# 1AC- R2 Bing

## 1AC R2

### Plan

#### Plan: The United States federal government should substantially increase prohibitions on private sector conduct that is more restrictive of competition than reasonably necessary to enable creation of information technology standards.

### 1AC---Innovation ADV

#### Advantage 1 is Innovation:

#### Current standard setting organization and FRAND enforcement is failing now

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I. Standard Setting and the Competitive Process

The fundamental economics in the information technology sector, driven by network effects, implies that there is enormous value associated with establishing compatibility standards. Popular standards include the mobile broadband standards used in cell phones, which are established by the 3rd Generation Partnership Project (3GPP), and the Wi-Fi technology for wireless local area networks, which is enabled by the 802.11 standard established by the Institute of Electrical and Electronics Engineers (IEEE).4

There are many SSOs, and their rules and procedures differ considerably. In addition to IEEE, leading SSOs include the International Organization for Standardization (ISO), the International Telecommunication Union (ITU), the European Telecommunications Standards Institute (ETSI), the Internet Engineering Task Force (IETF), and the World Wide Web Consortium (W3C).5 SSOs generally establish standards by holding a series of committee meetings among industry participants. These meetings culminate in a vote on a technical specification that describes what features or attributes a product must have in order to comply with the standard. Most SSOs are open to all industry participants and seek to operate on a consensus basis, applying certain voting rules. SSOs do not normally engage in patent licensing, nor do they specify how patent royalties will be divided up among patent holders. They leave that to their members, which in some cases form patent pools to address these issues.6

SSOs adopt specific policies relating to intellectual property rights (IPRs).7 These IPR policies are generally intended to enable the SEP holders to obtain reasonable royalties for licensing their patents, while prohibiting them from charging excessive royalties after other industry participants have committed to the standard. At that point, firms committed to implementing the standard— which we call “implementers”—would find it very costly to avoid using the patented technology. For this purpose, most SSOs require SEP owners to license their SEPs on FRAND terms.8

FRAND policies are especially necessary because negotiations between SEP holders and implementers generally take place only after the implementers have used and infringed the technologies claimed by the SEPs. Standards involving information and communications technology can involve hundreds or even thousands of SEPs, many with uncertain boundaries for infringement. In addition, a time lag exists between patent application and patent issuance. For these and other reasons, it is impractical for implementers to enter into negotiations for patent licenses with all SEP owners prior to the establishment of a standard and to their implementation of it.9

The fact that patent negotiations generally do not take place until after implementers have used and infringed the technologies has several critical implications. First, at the time of negotiation, implementers are locked into the standard and the technologies claimed by the SEPs—that is, the cost to switch to an alternative technology or standard at that point—ex post—is much greater than it was ex ante, before the patented technology was first included in the standard. Ex post, the patent holder is no longer competing to have its technology included in the standard, nor is it competing to have implementers of the standard use its technology. Instead, because the patent holder owns an asset that is essential to the standard, implementers have no choice but to use the patented technology.

If the standard is commercially successful, implementers are willing to pay a much larger royalty for use of the patented technology than they would have paid ex ante, when the SEP holder faced competition from other technologies. In these circumstances, the SEP holder can be said to have obtained monopoly power in the market in which the patented technology is licensed for use in implementing the standard.10

Second, because of lock-in and the implementer’s ongoing infringement, the potential for litigation looms large in licensing negotiations. In effect, the parties are negotiating about how to settle an infringement suit, and that negotiation is heavily influenced by their predictions as to what the court will do if they cannot agree. This situation is not unique to SEPs; it arises frequently when firms are faced with patent infringement claims for products they have independently developed or technologies they have inadvertently infringed. Patent law addresses such instances by specifying that patent holders are entitled to “reasonable royalties,” defined as the royalties that the parties would have negotiated prior to the infringement and thus prior to lock-in.11 Those hypothetical ex ante royalties reflect the market value of the patent license. Notwithstanding the law’s embrace of this principle, however, as a practical matter, patent holders are generally able to recover more than the ex ante value of the patent when litigation occurs after the implementers are locked in. Further, negotiations in the shadow of litigation after lock-in tend to result in royalties in excess of the ex ante or market value of the patented technology.12

Third, the shadow of litigation is particularly problematic in the communications and technology sector, in which products typically include hundreds or thousands of patented technologies. A court-ordered injunction involving such products would deprive the implementer of not only the value of the technology covered by the patent-in-suit, but also the value of the entire product.13 Implementers that are forced to bear the risk of an injunction are thus induced to agree to royalties greater than those that would be appropriate if only the value of the patented technology were at stake. Those royalties systematically provide SEP holders with excessive compensation in comparison with the benchmark of ex ante royalties.

These implications of lock-in and ex post dealings are well-understood: they represent an example of the general concept of lock-in and opportunism developed by Oliver Williamson.14 The Federal Circuit has also recognized the market distortions caused by the inclusion of patented technologies in public standards and the resulting danger of patent holdup involving SEPs.15

For these and other reasons, the SEP holder has ex post monopoly power that, if left unchecked, would enable it to obtain royalties far in excess of the royalties that it could earn in a competitive market.16 To address this common problem and limit ex post opportunism by SEP holders, SSOs typically require participants that own SEPs to make certain FRAND commitments. In particular, by requiring a commitment to license on “fair and reasonable” terms, the FRAND requirement aims to prevent, or at least reduce, the extent of monopoly pricing by SEP holders. And by requiring a commitment to license on “nondiscriminatory” terms, the FRAND requirement can prevent SEP holders from extracting monopoly premiums by selective licensing or, more important, migrating their monopoly power from the FRAND-regulated market to unregulated standard-implementing product markets by licensing to only one or a few implementers or licensing to selected implementers on discriminatorily favorable terms.

#### Holdup is accentuated by FTC v Qualcomm

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Standards can enhance competition and consumer choice, but they also massively inflate the value of patents deemed essential to the standard, and give their owners the power to sue companies that implement the standard for money damages or injunctions to block them from using their SEPs. When standards cover critical features like wireless connectivity, SEP owners wield a huge amount of “hold-up” power because their patents allow them to effectively block access to the standard altogether. That lets them charge unduly large tolls to anyone who wants to implement the standard.

To minimize that risk, standard-setting organizations typically require companies that want their patented technology incorporated into a standard to promise in advance to license their SEPs to others on fair, reasonable, and non-discriminatory (FRAND) terms. But that promise strikes at a key tension between antitrust and patent law: patent owners have no obligation to let anyone use technology their patent covers, but to get those technologies incorporated into standards, patent owners usually have to promise that they will give permission to anyone who wants to implement the standard as long as they pay a reasonable license fee.

Qualcomm is one of the most important and dominant companies in the history of wireless communication standards. It is a multinational conglomerate that has owned patents on every major wireless communication standard since its first CDMA patent in 1985, and it participates in the standard-setting organizations that define those standards. Qualcomm is somewhat unique in that it not only licenses SEPs, but also supplies the modem chips used by a wide range of devices. These include chips that implement wireless communication standards, which lie at the heart of every mobile computing device.

Although Qualcomm promised to license its SEPs (including patents essential to CDMA, 3G, 4G, and 5G) on FRAND terms, its conduct has to many looked unfair, unreasonable, and highly discriminatory. In particular, Qualcomm has drawn scrutiny for bundling tens of thousands of patents together—including many that are not standard-essential—and offering portfolio-only licenses no matter what licensees actually want or need; refusing to sell modem chips to anyone without a SEP license and threatening to withhold chips from companies trying to negotiate different license terms; refusing to license anyone other than original-equipment manufacturers (OEMs); and insisting on royalties calculated as a percentage of the sale price of a handset sold to end users for hundreds of dollars, despite the minimal contribution of any particular patent to the retail value.

In 2017, the U.S. Federal Trade Commission [sued](https://www.ftc.gov/news-events/press-releases/2017/01/ftc-charges-qualcomm-monopolizing-key-semiconductor-device-used) Qualcomm for violating both sections of the Sherman Antitrust Act by engaging in a number of anticompetitive SEP licensing practices. In May 2019, the U.S. District Court for the Northern District of California agreed with the FTC, identifying numerous instances of Qualcomm’s unlawful, anticompetitive conduct in a comprehensive [233-page opinion](https://www.eff.org/document/ftc-v-qualcomm-district-court-opinion). We were pleased to see the FTC take action and the district court credit the overwhelming evidence that Qualcomm’s conduct is corrosive to market-based competition and threatens to cement Qualcomm’s dominance for years to come.

But this month, a panel of judges from the Court of Appeals for the Ninth Circuit unanimously [overturned](https://www.eff.org/document/ninth-circuit-opinion-ftc-v-qualcomm) the district court’s decision, reasoning that Qualcomm’s conduct was “hypercompetitive” but not “anticompetitive,” and therefore not a violation of antitrust law. To reach that result, the Ninth Circuit made the patent grant more powerful and antitrust law weaker than ever.

According to the Ninth Circuit, patent owners don’t have a duty to let anyone use what their patent covers, and therefore Qualcomm had no duty to license its SEPs to anyone. But that framing requires ignoring the promises Qualcomm made to license its SEPs on reasonable and non-discriminatory terms—promises that courts in this country and around the world have consistently enforced. It also means ignoring antitrust principles like the essential facilities doctrine, which limits the ability of a monopolist with hold-up power over an essential facility (like a port) to shut out rivals. Instead, the Ninth Circuit held rather simplistically that a duty to deal could arise only if the monopolist had provided access, and then reversed its policy.

