was used in The Limits to Growth model (and which I have used), reportedly once said that feedback effects tend to overwhelm the initial stimuli, which is probably true in many cases. Yet, many neo-Malthusians and especially peak oil advocates tend to extrapolate a given trend endlessly, assuming no feedback effect whatsoever.

Indeed, the first wave of peak oil advocates explicitly argued that no feedback effect would occur: prices didn't affect production or consumption levels. Technological advances were either unimportant or had ceased and so could not increase the resource base.

An important element of the fear of exponential growth is the analysts' choice of particularly high growth rates. As Figure 4.1 showed, Ehrlich chose the highest observed growth in the 20th century for his calculations, even though it represented the post-World War II baby boom and should have been considered an exception, not the norm. Similarly, Bartlett, writing in 1998, talks about the growth in oil demand from the 1950s and 1960s at 7 [percent] a year, which causes a doubling of use every decade, 25 which sounds alarming, given the arguments about the difficulty of making a speedy energy transition, until you realize that consumption growth dropped to 3% per year in the 1970s (a doubling time of 24 years), and under 1 [percent] per year in the 1980s (a doubling period of 75 years), before recovering to 1.5% in the seven years before his talk (48 years).

This emphasizes the lack of feedback mechanism used in these simplistic models and how important they are in the real world.

REAL SCARCITY

Indeed, the subtext of the fear of resource scarcity is that renewable resources have repeatedly been the source of problems. In Tainter's The Collapse of Complex Societies, he talks about resources as causing the fall of a number of (mostly) ancient civilizations; nearly all suffered from problems like lengthy droughts and salt buildup in irrigated farmland. 26

And similar problems continue today, especially if you consider endangered species, from rhinos to tuna. In all cases, these are renewable resources, the very ones that are NOT finite, that are sustainable, that we can rely on for all eternity-in theory. No lasting shortage of nonrenewable resources minerals and energy-has occurred since the advent of the global economy.

#### 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.

#### Energy poverty---that disproportionately impacts vulnerable communities.

NBCC 15—National Black Chamber of Commerce [“POTENTIAL IMPACT OF PROPOSED EPA REGULATIONS ON LOW INCOME GROUPS AND MINORITIES,” June, p. 85-99, <http://www.ieca-us.com/wp-content/uploads/NBCC_Minority-Impacts-Report-June-2015-Final.pdf>]

More generally, a substantial body of literature has developed examining the potential impacts of energy and environmental regulations on GDP, energy prices, income, and employment. It has been estimated, for example, that initiatives requiring expanded use of high cost energy alternatives such as natural gas and renewables would increase the cost of energy to the point that per-capita income and employment rates would decrease in a quantitatively predictable manner. Assuming these estimates to be approximately correct, and given the epidemiological findings on socioeconomic status and health, it follows that policies such as carbon restrictions would bring about a net increase in population mortality.123 Thus, a major impact of restricting the use of coal and other fossil fuels will be to increase U.S. mortality rates.

Socioeconomic-status findings demonstrate that changes in the economic status of individuals produce subsequent changes in the health and life spans of those individuals. Research shows that decreased real income per capita and increased unemployment have consequences that lead to increased mortality in U.S. and European populations. The research uses econometric analyses of time-series data to measure the relationship between changes in the economy and changes in health outcomes. Studies have found that declines in real income per capita and increases in unemployment led to elevated mortality rates over a subsequent period of six years. For example, a 1984 study by the Joint Economic Committee of the U.S. Congress found that a one-percentage-point increase in the unemployment rate (e.g., from five percent to six percent) would lead to a two percent increase in the age-adjusted mortality rate.124 The growth of real income per capita also showed a significant correlation to decreases in mortality rates (except for suicide and homicide), mental hospitalization, and property crimes.125 The European Commission has supported similar research showing comparable results throughout the European Union.126

Upward trends in real income per capita represented the most important factor in decreased U.S. mortality rates over the past half-century. Also, the unemployment rate continued to bear a significant correlation to increased mortality rates, such that an increase of one percent in the unemployment rate eventuates in an approximately two percent increase in the age-adjusted mortality rate, estimated cumulatively over at least the subsequent decade.127

Being unable to afford energy bills can thus be harmful to one’s health. As indicated above, some people purchase less medicine when their utility bills are too high. Other health hazards can occur if inside temperatures are too low or too high as a result of shut-offs or efforts to lower bills by reducing the use of heating and cooling equipment. Thirty-one percent of households with incomes at or below 150 percent of poverty kept their homes at a temperature that they thought was unsafe or unhealthy at some point during the year. Similarly, so also did 24 percent of those between 151 percent and 250 percent of poverty.128