But even when Qualcomm restricted its licensing policies in critical ways, the Ninth Circuit found reasons to approve those restrictions. For example, Qualcomm stopped licensing its patents to chip manufacturers and started licensing them only to OEMs. This had a major benefit: it let Qualcomm charge a much higher royalty rate based on the high retail price of the end user devices, like smartphones and tablets, that OEMs make and sell. If Qualcomm had continued to license to chip suppliers, its patents would be “exhausted” once the chips were sold to OEMs, extinguishing Qualcomm’s right to assert its patents and control how the chips were used.

Patent exhaustion is a century-old doctrine that protects the rights of consumers to use things they buy without getting the patent owner’s permission again and again. Patent exhaustion is important because it prevents price-gouging, but also because it protects space for innovation by letting people use things they buy freely, including to build innovations of their own. The doctrine thus helps patent law serve its underlying goal—promoting economic growth and innovation. In other words, the doctrine of exhaustion is baked into the patent grant; it is not optional. Nevertheless, the Ninth Circuit wholeheartedly approved of Qualcomm’s efforts to avoid exhaustion—even when that meant cutting off access to previous licensees (chip-makers) in ways that let Qualcomm charge far more in licensing fees than its SEPs could possibly have contributed to the retail value of the final product.

It makes no sense that Qualcomm could contract around a fundamental principle like patent exhaustion, but at the same time did not assume any antitrust duty to deal under these circumstances. Worse, it’s harmful for the economy, innovation, and consumers. Unfortunately, the kind of harm that antitrust law recognizes is limited to harm affecting “competition” or the “competitive process.” Antitrust law, at least as the Ninth Circuit interprets it, doesn’t do nearly enough to address the harm downstream consumers experience when they pay inflated prices for high-tech devices, and miss out on innovation that might have developed from fair, reasonable, and non-discriminatory licensing practices.

We hope the FTC sticks to its guns and asks the Ninth Circuit to go en banc and reconsider this decision. Otherwise, antitrust law will become an even weaker weapon against innovation-stifling conduct in technology markets.

#### Weakened antitrust enforcement emboldens firms to follow Qualcomm’s lead

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While the FRAND process has been highly productive, it is also fragile. Firms are tempted to make commitments at the beginning when the incentive to join is large, but renege on them later when they can profit by doing so. At least in this particular case, private FRAND enforcement had not worked very well. Qualcomm had been able to violate FRAND commitments in order to exclude rivals and obtain higher royalties than FRAND would permit, largely with impunity. Other firms will very likely follow Qualcomm’s lead. If that happens the FRAND system will fall apart, doing irreparable injury to the modern wireless telecommunications network or, at the very least, diminishing the leadership role of the United States in preserving effective network competition.

While governments can be heavily involved in standard set-ting,9 the implementation of technical standards in information technologies is largely the work of private actors. Government involvement is limited mainly to enforcement of contract, intellectual property, or antitrust law. As private actors, those involved in standard setting or compliance are fully subject to the federal antitrust laws.

This Article addresses one question: when is an SSO participant’s violation of a FRAND commitment an antitrust violation, and if it is, of what kind and what are the implications for remedies? It warns against two extremes. One is thinking that any violation of a FRAND commitment is an antitrust violation as well. In the first instance FRAND obligations are contractual, and most breaches of contract do not violate any antitrust law. The other extreme is thinking that, because a FRAND violation is a breach of contract, it cannot also be an antitrust violation. The question of an antitrust violation does not de-pend on whether the conduct breached a particular agreement but rather on whether it caused competitive harm. This can happen because the conduct restrained trade under section 1 of the Sherman Act, was unreasonably exclusionary under section 2 of the Sherman Act, or amounted to an anticompetitive condition or understanding as defined by section 3 of the Clay-ton Act.10 The end goal is to identify practices that harm com-petition, thereby injuring consumers.

The Ninth Circuit’s Qualcomm decision will make antitrust violations in the context of FRAND licensing much more difficult to prove, even in cases where anticompetitive behavior and consumer harm seem clear.11 Indeed, in this case the court itself acknowledged the harm to consumers but appeared to think that they were not entitled to protection.12 If this decision stands, FRAND obligations will to a larger extent have to be settled through private litigation and the federal antitrust enforcement agencies will have a diminished role. Anticompetitive behavior by one firm that is not effectively disciplined will lead others to do the same thing.

#### A trusted and credible system for ICT innovation is critical to rapid tech diffusion and economic growth---absent FRAND, the system will collapse.

Bauer et al. 17, \*Matthias Bauer is Senior Economist at ECIPE; \*Fredrik Erixon is a Swedish economist and writer. He has been the Director of the European Centre for International Political Economy (ECIPE) ever since its start in 2006; (October 2017, “Standard Essential Patents and the Quest for Faster Diffusion of Technology”, https://ecipe.org/publications/standard-essential-patents/)

It is easy to take a pessimistic view about whether the system will break. If the current trend continues, the system is likely to break at some point for the simple reason that companies will not trust it anymore. The series of legal disputes witnessed over the past years – sometimes referred to as the “smartphone patent wars” – has been fodder for a pessimistic reading of “the two tales of SEPs”. While it is common in the business world that disputes over patents and licenses are settled in courts, various SEP disputes have revealed problematic aspects of the SEP market that are different from those disputes that follow the normal stream of business and contracts. Often, the SEP disputes are less concerned about the rights and boundaries of patents, and more about antitrust limits to market behavior: they concern market abusive practices and restrictions to competition as much as they are about intellectual property.

If the SEP system actually does break at some point, the consequences would be felt throughout the economy. SEPs have been a critical part of the ICT revolution. SEPs have allowed for the fast rates of innovation diffusion that the world has witnessed over the past quarter of a century. All the computer and Internet related products and services that people are now dependent upon for their private and professional lives are intricate webs of intellectual property. As many as 250,000 patents can be used to claim ownership of some technical specification or design element in a single smartphone (NYT 2012). A laptop, suggests one calculation, implements more than 250 interoperability standards (Biddle et al. 2010), and the number of SEP holders for 3G and 4G standards grew from 2 in 1994 to 130 in 2013 while the number of SEPs rose from fewer than 150 in 1994 to more than 150,000 in 2013 (Galetovic and Gupta 2016). The standardization-body ETSI has registered more than 150,000 declarations of SEPs from companies, and ETSI is just one of many bodies in the world of ICT standardization. For the 3G standard, the same body has about 24,000 patents that have been declared essential. Now, with the economy yet again on the threshold of big technological change, a trusted and credible system for creators and users of technology to standardize proprietary technology would be a boon for innovation, interoperability and – ultimately – the consumers.

And there are reasons for optimism. Although many of the problems in the SEP regimes need to be addressed, the numbers above indicate that the SEP system is in fact attractive to patent holders and SEP implementers. It is easy to see why: neither holders nor implementers are presented with alternative options that on the face of it would be far more profitable for them. In other words, there simply would not be as many patents declared as essential if both creators and users of technology believed the SEP system worked to their disadvantage or was grossly unfair. While the reality for some companies may be that legal disputes and unpredictability prompt them to find other ways than SEPs to get access to key technologies for their products, it remains the case that most stakeholders have strong economic incentives to maintain a balanced SEP system that is trusted.

First, standard essential patents are an asset for creators of technology because, by becoming essential to a standard, their volumes of sales for technologies that users value rise significantly. As many holders want to raise more revenues for their SEPs and – ideally – have the freedom to contract with buyers on their terms, they can expand their customer base when they agree to sell patented technology in accordance with a set of rules that are designed to prevent SEP holders exploiting the weakness of a customer that has grown dependent on having access to their technology.

Second, SEPs are hugely beneficial also to those that buy the licenses – the implementers or users. Through the SEP system, they can access technologies that are interoperable and work with different products and functionalities – and they can do it under conditions that, if history is a guide, in most cases give them stable and predictable terms of contract. As a consequence, both creators and users can focus on their competitive advantages and profit on the economies of scale and specialization. Downstream firms do not need to develop their own upstream technology and upstream firms do not need to package their technologies in end-customer products in order to make their products valuable.

Third, standard-setting organisations (SSOs) also have a big stake in an SEP system that works well – and, like creators and users of technology, they would stand to lose significantly if the SEP system were to collapse.

Lastly, the biggest beneficiaries are individual consumers – those who buy the end products using FRAND-conditioned SEPs. The advent of SEPs and the rules represented by FRAND have enabled a development of fast technology creation and contributed to the rapid diffusion in ICT goods and ICT-based services. The SEP system has also allowed for new competition, both between existing technologies and brands, and from new ones that have stepped into the market with the ambition to disrupt it, again to the benefit of the consumer. It is difficult to imagine that the ICT and digital development would have been as fast as it has been if SEPs had not been a central feature of the market.

The changing fortunes of companies operating in the cellular and smartphone market would not have been possible if there had not been an SEP system that supported competition. Now that the world economy is on the doorstep of new innovations that are dependent on a great number of input technologies – e.g. the Internet-of-Things, transport connectivity and intelligent vehicles – it is crucially important for the consumer that a balanced and functioning SEP system is maintained and that actors in the system converge towards it – which would ultimately meet their economic interests.

#### ICT innovation is key to post-COVID economic recovery and long-term growth.

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Introduction

As the global economy has entered recession in 2020, triggered by the COVID-19 pandemic, the human casualties, and economic damage are perceived to be very large. Even as the health crisis will gradually become manageable, the impact on economic growth can be long-lasting and the recovery path can take several years. In particular, growth drivers such as the pace of job creation, income generation and investment may take several years to get back to pre-crisis trends. Initially the productivity of those growth drivers may be of less concern as the mantra of ‘we’ll do what it takes to avoid worse’ is predominant in this phase of the crisis.

However, once the recovery gets underway the productive use of resources is key to sustained growth. While we do not ignore the short-term challenges of the economic recovery, our primary focus in this paper is on the productivity puzzle from a long-term perspective. Productivity is driven by technological change and innovation which, in turn, depends on investment in human and physical capital as well as in other ‘missing capitals’ often referred to as intangible assets. Indeed, those investments create a positive feedback effect, as the productivity it generates also helps to make more efficient usage of scarce resources in the future. When properly measured and valued, productivity also provides a critical yardstick to realise a fairer distribution of the gains from economic growth to those who bring the resources to bear. It thereby creates the incentives for people to produce and business to invest helping to drive economic growth and raise living standards.

Unfortunately, in the aftermath of the global financial crisis of 2008/2009, many economies around the world, especially advanced economies, have failed to recharge the economy by powering productivity as the key source of growth in the long term. Indeed the latest update of The Conference Board Total Economy Database (July 2020) points at significant weakening in labor productivity growth in Europe up to 2019 (figure 1a–c). While the United States experienced somewhat faster productivity growth from 2017 to 2019 than the Euro Area and the United Kingdom, it still has not recovered to the rates of productivity growth from before the global financial crisis either.

The slowdown in productivity growth over the past 15 years has been well documented. There are multiple causes including an exhaustion of catch-up potential in emerging markets impacting economies along entire global value chains, and the drag from the global financial crisis because of low demand and weak investment, too low interest rates causing misallocations an overreliance on cheap labor, and failing fiscal policies (Bauer et al., 2020; Cette et al., 2016; Crafts, 2018; Dieppe, 2020; Fernald et al., 2017; Syverson, 2016).1 Technical measurement issues regarding inputs and outputs may have played a role as well.

In our earlier work we have stressed the importance of time lags in the adoption of new technologies, and in particular the complexity in generating productivity growth from the latest round of new digital technologies since the early 2010s, including the move toward mobile, ubiquitous access to broadband, the rise of cloud storage and advances in artificial intelligence (AI) and robotics (van Ark, 2016a, 2016b; van Ark and O’Mahony, 2016; van Ark et al., 2016).

While the first priority for economic recovery from the COVID-19 crisis is to restore jobs, it is important that any employment-intensive growth path does go together with a productivity revival. In this paper, we argue that it is possible to avoid another productivity slowdown. Underneath the aggregate figures, there is evidence pointing toward a possible tipping point at which many advanced economies may expect to see more widespread impacts from the adoption and absorption of digital technology on productivity and GDP growth.

In Section 2 we review the latest literature on the productivity impacts of general purpose technologies (GPTs), including the notion of time lapses through which digital technologies result in faster productivity growth. We also look at patterns by which innovation and productivity effects GPTs emerge across industries and disperse across the economy. We explain why the New Digital Economy (NDE) is especially characterised by long lag effects.

In Section 3 we provide an empirical analysis of productivity growth by industry data to observe whether we can detect a distinct pattern across groups of industries pointing to a structural improvement in recent years. We use a taxonomy on digital intensity by industry which was recently developed by the Organisation for Economic Co-operation and Development (OECD) (Calvino et al., 2018), showing that the most digital-intensive industries have experienced a relatively strong performance in terms of labor productivity growth since 2007 and especially since 2013.

In Section 4 of the paper, we discuss the connection between labor and skills in the digital economy, which we believe provides the key to a productivity revival. We developed a new metric on innovation competencies by occupation on the basis of data from the O\*Net database on occupation-specific descriptors in the United States (Hao et al., 2018). When applied to the United Kingdom, we find that innovation competencies point at stronger productivity effects by industry.

In Section 5 we focus on how productivity has been behaving in the short-term during the COVID-19 recession. In particular, we address the potential trade-offs between traditional pro-cyclical recovery effects and scarring effects the recession leaves, especially on the labor market. We argue that increased adoption and usage of digital technologies during the COVID-19 crisis may create a positive productivity effect. In the final section, Section 6, we will review our hypothesis that a productivity revival could be imminent in the light of the recovery from the COVID-19 crisis. In order not to miss this opportunity again, as happened a decade ago, we argue that a coordinated effort from business and policy is needed, and has to be delivered in such a way that the gains from productivity will be more widespread and such that those who provide the resources for growth are incentivised to deliver them in an efficient way.

2. The productivity paradox of the New Digital Economy

It is well known that General Purpose Technologies (GPTs), defined as new methods of producing and inventing new goods and services which are important enough to have a long-term aggregate impact on the economy, can take a significant amount of time to translate to faster productivity growth at the aggregate level of the economy. This is inherent to the three critical characteristics of a GPT as identified by Bresnahan and Trajtenberg (1995).2

1. Pervasiveness –The GPT should spread to most sectors.

2. Improvement –The GPT should get better over time and, hence, should keep lowering the costs of its users.

3. Innovation spawning –The GPT should make it easier to invent and produce new products or processes.

Historical analysis has focussed on productivity trends in previous technology phases (Bakker et al., 2019; Crafts, 2004). Recent literature has shown that the information and communication technology (ICT) revolution of the past 50 years can be characterised as a GPT and doesn’t pale with previous GPTs such as steam technology, electricity and the combustion engine. For example, Hempell (2005) concludes that ‘investment in information and communication technologies (ICT) are closely linked to complementary innovations and are most productive in firms with experience from earlier innovations’. In a more recent analysis of the evolution of the Internet, Simcoe (2015) argues that the modularity of the internet has prevented a fall in return to investments in innovation by ‘facilitating low-cost adaptation of a shared general-purpose technology to the demands of heterogeneous applications’. In a review of the data, Liao et al. (2016) conclude that:

‘...ICT investment does contribute to productivity but not in the usual manner –we find a positive (but lagged) ICT effect on technological progress. We argue that for a positive ICT role on growth to actually take place, a period of negative relationship between productivity and ICT investment together with ICT-using sectors’ capacity to learn from the embodied new technology was crucial. In addition, it took a learning period with appropriate complementary co-inventions for the new ICT-capital to become effective and its gains to be realised. Our findings provide solid, further empirical evidence to support ICT as a general purpose technology’.

#### Growth solves nuclear war.

Henricksen 17, \*Thomas H., emeritus senior fellow at the Hoover Institution; (March 23rd, 2017, “Post-American World Order,” Hoover Institution, <http://www.hoover.org/research/post-american-world-order>)

What Is To Be Done?

The first marching order is to dodge any kind of perpetual war of the sort that George Orwell outlined in  “1984,” which engulfed the three super states of Eastasia, Eurasia, and Oceania, and made possible the totalitarian Big Brother regime. A long-running Cold War-type confrontation would almost certainly take another form than the one that ran from 1945 until the downfall of the Soviet Union.

What prescriptions can be offered in the face of the escalating competition among the three global powers? First, by staying militarily and economically strong, the United States will have the resources to deter its peers’ hawkish behavior that might otherwise trigger a major conflict. Judging by the history of the Cold War, the coming strategic chess match with Russia and China will prove tense and demanding—since all the countries boast nuclear arms and long-range ballistic missiles. Next, the United States should widen and sustain willing coalitions of partners, something at which America excels, and at which China and Russia fail conspicuously.

There can be little room for error in fraught crises among nuclear-weaponized and hostile powers. Short- and long-term standoffs are likely, as they were during the Cold War. Thus, the playbook, in part, involves a waiting game in which each power looks to its rivals to suffer grievous internal problems which could entail a collapse, as happened to the Soviet Union.

Some Chinese and Russian experts predict grave domestic problems for each other. They also entertain similar thoughts about the United States, which they view as terminally decadent and catastrophically polarized over politics, ethnicity, and the future direction of the country. So, the brewing three-way struggle also involves a systemic contest, which will test the competitors’ economic and political institutions.

At this juncture, the world is entering a standoff among the three great and several not-so-great powers. Averting war, while defending our interests, will prove a challenge, calling for deft policy, political endurance, and economic growth, as well as sufficient military force to keep at bay aggressive states or prevail over them if ever a war breaks out.

#### Absence of domestic 5G competition cedes leadership in technical standards to China.

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There is little doubt today that American superiority in the next generation of mobile communications, commonly called 5G, is a matter of extraordinary national concern. There is also little doubt that China is a strong competitor, already having outspent the United States by [$24 billion](https://www2.deloitte.com/content/dam/Deloitte/us/Documents/technology-media-telecommunications/us-tmt-5g-deployment-imperative.pdf#page=3) and planning [$411 billion](https://www.scmp.com/tech/china-tech/article/2098948/china-plans-28-trillion-yuan-capital-expenditure-create-worlds) in 5G investment over the next decade. The Chinese government has also laid out multiple national plans for establishing the country as a leader in mobile technology, and the Chinese firm Huawei is poised to be the [top smartphone manufacturer](https://www.cnbc.com/2018/11/16/huawei-aims-to-overtake-samsung-as-no-1-smartphone-player-by-2020.html) by 2020.

And what are United States companies doing about this? Bickering over patents.

For years, the leading American supplier of advanced mobile communications chips has been the San Diego-based Qualcomm. The company has been an innovator of mobile technology, but it has also been a remarkable innovator of convoluted legal strategies. As an ongoing Federal Trade Commission [lawsuit alleges](https://www.ftc.gov/news-events/press-releases/2017/01/ftc-charges-qualcomm-monopolizing-key-semiconductor-device-used), Qualcomm has used its dominant position as a chip supplier and its extensive patent holdings to weave an intricate web of patent licensing across the mobile industry. The effect of that complex licensing scheme, the FTC claims, has been to force competitor chipmakers out of the market and to extract concessions and high patent royalties from smartphone and mobile-device makers.