Further, there are substantial health benefits of temperature control in warmer climates, and studies have analyzed the effect of temperature on mortality and morbidity and documented the effectiveness of air conditioners (ACs) as a mitigation strategy. For example, a recent study investigated the association between temperature and hospital admissions in California from 1999 to 2005 and also determined whether AC ownership and usage, assessed at the zip-code level, mitigated this association.129 It found that ownership and usage of ACs significantly reduced the effects of temperature on adverse health outcomes, after controlling for potential confounding by family income and other socioeconomic factors. These results demonstrate important effects of temperature on public health and the potential for mitigation. That is, the research found significant associations between heat and several disease-specific hospital admissions in California, and concluded that the use of central AC significantly reduces the risk from higher temperatures. Thus, higher electricity costs that limit or prohibit the use of AC can be hazardous to one’s health.

EPA has acknowledged that “People's wealth and health status, as measured by mortality, morbidity, and other metrics, are positively correlated. Hence, those who bear a regulation's compliance costs may also suffer a decline in their health status, and if the costs are large enough, these increased risks might be greater than the direct riskreduction benefits of the regulation.”130 In addition to EPA, the Office of Management and Budget, the Food and Drug Administration, and the Occupational Safety and Health Administration use similar methodology to assess the degree to which their regulations induce premature death amongst those who bear the costs of federal mandates.131 Further, OMB Circular A-4, which provides the procedures for federal regulatory impact analysis and benefit-cost analysis, states “the benefits of a regulation that reduces emissions of air pollution might be quantified in terms of the number of premature deaths avoided each year; the number of prevented nonfatal illnesses and hospitalizations.”132

VII.C.2. Safety Risks

High energy prices also compromise the safety of low-income households. For example, the inability to pay utility bills often leads to the use of risky alternatives. In a survey of energy assistance recipients, eight percent of respondents indicated that at some point in the previous year they were unable to use a main heating source such as heating oil or propane because they could not pay for the delivery.133 Six percent indicated that a utility company had shut off their main heating sources of natural gas or electricity during the previous year due to nonpayment.134

When households are cut off from their main heating source – such as natural gas, propane, or fuel oil, or are trying to save money by reducing use of a main heating source, they most commonly turn to heating alternatives such as electric space heaters. According to the National Fire Protection Agency, these devices are associated with a significant risk of fire, injury, and death. In 2005, space heaters accounted for 32 percent of home heating fires, totaling 19,904 fires and 73 percent of home heating fire deaths, which killed 489 people.135 Researchers at the Johns Hopkins School of Medicine also noted this problem in a 2005 study in which they found that utility terminations were associated with a significant subset of fires involving children -- 15 percent of fires that brought patients to their hospital were rooted in utility shut-offs.136

VII.C.3. Housing Instability

Families and individuals who cannot afford their energy bills are at risk of housing instability

. They may have to move to locations with lower utility costs, or shut-offs can make homes uninhabitable, forcing household members into homelessness or alternative forms of shelter. Often, unaffordable housing compounds this problem as families experiencing difficulty paying mortgages or rent fall further behind due to energy bills that represent a higher-than-normal percentage of their income. This factor was particularly relevant during the recent subprime mortgage crisis, which resulted in excessively high mortgage payments for some families.

The connections between unmanageable home energy costs and homelessness have been well documented. For example, a Colorado study found that 16 percent of homeless people in the state cited their inability to pay utility bills as one of the causes of their homelessness.137 A nationwide survey of individuals receiving energy assistance produced further evidence of this phenomenon. Twenty-five percent reported that within the previous five years, they had failed to make a full rent or mortgage payment due to their energy bills.138 Difficulties with paying utilities resulted in other negative outcomes such as evictions (two percent of respondents), moving in with friends or family members (four percent of respondents), and moving into a shelter or homelessness (two percent).139

Housing instability disrupts lives, especially if individuals are forced to move between several different locations before regaining permanent housing. Household members may find themselves at a greater distance from work and/or school and face increased transportation costs and challenges. They can also be disconnected from familiar communities, neighbors, family members, and friends. For children, the outcomes can be devastating, with homelessness being associated with increased risk of physical illness, hunger, emotional and behavioral problems, developmental delays, negative educational outcomes, and exposure to violence.140

VII.D. Impacts on Cost of Living and Poverty Rates

As discussed, one of the major effects of implementing the EPA regulations will be to substantially increase the costs of energy and, especially, electricity. This will impact minorities disproportionately, both because they have lower incomes to begin with, but also because they have to spend proportionately more of their incomes on utilities and electricity. For example:

• Whites spend, on average, about six percent of their income on utilities, whereas Blacks spend 12 percent and Hispanics spend nine percent.