Qualcomm today faces only one major U.S. competitor—Intel, whose chips Apple recently [started using](https://www.cultofmac.com/484250/intel-reaping-rewards-apples-scrap-qualcomm/) instead of Qualcomm’s. Not surprisingly, Qualcomm has leveraged its patents to force a retaliatory investigation against Apple, the effect of which could be, as an administrative judge [recently determined](http://www.fosspatents.com/2018/10/itc-judge-didnt-buy-testimony-for-which.html), to boot Intel out of the mobile-chip market and leave Qualcomm as a monopoly.

It is hard to imagine that this infighting among Apple, Intel and Qualcomm is getting the United States very far in 5G, and it is harder to imagine that Qualcomm’s desired outcome would do so, either. The best path, instead, is the obvious one: allowing competition and expanding the number of firms working on 5G.

Competition encourages companies to out-innovate each other in order to grab market share. Of particular importance to 5G, competition leads to [better cybersecurity](https://morningconsult.com/opinions/in-the-race-to-5g-monopoly-considered-harmful/) in products, making them less vulnerable to hacking or misuse.

Competition is especially crucial when it comes to the technical standards that define how 5G works. These standards are the work of 3GPP, an international consortium of technology companies in the field. Chinese players such as Huawei and ZTE are major participants in 3GPP. Ensuring that 3GPP’s standards reflect American values requires having as many American companies at the negotiating table as possible—which is harder to achieve when those companies are trying to sue each other out of business.

Certainly patents themselves, as rewards for new inventions, are a driver of innovation in areas such as 5G. The problem, though, is not the existence of a patent system but the ever-expanding power of the patent laws, which encourage companies to pour dollars into complex patent licensing and assertion schemes—as companies like Qualcomm have done—rather than to perform the hard work of building new technologies. When innovation in patent strategy is more profitable than actual innovation, we lose the race to 5G and other technologies.

But don’t take my word for it. [Multiple members of Congress](https://www.patentprogress.org/2019/01/11/congress-weighs-in-on-qualcomm-and-apple-at-the-itc/), from both sides of the aisle, have denounced the use of patents to kick companies like Intel out of 5G development, predicting that such actions would “dampen the quality, innovation, competitive pricing, and in this case the preservation of a strong U.S. presence in the development of 5G and thus the national security of the United States.”

Or look to what China itself is doing. The Chinese government is handing out rewards left and right to encourage technology research and development. Indeed, it grants subsidies and financial benefits (ranging from the [ordinary](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2818503) to the [imperfect](https://funginstitute.berkeley.edu/wp-content/uploads/2013/12/patent_subsidy_Zhen.pdf) to the [bizarre](https://www.scmp.com/news/china/article/1681850/how-get-out-jail-early-china-buy-inventors-idea-and-patent-it)) to encourage its citizens to file for patents. But while China specifically encourages filing for patents, it does little to encourage using them: Patent infringement awards in court are peanuts—often only [five figures](https://scholarship.law.berkeley.edu/btlj/vol33/iss2/2/)—and most Chinese patent owners drop their patents [within five years](https://www.bloomberg.com/news/articles/2018-09-26/china-claims-more-patents-than-any-country-most-are-worthless) of getting them. The message in China is clear: You will be rewarded for innovating, but not for quibbling over patents.

The United States should take the same tack if it wants to match China in 5G. Ever-stronger patent rights encourage counterproductive disputes that are a drag on industry, a drag on research and development, and ultimately a drag on domestic competitiveness on the global stage. If America wants to lead in 5G, then it must clear the path for strong competition among leading American technology companies.

#### Standards leadership allows China to export digital authoritarianism.

Drew et al. 21, \*Dr Alexi Drew, Research Associate, The Policy Institute, King’s College London; (May 7th, 2021, “The Critical Geopolitics of Standards Setting”, https://www.transatlantic-dialogue-on-china.rusi.org/article/the-critical-geopolitics-of-standards-setting)

However, this previously ‘western’ domain is challenged by a Chinese bloc of private industry actors with centrally directed, strategic motivations for their efforts who have managed to leverage the flaws of this system for political and economic advantage.  The market-driven self-regulation model of technical standards has proven itself unsustainable given the geopolitical power achievable through the control of these standards. The marketised approach is easily abusable by a technologically developed nation-state with geopolitical intentions firmly in mind.

Obscurity Through Complexity

Technical standards have the immediate appearance of being both apolitical and ethically neutral. This seems to set them apart from the debate over standards of state behaviour in [cyber space concerning espionage and actions below the threshold of armed conflict](https://www.cfr.org/blog/unexpectedly-all-un-countries-agreed-cybersecurity-report-so-what). Yet, technological standards are unequivocally connected to normative practices of international behaviour and ethics. The extremely complex nature of the standards under consideration in bodies such as the International Organization for Standardization, the International Electrotechnical Commission (IEC), the International Telecommunications Union (ITU), and the Third Generation Partnership Project (3GPP) obscures the very tangible real-world impact that the standards they set have. The 3GPP is responsible for standards setting for mobile telecommunications. It covers everything from 5G through to autonomous vehicles and the Internet of Things. These are the bodies defining how the modern world is constructed.

On the one hand they appear quite benign, responsible for such banalities as the use of Universal Serial Bus (USB) connectors versus proprietary standards. This hardly seems a matter of national security importance. But the same process is responsible for what ultimately shape the basic operating parameters of facial recognition technology in closed circuit television systems, the level of centralised state control at the technical foundations of the internet, and the protections of personally identifiable data. These generate profound implications for international policy and ethics.

Internal Competition vs Strategic Direction

Technical standards setting processes have, historically, been dominated by private sector actors who have had both the capacity to develop a particular technology to the point of holding a significant market share, and the ability to use that market share to advocate for the standardisation of the technology in line with their own production. The market led approach has continued to be the prevailing model by which American companies have globalised the technical standards behind US dominated technological innovation. This privatised form of self-regulation for technology companies is only partially influenced by the approach taken within the EU where [some licensing of standards are controlled by state or EU led institutions.](https://www.ui.se/globalassets/ui.se-eng/publications/ui-publications/2019/ui-brief-no.-2-2019.pdf)

In contrast to this approach the Chinese model has involved a high level of state-oriented direction, oversight, and direct engagement on the creation and signing off technical standards. Efforts to harmonise and centralise technical standards domestically have become increasingly internationalised as the CCP takes this centralised, strategic approach to technical standards setting bodies such as the ITU, 3GPP, and IEC. Technical standards have also become an increasingly central component of the Digital Silk Road with the openly expressed goal of increasing uptake of Chinese technical standards in partner countries.

The implications of this clash between a system of technical standardisation that is driven by the market versus one driven by an authoritarian government subsidised model are a direct challenge to the development of free, open, and ethical technology. Standardisation mechanisms have become political, or rather there has been a gradual realisation of the political power to be gained from the control of technical standards. While the PRC might have come to this awareness first, the US and Europe have since had a rude awakening about the missed opportunity. The privatised model of technical standards setting favoured by European and US markets relies upon the dynamics of financial competition to regulate behaviour. This is in stark contrast to the statist Chinese model.

#### Causes global backsliding.

Kendall-Taylor et. al 20 \*Andrea Kendall-Taylor, senior fellow and director of the Transatlantic Security Program at the Center for a New American Security, co-author of Democracies and Authoritarian Regimes; Erica Frantz is Assistant Professor of Political Science at Michigan State University; Joseph Wright is Professor of Political Science at Pennsylvania State University; (March/April 2020, “The Digital Dictators,” Foreign Affairs, <https://www.foreignaffairs.com/articles/china/2020-02-06/digital-dictators>)

The risk that technology will usher in a wave of authoritarianism is all the more concerning because our own empirical research has indicated that beyond buttressing autocracies, digital tools are associated with an increased risk of democratic backsliding in fragile democracies. New technologies are particularly dangerous for weak democracies because many of these digital tools are dual use: technology can enhance government efficiency and provide the capacity to address challenges such as crime and terrorism, but no matter the intentions with which governments initially acquire such technology, they can also use these tools to muzzle and restrict the activities of their opponents.

#### Democracy solves a litany of existential threats.

Diamond 19, Professor of Political Science and Sociology at Stanford University, Senior Fellow at the Hoover Institution, Senior Fellow at the Freeman Spogli Institute for International Studies, PhD in Sociology from Stanford University, (Dr. Larry, Ill Winds: Saving Democracy from Russian Rage, Chinese Ambition, and American Complacency, p. 199-202)

The most obvious response to the ill winds blowing from the world’s autocracies is to help the winds of freedom blowing in the other direction. The democracies of the West cannot save themselves if they do not stand with democrats around the world. This is truer now than ever, for several reasons. We live in a globalized world, one in which models, trends, and ideas cascade across borders. Any wind of change may gather quickly and blow with gale force. People everywhere form ideas about how to govern—or simply about which forms of government and sources of power may be irresistible—based on what they see happening elsewhere. We are now immersed in a fierce global contest of ideas, information, and norms. In the digital age, that contest is moving at lightning speed, shaping how people think about their political systems and the way the world runs. As doubts about and threats to democracy are mounting in the West, this is not a contest that the democracies can afford to lose. Globalization, with its flows of trade and information, raises the stakes for us in another way. Authoritarian and badly governed regimes increasingly pose a direct threat to popular sovereignty and the rule of law in our own democracies. Covert flows of money and influence are subverting and corrupting our democratic processes and institutions. They will not stop just because Americans and others pretend that we have no stake in the future of freedom in the world. If we want to defend the core principles of self-government, transparency, and accountability in our own democracies, we have no choice but to promote them globally. It is not enough to say that dictatorship is bad and that democracy, however flawed, is still better. Popular enthusiasm for a lesser evil cannot be sustained indefinitely. People need the inspiration of a positive vision. Democracy must demonstrate that it is a just and fair political system that advances humane values and the common good. To make our republics more perfect, established democracies must not only adopt reforms to more fully include and empower their own citizens. They must also support people, groups, and institutions struggling to achieve democratic values elsewhere. The best way to counter Russian rage and Chinese ambition is to show that Moscow and Beijing are on the wrong side of history; that people everywhere yearn to be free; and that they can make freedom work to achieve a more just, sustainable, and prosperous society. In our networked age, both idealism and the harder imperatives of global power and security argue for more democracy, not less. For one thing, if we do not worry about the quality of governance in lower-income countries, we will face more and more troubled and failing states. Famine and genocide are the curse of authoritarian states, not democratic ones. Outright state collapse is the ultimate, bitter fruit of tyranny. When countries like Syria, Libya, and Afghanistan descend into civil war; when poor states in Africa cannot generate jobs and improve their citizens’ lives due to rule by corrupt and callous strongmen; when Central American societies are held hostage by brutal gangs and kleptocratic rulers, people flee—and wash up on the shores of the democracies. Europe and the United States cannot withstand the rising pressures of immigration unless they work to support better, more stable and accountable government in troubled countries. The world has simply grown too small, too flat, and too fast to wall off rotten states and pretend they are on some other planet. Hard security interests are at stake. As even the Trump administration’s 2017 National Security Strategy makes clear, the main threats to U.S. national security all stem from authoritarianism, whether in the form of tyrannies from Russia and China to Iran and North Korea or in the guise of antidemocratic terrorist movements such as ISIS.1 By supporting the development of democracy around the world, we can deny these authoritarian adversaries the geopolitical running room they seek. Just as Russia, China, and Iran are trying to undermine democracies to bend other countries to their will, so too can we contain these autocrats’ ambitions by helping other countries build effective, resilient democracies that can withstand the dictators’ malevolence. Of course, democratically elected governments with open societies will not support the American line on every issue. But no free society wants to mortgage its future to another country. The American national interest would best be secured by a pluralistic world of free countries—one in which autocrats can no longer use corruption and coercion to gobble up resources, alliances, and territory. If you look back over our history to see who has posed a threat to the United States and our allies, it has always been authoritarian regimes and empires. As political scientists have long noted, no two democracies have ever gone to war with each other—ever. It is not the democracies of the world that are supporting international terrorism, proliferating weapons of mass destruction, or threatening the territory of their neighbors.

#### Emergence of smart cities depends on IoT applications of 5G interoperability standards---absent FRAND, excessive royalties will undermine sustainable development.

Schwartz 18, \*Matt Schwartz, Privacy Fellowship Coordinator at ACT, App Association; (March 2nd, 2018, “It’s Smart to be FRANDly: How the FRAND Commitment Will Determine the Future of Smart Cities”, https://actonline.org/2018/03/02/its-smart-to-be-frandly-how-the-frand-commitment-will-determine-the-future-of-smart-cities/)

In December, we [outlined](https://actonline.org/2017/12/18/smart-cities-connecting-your-community-through-technology/%5d) the emergence of Smart Cities – cities that harness technological innovations like internet of things (IoT) devices and data analytics to improve essential infrastructure in growing urban centers. The technological foundation of Smart Cities aims to improve public safety, better allocate resources, and meet the needs of citizens more quickly.

A central element to Smart Cities is the comprehensive network of sensors and devices implemented within buildings, roads, traffic signs, and parking meters that allows them to interact with public, and potentially private-owned, infrastructure. These sensors will “speak” to one another, communicating information about energy usage, traffic density, or other elements of city management that have traditionally either been analyzed separately or not tracked at all. The potential of Smart Cities allows data to flow from previously disconnected branches of the city and be processed in real-time, unlocking previously unknown insights.

The powerful interoperability of Smart Cities will rely heavily on standardized technologies developed in organizations like the IEEE, which is responsible for standardizing the wi-fi technology we use every day. Standardized technologies often include standard-essential patents (SEPs), which, like their name suggests, are patents declared essential to an industry standard by a standards-setting organization. In simple terms, one cannot implement the standardized technology without using the patent.

Like regular patents, the users of SEPs must pay royalties or licensing fees to the patent owner before they may use it. For example, if a manufacturing company wants to make an IoT device interoperable with a 5G network, the manufacturer must pay a licensing fee to the owner of the SEP that is essential to the 5G standard. SEPs play a vital role in the new innovations we enjoy and have come to expect, and because of the value of these patents, SEP holders have the ability to demand high license fees from those who wish to implement the standard. To offset this competition issue, many SEP holders voluntarily agree to license their SEPs to any willing licensee under fair, reasonable, and non-discriminatory (FRAND) terms.

While wi-fi and LTE are standards that will be vital to Smart City deployment, countless new standardized technologies are being developed that will be integral to any fully-operational Smart City. With reasonable access to SEPs, assured by the FRAND commitment, innovators can enjoy the legal and business certainty they need to compete. While the meaning of the FRAND commitment continues to be refined – as evidenced by the development of SEP best practices recently launched by the App Association in Europe – its foundations are well-established.

But what happens when SEP holders do not abide by the FRAND licensing commitment, or simply refuse to license at all? Sadly, small and medium-sized companies would be forced to accept untenable licensing terms, but more realistically, they would be priced out of using the standard altogether. As a result, it would impose a barrier to innovation that would result in fewer products offered to consumers or cities eager to implement IoT technologies. For example, many hope the rise of autonomous vehicles will be seamlessly integrated into the Smart City network. But how beneficial would it be if only some autonomous vehicle brands are able to license the technology needed to communicate with traffic lights, simply because of the market power of a chipmaker? The FRAND commitment is an important backstop to that unfortunate possibility.

It is vital for SEP holders to honor FRAND licensing terms, if not for small and medium-sized innovators, then for the sustainability of future Smart Cities. FRAND creates a platform for innovation, providing a floor on which companies can stand, innovate, and compete. If the foundation of the FRAND commitment is reneged, American innovators pay a steep price – not only do they lose a key component of product development and market entry, but they are also left with years of expensive negotiations and litigation if they choose to challenge the licensing practice. What’s more, the confidence developed in the open standards development system is shaken, and Smart Cities have fewer choices in IoT solutions for their future.

To achieve the promise of Smart Cities, a balanced standards ecosystem is essential. We must allow small and medium-sized developers to leverage industry standards for innovation and prevent cost-prohibitive royalty structures and negotiating practices that are detrimental to competition, while also ensuring that SEP owners can protect their intellectual property and be fairly compensated for its use. The FRAND commitment continues to be the best framework to achieve this balance, and adherence to its principles will determine the future and success of Smart Cities.

#### Climate change is anthropogenic and causes extinction---5G-enabled smart cities are critical for mitigation and adaptation.

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Currently, the entire planet is at risk due to continual climate change [1–3]. The recorded increase in average temperature across the world in the past hundred years, and the associated changes attributed to this, are known as global warming. Many scientists are convinced by the published evidence that this change is anthropogenic and resulted from the elevated emission levels of global greenhouse gases (GHGs) [4,5]. Gases such as water vapor, carbon dioxide, methane, nitrous oxide, and ozone are responsible for the absorption and emission of thermal radiation. These changes in the relative quantities of the GHGs induce a proportional change in the amount of preserved solar energy. Presently, the accepted indicator for global warming is the sustained rise in the mean temperature worldwide. This definition is designed to account for the fact that there may be some localized exceptions to this rise. For example, there may be cooling experienced in a region while the global temperature may increase altogether, hence the need for average temperature. A key concern with the GHGs trapping of more heat in the atmosphere is that it affects both climate and short scale weather patterns. Consequently, it results in greater numbers of adverse weather events such as storms, heat waves, cold snaps, droughts, and fires [6]. Climate-related risks to health, livelihoods, food security, water supply, human safety, and economic growth are projected to increase with global warming of 1.5 ◦C [7] and further increase further at 2 ◦C, as shown in Figure 1. In addition, the risks to global aggregated economic growth due to the climate change impacts are projected to be lower at 1.5 ◦C than at 2 ◦C by the end of this century.

Carbon dioxide has the most substantial effect on global warming [8]. Although it was once assumed to have an ~100 year lifespan in the atmosphere, careful studies revealed that the situation is far worse, with three-quarters of the gas expected to remain for a time in the region of up to ~1000 years, with the remainder lasting for an indefinite period of time [9]. It was indicated that the present impacts of humanity on the atmosphere can certainly cause a long term problem [10]. Carbon dioxide is released when oil, coal, and other fossil fuels are burnt for the energy we use to power our homes, cars, and smartphones. By lessening its usage, we can curb our own contribution to climate change while saving money. The first challenge is eliminating the burning of coal, oil, and, eventually, natural gas. Oil is the lubricant of the global economy as it is hidden inside such ubiquitous items as plastic and corn, fundamental to the transportation of both consumers and goods. Coal is the substrate, supplying roughly half of the electricity worldwide, a percentage that is likely to grow according to the International Energy Agency (IEA). In fact, buildings contribute up to 43% of all the greenhouse gas emissions worldwide [11], even though investing in thicker insulation and other cost-effective as well as temperature-regulating strategies can save money in the long run. Investment in new infrastructures, or radical upgradation of the existing highways and transmission lines, may help to reduce greenhouse gas emissions, yielding economic growth in the developing countries.