• Whites spend, on average, about two percent of their income on electricity, whereas Blacks spend nearly five percent and Hispanics four percent.

As shown in Figure VII-1, there is an average income disparity of $17,300 between non-Hispanic white families and Hispanic families and an average income disparity of $23,700 between non-Hispanic white families and black families.

The implication of these data is that rising energy costs inflict greater harm on minority families. Lower-income families are forced to allocate larger shares of the family budget for energy expenditures, and minority families are significantly more likely to be found among the lower-income brackets. Figure VII-8 shows that, in the aggregate, Hispanic families must dedicate almost 20 percent more of their after-tax income to energy expenditures than white families. Black families must dedicate almost more than 25 percent more than white families.141

This disparity between racial groups means that rising energy costs have a disproportionately negative effect on the ability of minority families to acquire other necessities such as food, housing, childcare, or healthcare. Essentially, the EPA regulations will have the effect of a discriminatory tax based on race. Thus, “Because Hispanics spend more of their income on energy than the average American -- and already face higher Unemployment rates -- the EPA’s new rule will impose disproportionately higher costs on Hispanics in exchange for no significant benefit to the global climate.” 142

Black and Hispanic workers -- and their families – will likely be adversely affected threefold if the EPA Plan is implemented: Their incomes will be substantially less than they would without the regulation, their rates of unemployment will increase substantially, and it will take those who are out of work much longer to find another job. As might be expected, these impacts on earnings and employment will increase the rates of poverty among Blacks and Hispanics.

The poverty rate for Blacks is slightly higher than that for Hispanics, the poverty rates for Blacks and Hispanics are nearly twice the national average and nearly three times as high as the rate for non-Hispanic Whites. As shown in Figure VII-9, we estimate that one of the impacts of implementing the EPA regulations will be to, by 2025:

• Increase the poverty rate for Hispanics from 23 percent to about 29 percent. This represents an increase in Hispanic poverty of more than 26 percent.

• Increase the poverty rate for Blacks from 26 percent to about 32 percent. This represents an increase in Black poverty of more than 23 percent.

This must be considered one of the more troubling potential impacts of the EPA Plan. While it is possible to debate specific estimates, timelines, and percentages, an unintended result of the EPA regulations will likely be to force millions of Blacks and Hispanics below the poverty line -- many of whom have only recently managed to work their way out of poverty. Further, it should also be recognized that the welfare reforms of the 1990s and the 2007 – 2009 recession have made the social safety net at both the Federal and state levels less comprehensive and much stricter. This will have unfortunate implications for those Blacks and Hispanics whose incomes are reduced below the poverty level over the next decade because of the EPA action.

In addition, the EPA CO2 restrictions, by increasing the costs of energy and energy-intensive building materials, will also increase the costs of housing. This will seriously affect Blacks and Hispanics because they have higher housing costs, higher housing cost burdens -- the proportion of monthly income household devote to housing related expenses, 143 and a lower rate of home ownership than Whites:144

• Only about ten percent of Whites pay 50 percent or more of their income in housing costs; the comparable percentage for Blacks and Hispanics is about 20 percent. • Whereas 25 percent of Whites pay 30 percent or more of their income in housing costs, the comparable percent for Blacks is 40 percent, and for Hispanics it is 45 percent. • Housing cost burdens for Blacks and Hispanics are 30 – 40 percent higher than those for Whites.

VII.E. Impacts on Incomes and Jobs145

VII.E.1. Impacts on Incomes

Consumers and households will ultimately bear the added costs that will result from the EPA Plan. It will result in fuel switching away from less costly conventional fuels, such as coal, towards more costly lower carbon alternatives. Further, costs for all carbon-based energy sources (e.g., coal, oil, and natural gas) will increase significantly. As discussed, these added costs will reduce GDP, economic activity, and household incomes, and higher energy prices will increase prices throughout the economy and will impose increased financial costs on households.

As shown in Figure VII-10, the EPA regulations will reduce Black and Hispanic household incomes by increasing amounts each year:

• In 2020, Black median household income will decrease more than about $250 compared to the reference case (which assumes that the EPA Plan is not implemented), and Hispanic median household income will decrease nearly $300 compared to the reference case. • In 2025, Black median household income will be more than $400 less than under the reference case, and Hispanic median household income will be about $460 less than under the reference case • In 2035, Black median household income will be $455 less than under the reference case, and Hispanic median household income will be $515 less. • The cumulative loss in Black median household income over the period 2015 – 2035 will exceed $5,000. • The cumulative loss in Hispanic median household income over the period 2015 – 2035 will exceed $7,000.