Nations across the globe have kept very high targets to reducing their GHG discharges [12,13]. In order to meet these goals, considerable reductions in city energy usage is required. At a global scale, urban communities represent over half (55%) of the population, which is predicted to reach 68% by the middle of this century [14]. Urban areas claim ownership of the highest levels of energy use, gas emission, and also the largest local economy. As such, it is crucial for urban areas to reduce their consumption and utilize renewable sources wherever available to reduce their gas discharge levels. Smart cities often utilize digital sensors to measure and transmit data about the levels of GHGs in the city at that moment, as a means of tackling them [15]. The efficacy of such a system is thus reliant on the network used to collate and analyze the data collected as an extant network. The mobile telecommunications networks offer a convenient solution to this desire, as their pre-existence has the clear benefit of reducing costs compared to the design and implementation of a novel system. It is recognized that smart cities will certainly act as the key players meeting these ambitious targets [16,17]. In this study, we focused primarily on the potential applications of 5G network technology to control climate change in Singapore. In addition, a clear overview of the sustainability benefits of introducing 5G technology compatible smart cities, buildings, and farms in all aspects of urbanization is provided. Herein, the main purpose is to tackle the negative outcomes associated with anthropogenic climate change, with a particular focus on the contributions that are best made by the telecoms network operators.

Climate change is one of the most challenging problems that humanity has ever faced. Presently, hundreds of millions of lives, innumerable species, entire ecosystems, health, economy, and the future habitability of this planet are at risk. Fortunately, climate change is solvable, we just need to wisely exploit the existing technologies and sciences. Climate change mitigation is a pressing international need in which many management actions are required. The development of 5G technology has been largely driven by smart mobile devices and advanced communication technologies. It may thus serve as a technical enabler for a whole new range of business opportunities, energy, and facilities management, together with industrial applications. Moreover, it may enable different devices to work together seamlessly. Definitely, the 5G cellular network technology is expected to revolutionize the global industries with profound effects on the savings of energy, waste generation and recycling, and water resources management, thus reducing the climate change impacts.

#### The plan requires SSO’s to administer reasonable action to prohibit ex post opportunism---that solves

Melamed & Shapiro 18, \*A. Douglas Melamed is Professor of the Practice of Law at Stanford Law School; \*Carl Shapiro is the Transamerica Professor of Business Strategy at the Haas School of Business at the University of California at Berkeley; (May 2018, “How Antitrust Law Can Make FRAND Commitments More Effective”, https://www-cdn.law.stanford.edu/wp-content/uploads/2018/05/How-Antitrust-Law-Can-Make-FRAND-Commitments-More-Effective.pdf)

3. Application of the Basic Legal Principles

The antitrust principle is straightforward: industry-wide collaboration through SSOs to establish procompetitive standards is permitted only if it is no more restrictive of competition than reasonably necessary to enable creation of the standards. When standard setting predictably creates technology monopolies that, if unrestrained, will enable anticompetitive ex post opportunism that would otherwise not occur, an SSO that does not take effective measures to prevent or minimize such ex post opportunism engages in conduct that is more restrictive of competition than necessary. In that case, the SSO and, in appropriate cases, its members, may well violate Section 1 of the Sherman Act.

Under this principle, SSO procedures and FRAND rules should be evaluated based on whether they lead to reasonable SEP royalties, using the competitive ex ante licensing standard discussed above, which has been adopted by the courts in patent law. Put differently, FRAND rules should be evaluated based on their ability to prevent SEP holders from obtaining more than the ex ante value of their technology from implementers.

This limitation would not prevent a SEP holder from proﬁting, perhaps greatly, from participating in the SSO and having its patented technology included in the standard. The SEP holder continues to be rewarded for its technology because the inclusion of its technology in the standard can still greatly increase the volume of licensing opportunities available to the SEP holder.

Whether a particular set of FRAND rules are sufficiently effective in preventing ex post opportunism will depend on the particular circumstances. The procedural unfolding of the case will also depend upon the circumstances. As a general matter, the case would probably be structured as an ordinary Rule of Reason case.82

First, the plaintiff would have to demonstrate harm to competition as a result of the collaboration of the SSO’s members, many of which compete with one another. In this case, the harm to competition would stem from the ability of the SEP holder to exercise monopoly power by obtaining royalties in excess of the competitive, ex ante level. The decision to include patented technologies in the standard would be the allegedly unlawful agreement. Notably, the court need not determine what a FRAND royalty is; it would suffice to determine that market power has been created or exercised, and that existing SSO rules and policies were not adequate to prevent the competitive harm. The defendant, which could be the SSO or perhaps one or more SSO members, would win at this point if the plaintiff failed to show harm to competition. If might fail if the standard faces substantial competition and the court concludes that the SEP holder therefore does not have market power or if the SSO’s rules and policies are found to be effective in preventing ex post opportunism, even if the plaintiff or even the court thinks that other rules and policies would be preferable.

Second, if the plaintiff makes the requisite showing of harm to competition, the defendant(s) would then have to show some procompetitive justiﬁcation— in this case, the beneﬁts of the standard. These two initial steps should be straightforward.

Third, if as is likely the defendant is able to show a procompetitive justiﬁcation, the plaintiff would have to show that the SSO could have used available, reasonable alternatives to realize the efficiency beneﬁts with less or none of the competitive harms. The plaintiff might identify reasonable alternatives that would have led to a different standard, based on including unpatented technology in the standard or perhaps involving fewer SEPs or fewer owners of SEPs, which would be less subject to patent holdup. More likely, the plaintiff could suggest alternative SSO rules that would not change the standard, but would reduce the likelihood or extent of ex post opportunism. For example, the plaintiff might suggest more rigorous FRAND-type rules, such as rules that set forth more precise principles on which FRAND royalties are to be determined and the circumstances under which SEP holders might seek injunctions.

Fourth, the burden would then shift to the defendant(s) to show that the beneﬁts of the standard could not have been realized if the SSO had adopted any of the proffered alternatives or that those alternatives were unrealistic.83 The plaintiff would be entitled to judgment if the court concludes that those beneﬁts could have been realized with less competitive harm if the SSO had adopted the standard with different IPR rules or policies.

Our overall sense, based on experience and the empirical literature, is that the extant FRAND rules are generally useful, but tend to be inadequate because they are imprecise and leave unresolved such critical issues as (a) the meaning of a reasonable royalty, even conceptually; (b) the meaning of “non-discriminatory;” (c) to whom licenses must be offered; and (d) under what circumstances may a SEP holder obtain an injunction.84 These imprecise FRAND commitments are therefore not sufficient to adequately prevent ex post opportunism. The recent revisions to IEEE’s FRAND policy represent a signiﬁcant step in the right direction, but even this advance leaves important questions unanswered.85 If FRAND rules are inadequate in these ways, litigation involving extant FRAND rules would likely be resolved only at the ﬁnal, fourth step. The defendant would be able to demonstrate the beneﬁts created by the standard; the plaintiff would be able to demonstrate the creation of market power and that other reasonable and practical rules or policies would ameliorate the problem. The case would thus turn on whether the defendant is able to demonstrate that signiﬁcant beneﬁts associated with standardization could not have been realized if the SSO had adopted those other rules or policies.

The court would have available a variety of possible remedies if the plaintiff prevails. Implementers that paid supracompetitive royalties or were unlawfully excluded in whole or in part from product markets as a result of the inadequate FRAND policies would be entitled to damages and, in some cases, to treble damages.86 If the unlawful SSO conduct is regarded as the collective action of the SSO and its members, which is likely to be the case in most instances, SSO members would be jointly and severally liable for the damages. Forward-looking injunctive relief aimed at restoring competition would need to be fashioned to the requirements of the individual case. For example, a court could order the SSO to adopt a new rule or policy proposed by the plaintiff. If the court is reluctant to take on that governance role, it might give the SSO a period of time—maybe ninety days—to develop a rule, subject to the court’s ultimate approval, which would adequately ameliorate the competitive problem created by the SSO. Alternatively or in addition, the court might order the parties to attempt to negotiate a rule or policy on which they can agree. And, depending on the circumstances, the court might order SEP holders, including at least those that were defendants in the case, to comply with the new SSO rules and policies.

#### Threatening antitrust liability lures SSO’s into adopting best practices.

Lemley & Shapiro 13, \*Mark Lemley is the William H. Neukom Professor at Stanford Law School and a partner at Durie Tangri LLP; \*Carl Shapiro is the Transamerica Professor of Business Strategy at the Haas School of Business, University of California at Berkeley and a Senior Consultant at Charles River Associates; (2013, “A SIMPLE APPROACH TO SETTING REASONABLE ROYALTIES FOR STANDARD-ESSENTIAL PATENTS”, (https://faculty.haas.berkeley.edu/shapiro/frand.pdf)

Under our approach, many of these issues should become moot, since the patentee cannot obtain an injunction (or transfer the patent to someone who can) against a willing licensee, and since competitors are not involved in jointly setting the reasonable royalty rate. If SSOs set clear, reasonable rules following the best practices we recommend, and parties follow those rules, there should be little or no need for antitrust to intervene. Indeed, even the risk of non-disclosure of a patent is lessened, since the patentee has committed to license its essential patents whether or not it discloses them. For the most part, the rules we have described are self-executing, meaning that even if a party tries to break the rules set by the SSO there still may be no need for antitrust to intervene. Thus, we suggest that parties who abide by these procedures—patentees, implementers, and the SSOs themselves—should be immune from antitrust liability for activities that merely follow those rules.107 They have entered into an arrangement that is on balance good for competition, one that allows patentees to receive reasonable royalties but prevents holdup and reduces the risk of monopolization by trickery.