VII.E.2. Impacts on Jobs and Unemployment

If implemented, the EPA regulations would divert resources currently used to produce goods and services into the task of obtaining energy from sources that are less energy efficient and more costly than fossil fuels. As consumers and businesses are forced to spend more on energy due to its higher costs, they have less to spend on other goods and services, thus causing decreases in demand for the quantities of goods and services produced by the economy. In addition, as the resources are diverted to more expensive energy sources, labor productivity will decrease. Business activity is likely to contract relative to the levels that would have prevailed without the EPA policy-induced energy cost increases. Demand for labor will weaken because employers need to spend less on labor in order to supply the reduced amount of goods and services demanded by consumers.

As a result, payments to labor will decline relative to that which would have prevailed without the higher energy costs. This will be reflected in a combination of reduced employment, and lower wages for those workers not losing their job.146 The actual number of jobs that would be lost depends on whether higher-paying or lower- paying jobs are the ones that are eliminated. In our estimates, we assumed that jobs would be lost in equal proportions across the entire wage distribution, and estimated the loss in “average jobs.” The job estimates are inclusive of all increases in so-called “green jobs” that may be created as a result of the proposed EPA action

It should be noted that the economic impact of the EPA Plan will not be a short-term phenomenon that consists of a few years of belt-tightening, after which the economy will be on a different (lower-carbon) track. Rather, getting to the lower-carbon future will require a long-term, sustained effort to continue increasing investments in more costly forms of energy, and this implies that for several decades payments to workers will remain lower than under the reference case that assumes no EPA CO2 regulation.

The most salient characteristic of the employment status of the demographic groups is the fact that the unemployment rates for Blacks and Hispanics have consistently been much higher than average and higher than those for Whites:

• The unemployment rate for Blacks has historically been about twice that of Whites • The unemployment rate for Hispanics has been significantly higher than that for Whites, but lower than that for Blacks. • Unemployment rates for Blacks and Hispanics tend to increase more during recessions, and decrease less during recoveries than do those for Whites. • The duration of unemployment tends to be longer for Blacks and Hispanics than for Whites • While different levels of educational attainment explain some of the differences in unemployment rates, they do not account for all of the differences.

Blacks and Hispanics are also at a disadvantage in the labor force when they are employed, for they tend to be disproportionably concentrated in lower paid jobs. Even when standardized for levels of education, Black workers tend to make less than their White counterparts. For example, Blacks and Hispanics are disproportionately concentrated in jobs that pay the minimum wage or below.

In addition to increased difficulty in paying home energy costs, sustained high energy prices could have an impact on the employment rate of low-wage workers. High energy prices cause businesses to cut costs by laying off workers. Experience has shown that those workers on the margin are usually the first to go, and implementation of the EPA Plan will likely result in a significant increase in unemployment among lowwage workers – who are disproportionately Black and Hispanic.

Figure VII-11 shows that, nationwide, implementation of the EPA regulations would result in the loss of an increasingly large number of Black and Hispanic jobs:

• In 2020, nearly 200,000 Black jobs would be lost and more than 300,000 Hispanic jobs would be lost. • In 2025, more than 400,000 Black jobs would be lost and nearly 700,000 Hispanic jobs would be lost. • In 2030, 470,000 Black jobs would be lost and more than 800,000 Hispanic jobs would be lost. • In 2035, 535,000 Black jobs would be lost and nearly 900,000 Hispanic jobs would be lost.

The job losses increase every year and the cumulative losses for Blacks and Hispanics will increase rapidly over the next two decades if the EPA regulation is enacted. As shown in Figure VII-12:

• By 2025, cumulative job losses for Blacks will total nearly 2.2 million • By 2035, cumulative job losses for Blacks will total about 7 million.

As shown in Figure VII-13:

• By 2025, cumulative job losses for Hispanics will total 3.8 million • By 2035, cumulative job losses for Hispanics will total nearly 12 million.

VII.E.3. Impacts on Basic Expenditures and Discretionary Income

As discussed, Blacks and Hispanics have, on average, significantly lower incomes than Whites, and have to spend proportionately larger shares of their incomes on basic necessities such as food, housing, clothing, and utilities. Implementing the EPA Plan will significantly increase the costs of all fossil fuels and, since energy is a basic component in the production of all commodities, the prices of all goods will increase as the energy price increases work their way through the economy. Thus, the EPA regulations will likely have a doubly negative impact on the living standards of Blacks and Hispanics:

• First, implementing the Plan will decrease Black and Hispanic incomes below where they would be in the absence of the regulation.

• Second, the EPA regulations will increase the costs of the basic goods upon which Blacks and Hispanics must spend their reduced incomes.

In the face of reduced incomes and rising prices, the trade-offs that Blacks and Hispanics will face involve reallocating spending between food, clothing, housing, and heat. For example, proportionately.

• Blacks spend 20 percent more of their income on food, ten percent more on housing, 40 percent more on clothing, and 50 percent more on utilities than do Whites

• Hispanics spend 90 percent more of their income on food, five percent more on housing, 40 percent more on clothing, and 10 percent more on utilities than do Whites.

The EPA regulations will likely exacerbate this situation by forcing Blacks and Hispanics to spend an even more disproportionate share of their incomes -- which will have been reduced due to the effects of the CO2 restrictions -- on basic necessities.

Finally, the cumulative impact of increased unemployment, reduced incomes, and increased prices for housing, basic necessities, energy, and utilities resulting from implementation of the EPA Plan will be to further reduce Black and Hispanic discretionary incomes. Discretionary income is the money that remains for spending or saving after people pay their taxes and purchase necessities. It is an important concept both because of the financial flexibility it gives individuals and because many businesses depend on discretionary spending for sales and profits. Implementing the EPA Plan will reduce the average discretionary incomes of both Blacks and Hispanics.

VII.E.4. Increased Energy Poverty

One of the more serious, but less recognized effects of implementing the EPA regulations will be to significantly increase the energy burdens for the Blacks and Hispanics and increase the numbers of Blacks and Hispanics suffering from “energy poverty.”

The EPA Plan will greatly increase energy prices and set off repercussions throughout the economy, but nowhere do high prices bring consequences as swiftly and harshly as in low-income and minority households. For the tens of millions of low-income households throughout the country, the higher energy prices will intensify the difficulty of meeting the costs of basic human needs, while increasing energy burdens that are already excessive. At the same time, the EPA regulations will threaten low-income access to vital energy and utility services, thereby endangering health and safety while creating additional barriers to meaningful low-income participation in the economy. While home energy costs average about four percent per year in middle class households, they can reach a staggering 70 percent of monthly income for low-income families.

The price increases resulting from carbon restrictions would be highly regressive -- they would place a relatively greater burden on lower-income households than on higher-income ones. For example, one study estimated that the price increases resulting from a 15 percent reduction in carbon emissions would cost the average household in the lowest one-fifth of the income distribution about $560 a year, or 3.3 percent of its average income. Households in the top one-fifth of the income distribution would pay an additional $1,800 a year, or 1.7 percent of their average income.147

It has been widely documented that, in addition to health risks, excessive energy burdens cause a variety of difficulties for low-income households.148 Low-income households with high energy burdens are more likely than higher-income households to incur utility service disruptions because of an inability pay their bills. In turn, service disruptions represent major crises for affected customers, often threatening the customer's home. Studies have demonstrated a clear link between homelessness and utility terminations.149

The consequences of loss of heat in the winter include health and safety risks associated with alternative heat and lighting sources such as kerosene and candles, hunger and malnutrition, hypothermia, eviction, and increased homelessness and failure of children to thrive. In the summers, the dangers from loss of cooling are particularly acute.

Low-income households have made efforts to reduce their energy consumption, but these gains have been partially offset by an increase in cooling energy consumption, a result of the increased use of air conditioning. Despite these conservation efforts, rising costs of energy have caused energy bills to increase, particularly heating bills. From 1981 through 2005, overall energy expenditures for space heating and cooling for low-income households increased 37 percent and heating costs, the predominant portion of the total energy bill, increased 22 percent. 150

The high percentage of income paid by low-income households on home energy costs is more than just a statistical fact. That higher percentage translates into serious family and social problems. For example, several studies have demonstrated a strong connection between a family’s inability to pay its home energy bills and some obviousand not so obvious-consequences, including homelessness, malnutrition, heart disease, heat stroke, and the disintegration of families – including children removed from their homes because of loss of heat or electricity. Homeowners may be forced to sell their homes because they cannot afford their energy bills. Further, children’s educations are disrupted because their parents cannot pay the energy bills and are more likely to move frequently, changing schools and interrupting their children’s educational development. Finally, “Inability to pay utilities is second only to inability to pay rent as a reason for homelessness.”151