The fact that antitrust remains a last resort available when SSOs don’t follow best practices may have two practical benefits, however. First, under our approach the promise of avoiding the risk of antitrust liability will be a powerful incentive for both SSOs and patent owners to adopt the best practices we propose. Second, the risk of antitrust liability may be relevant when an individual patentee wants to adopt best practices but the SSO governing the standard has not yet done so. We propose that a patentee that unilaterally commits to the FRAND procedures we describe here should be immune from antitrust liability for following these procedures.108 A patentee’s unilateral binding commitment to arbitration could be enforced whether or not it was elicited by an SSO. Thus, just as the prospect of antitrust immunity might lure SSOs to adopt best practices, it might also lure patentees to implement those practices even if the SSO has not done so. Given the large number of standard-essential patents based on preexisting standards,109 and given that SSOs tend to update their IP rules rather slowly,110 this is not a small matter.

#### Only antitrust enforcement creates a consumer-action feature that counterbalances SSO’s conspiratorial incentives---private action fails.

Melamed & Shapiro 18, \*A. Douglas Melamed is Professor of the Practice of Law at Stanford Law School; \*Carl Shapiro is the Transamerica Professor of Business Strategy at the Haas School of Business at the University of California at Berkeley; (May 2018, “How Antitrust Law Can Make FRAND Commitments More Effective”, <https://www-cdn.law.stanford.edu/wp-content/uploads/2018/05/How-Antitrust-Law-Can-Make-FRAND-Commitments-More-Effective.pdf>)

2. Why Antitrust Enforcement Is Necessary

Some SSO members have an interest in ensuring that the SSO takes steps to minimize the potential harms from the SEP holders’ monopoly power, and this undoubtedly explains in part why most SSOs have adopted FRAND policies or similar requirements. But, as shown in the economic model in the Appendix,73 SSOs cannot in general be counted on to adopt effective FRAND policies. The bases for this conclusion, which is central to our argument for the applicability of Section 1 to SSO FRAND rules, can be summarized as follows.74

First, the SSO members collectively have an interest in permitting SEP holders to charge supracompetitive royalties that elevate the downstream price of compliant devices to the monopoly level. Doing so will enable the members in aggregate to collect increased revenues from consumers, and thus to generate increased profits that in theory could be shared by all the members. In other words, supracompetitive royalties can enrich industry participants as a group at the expense of final consumers. This fact alone should serve as a clear and strong signal regarding the dangers of counting on SSOs to implement effective FRAND policies: if the SSO members negotiate efficiently, the outcome will be just as bad for consumers as if the members agreed to fix downstream prices.75 The fundamental problem is that final consumers are not at the table when the SSO rules are negotiated.

Second, SSO members that own SEPs but earn little or no profits as implementers have a powerful self-interest in being able to exercise the ex post monopoly power associated with their SEPs. Because SSO policies are usually determined by a consensus process, these members will likely be able to block the adoption of fully effective FRAND policies. Moreover, these SSO members often have the greatest interest in SSO patent policies. Since much of their income may be attributable to patent licensing, they can be expected to devote substantial resources to block the adoption of FRAND policies that effectively prevent patent holdup.

Third, even SSO members that earn significant profits as implementers may have mixed incentives if they also own SEPs, which can also lead to weak or in-effective FRAND rules. In the Appendix, we show that, if the requisite share of votes in the SSO are cast by firms whose share of SEP royalties is at least as large as their share of downstream profits, and if these firms can coordinate their voting over the FRAND rules, then an SSO unconstrained by antitrust laws will establish FRAND rules leading to an outcome no better for consumers than would result from an integrated monopolist controlling all SEPs and all downstream sales.76

Fourth, even SSO members that are downstream implementers and own few, if any, SEPs may have only a modest interest in promoting effective policies to restrict ex post opportunism. Because all implementers will be subject to the opportunism, all of them will face increased licensing costs, and therefore will likely be able to pass on most or all of the increased costs to their customers.77 Furthermore, these implementers might not be especially active or effective in the standard-setting process for free-riding or public-good reasons, especially if SEP royalties constitute only a relatively small portion of the costs of their standard-implementing products. Public choice theory predicts that the highly motivated SEP holders are likely to have the greatest influence over patent policies.

Empirical evidence bears out these concerns. As a starting point, we find it striking that SSO FRAND rules are almost always quite vague.78 Notably, SSOs in which SEP holders are more prevalent tend to have weaker FRAND rules.79 Further, to our knowledge, SSOs have made almost no effort to enforce their FRAND rules and have, instead, left enforcement efforts to others.80 This evidence raises serious doubts about the effectiveness of the existing FRAND rules in preventing ex post opportunism.

### 1AC---Cybersecurity ADV

#### Advantage 2 is Cybersecurity:

#### Aggressive patent strategies create structural flaws in 5G standardization that imperils domestic cybersecurity---market competition reduces the incidence of vulnerability and severity of attacks.

Duan 20, \*Charles Duan is a senior fellow and associate director of tech & innovation policy at the R Street Institute, where he focuses his research on intellectual property issues; (2020, “OF MONOPOLIES AND MONOCULTURES: THE INTERSECTION OF PATENTS AND NATIONAL SECURITY”, Santa Clara High Technology Law Journal, 36(4), 369-405. Retrieved from <https://www2.lib.ku.edu/login?url=https://www.proquest.com/scholarly-journals/monopolies-monocultures-intersection-patents/docview/2442966690/se-2?accountid=14556>)

III. COMPETITION AND CYBERSECURITY

In addition to the historical review done so far, another approach to understanding the relationship among patents, competition, and national security is to consider the role of cybersecurity. There is little doubt that computer system vulnerabilities that enable hacking and spread of computer exploits are a threat to the nation’s defenses, so better cybersecurity is a key part of national security strategy.155

Strong competition can thus complement national security by enhancing domestic cybersecurity, and patent assertion that unduly weakens competition detracts from cybersecurity.156 Competition promotes better cybersecurity in at least two ways. First, multiple studies show that competition encourages firms to improve their products on multiple vectors including cybersecurity. Second, competition avoids a situation that security experts call a “monoculture,” which increases vulnerability to severe cyberattacks. As former Secretary of Homeland Security Michael Chertoff wrote recently, “We need competition and multiple providers, not a potentially vulnerable technological monoculture,” to guarantee national security.157 Thus, cybersecurity provides a useful lens for understanding how unfettered patent assertion and licensing can detract from national security.

A. Cybersecurity as Competitive Value-Add

Competition enhances national security by reducing the incidence of technical vulnerabilities. That effect is especially important for security sensitive systems such as mobile telecommunications.

Intuitively, a causal chain from competition to cybersecurity makes logical sense. Computer security is a value-added benefit to consumers, so firms in competitive markets are likely to use security to gain an edge over their competitors.158 In monopolized markets, though, there may be less external impetus to test products for flaws, and the monopolist may choose to focus less on security and more on new product features or increased product quality.

Economic research confirms these hypotheses about competition leading to better cybersecurity. A 2009 empirical study of web browsers considered the impact of market concentration on the amount of time that vendors took to fix security vulnerabilities as they were discovered.159 The study found that the presence of more competitors correlated with faster cybersecurity response—a reduction of 8–10 days in response time per additional market rival.160 Similarly, business researchers in 2005 modeled incentives for firms to engage in sharing of cybersecurity information, and concluded that the “inclination to share information and invest in security technologies increases as the degree of competitiveness in an industry increases.”161 Another study found that, where two software firms are in competition, at least one will be willing to take on some degree of risk and responsibility for cybersecurity, whereas a monopoly software firm will consistently fail to accept such responsibility.162 To be sure, an unpublished study from 2017 found that some market concentration can make firms more responsive to cybersecurity issues, but only to a point: “being in a dominant position reduces the positive effect of having less competitors on the responsiveness of the vendor,” and indeed the “more dominant the firm is, the less rapid it is in releasing security patches.”163 This research confirms that competition is more conducive to cybersecurity.

It is not hard to see how this applies to emerging communication technologies markets. In the absence of competition, the above research suggests that device manufacturers, chip makers, and software developers will lack incentives to respond to vulnerabilities, to share information about cybersecurity practices and issues, and to take responsibility for security matters. Mobile phone chips have had their share of cybersecurity failures already.164 The best way to flush out ongoing and future cybersecurity issues is to maintain competitive pressure at all levels of the supply chain.

B. Vulnerabilities of “Monocultures”

A second reason why monopoly undermines cybersecurity is that monopoly leads to a “monoculture” of single-vendor products, opening the door to massive systemic failure in the case of a cyberattack. Computer researchers developed the theory of software monocultures in the early 2000s, in response to the regular phenomenon of computer viruses and other attacks spreading rapidly by exploiting flaws in the dominant operating system at the time, Microsoft Windows.165 Where a computer system such as Windows has a commanding share of users, a virus that exploits a flaw in that system can quickly spread to infect a whole interconnected ecosystem. An operating system monopoly thus enables fast and easy spread of cyberattacks, and better cybersecurity would be achieved through greater diversity in online systems.166 As one research group posited, “a network architecture that supports a collection of heterogeneous network elements for the same functional capability offers a greater possibility of surviving security attacks as compared to homogeneous networks.”167

There has been considerable study of the theory that computer monocultures are naturally more vulnerable to attacks.168 In one study, computer science researchers reviewed a catalog of 6,340 software vulnerabilities recorded in 2007, to compare whether comparable software would share the same flaws.169 Of the 2,627 vulnerabilities applicable to application software (as opposed to operating systems, web scripts, and other software components), only 29 (1.1%) applied to substitute products from different vendors but providing the same functionality.170 By contrast, different versions of a single software product were found to share vulnerabilities 84.7% of the time.171 Thus, software monocultures share exploitable flaws even when there is some variation in versions across the monoculture; by contrast, diversity in software is almost guaranteed to prevent a single flaw from affecting all users.

In the case of 5G and wireless mobile communications, a monoculture is an especially concerning possibility. To the extent that systems such as smart city sensors or communication networks are widely deployed in a monoculture fashion, a widespread attack could have devastating consequences, potentially blacking out a region and affecting essential services such as 911.172 A monoculture that is vulnerable to so-called “rootkits” or “backdoors”—maliciously installed software that enable bad actors to commandeer systems—could also enable mass surveillance or spying by private hackers or foreign governments.173 The presence of systems from multiple vendors would mitigate these possibilities.

#### Insecure technical standards cause inevitable systemic grid collapse---extinction.

DeNardis 21, \*Dr. Laura DeNardis, PhD in Science and Technology Studies from Virginia Tech, Dean of the School of Communication at American University, and Gordon M. Goldstein, Adjunct Senior Fellow at the Council on Foreign Relations, (March 1st, 2021, “The Real Lesson of the Texas Power Debacle”, Lawfare, 3/1/2021, https://www.lawfareblog.com/real-lesson-texas-power-debacle)

The infrastructure was essential, ubiquitous and providing basic functionality for everything in daily life from water to heat and transportation. And in an instant it was gone, plunging tens of thousands of residents into a life-threatening crisis. This is, of course, the narrative of the recent debacle in Texas, where a winter storm overwhelmed the state’s electrical grid and brought the state to a near-total blackout. But it should also be interpreted as a preemptive warning of what Americans will face from the next generation of the internet and the new realm of cybersecurity risk it will dramatically amplify.

Both forms of infrastructure—a state-run electrical grid and the 5G and “internet of things” future to which we are rapidly hurtling—share three attributes. First, their construction reflects a lack of imagination about the danger that can quickly coalesce when seemingly remote threat scenarios become real. Second, compounding a lack of analytic imagination is an absence of preparedness. Third, for both the Texas electrical grid and the emerging internet, public policy protections are either meager or completely absent.

In planning for the resilience of its electrical grid, public officials in Texas discounted the potentially devastating disruption that could occur from unpredictable events—whether related to climate change or just a once-a-century anomaly. They also eschewed precautions other states take seriously by allowing for the interconnection of electrical grid supply chains across their borders, ostensibly because of their ideological rejection of federal regulatory oversight governing such arrangements.

As the United States builds out a new national 5G cyber-physical communications network through private service providers, Americans similarly discount the risks—myriad in their diversity and severity—that are orders of magnitude more significant than what Texas confronted recently. More physical things than people are already connected. The super empowered internet of tomorrow, known among some in the field as the “internet of everything,” will exceed by tens of billions of devices the number of connections between individuals simply communicating via social media or digital screens.

This confronts policymakers with an imminent threat: A cyber outage is no longer about losing digital communications but about losing basic societal functioning and even human life. The failure of imagination is to think of the SolarWinds attack on U.S. federal agencies and tech companies as a worst-case scenario. The failure of imagination is to think of cybersecurity through a content-centric lens rather than as possible attacks on the material world. The emergence of internet-connected cardiac devices, digitally dependent cars, and internet-connected agriculture systems portend the stakes of a cyberattack to health care, economic and social functioning, and food security.

The United States should be prepared for, and certainly not be caught by surprise by, such cyberattacks. Yet, the internet of everything is notoriously insecure. Internet-connected physical objects are not necessarily upgradeable. Nor do they come with adequate default security and encryption. The 5G infrastructure that helps connect digital objects has been at the center of debates over Chinese espionage. Industrial cyber-physical systems are based on technical standards that have not been collaboratively vetted for security and interoperability. One of the most infamous cyberattacks—the so-called Mirai botnet that took down major media sites and corporations—hijacked these insecure objects in homes to carry out the assault. The United States is not yet prepared.

Finally, in the race to conceive and deploy effective public policy responses, the U.S. government as a whole is hardly more anticipatory or synthesized in its response to potential calamity than the state of Texas. The focus of U.S. cyber policy remains on information policy issues such as disinformation, manipulation and violent speech rather than securing the digital world that now powers our material day-to-day lives. The Biden administration confronts an enormous challenge in crafting a comprehensive strategy to the cybersecurity risks foreshadowed by the ruinous experience in Texas and its management of vital infrastructure. While the digital world has leapt from two-dimensional to three-dimensional space, cyber policy has not at all jumped from 2D to 3D.

This failure of imagination, preparedness and policy protection must not be America’s cyber future; the stakes are far too high and the costs are far too great. The Texas disaster is a potent illustration of what has always been true: Our digital society and economy are extremely vulnerable and grow more porous and subject to penetration day by day. As digital sensors and cyber control systems become further embedded in physical infrastructure like energy systems, agriculture and transportation, there is no longer a separation between security of the “real” world and security of the online world. They are entangled and increasingly enmeshed—and policy has yet to catch up to either envisioning or mitigating the looming threats the U.S. confronts.

If the energy grid cannot weather a winter storm, how can it be expected to withstand a major cyberattack? What other vital forms of national infrastructure—ranging from water, bridges, highways and roads, and ultimately our day-to-day financial system—are comparably at risk? As Texas dramatizes, it is neither hyperbolic nor exaggerated to assert that our survival could now depend on securing the inevitable cyber-physical future that is accelerating with stunning rapidity.

# 2AC---Round 2

## ADV 1

### 2AC---Tech Good

#### Technological civilization is the only way to resolve existential risk

Stolyarov 12 — Gennady Stolyarov II (freelance philosophy writer and blogger, Lead Actuary in Property and Casualty Insurance for the Nevada Division of Insurance, holds a B.S. in Economics, Mathematics, and German from Hillsdale College) 4-3-2012, “Technology as the Solution to Existential Risk,” Rational Argumentator, http://www.rationalargumentator.com/index/blog/2012/04/technology-existential-risk/

What is the relationship between technology and existential risk?

Technology does not cause existential risk, but rather is the only effective means for countering it. I do not deny that existential risks are real – but I find that most existential risks exist currently (e.g., risks from asteroid impacts, a new ice age, pandemics, or nuclear war) and that technological progress is the way to remove many of those risks without introducing others that are as great or greater. My view is that the existential risks from emerging technologies are quite minor (if at all significant) compared to the tremendous benefits such technologies would have in solving the existential risks we currently face (including the biggest risk to our own individual existences – our own mortality from senescence). My essay “The Real War – and Why Inter-Human Wars Are a Distraction” describes my views on this matter in greater depth. In short, I am a techno-optimist, one who considers it imperative to restore the Victorian-era ideal of Progress as a guiding principle in contemporary societies. The problem, as I see it, is not in the technologies of the future, but in the barbarous and primitive condition of the world as it exists today, with its many immediate perils. As a libertarian, I believe that the entrepreneurship and innovation in even semi-free markets can address existential risks far more effectively than any national government – and bureaucratic management of these efforts would only hamper progress while incurring the risk of subverting the endeavors for nefarious objectives. (The National Security Agency’s recent attempt at a total surveillance state is a case in point.) But fears of technology are our greatest existential risk. They have a real potential of halting progress in many fruitful areas – either through restrictive legislation or through the actions of a few Luddite fanatics who take it upon themselves to “right” the wrongs they perceive in a world of advancing technology. I can point to examples of such fanatics already exploiting fears of technologies that are not even close to existing yet. For instance, in a post on the LessWrong blog, one “dripgrind” – a sincere and therefore genuinely frightening fanatic – explicitly advocates assassination of AI researchers and chastises the Singularity Institute for Artificial Intelligence for not engaging in such a despicable tactic. This is the consequence of spreading fears about AI technology rather than simply and calmly developing such technology in a rational manner, so as to be incapable of harming humans. Many among the uneducated and superstitious are already on edge about emerging technologies. A strong message of vibrant optimism and reassurance is needed to prevent these people from lashing out and undermining the progress of our civilization in the process. The Frankenstein syndrome should be resisted no matter in what guise it appears.

#### It's inevitable — the alternative fails and their impact’s non-unique

Kelly 16 — Kevin Kelly (founding executive editor of Wired magazine), 2016, “The Inevitable: Understanding the 12 Technological Forces That Will Shape Our Future.”

In the three decades since then, this technological convergence between communication and computation has spread, sped up, blossomed, and evolved. The internet/ web/ mobile system has moved from the fringes of society (where it was pretty much ignored in 1981) to the center stage of our modern global society. In the past 30 years the social economy based on this technology has had its ups and downs and seen its heroes come and go, but it is very clear there have been large-scale trends governing what has happened. These broad historical trends are crucial because the underlying conditions that birthed them are still active and developing, which strongly suggests that these trends will continue to increase in the next few decades. There is nothing on the horizon to decrease them. Even the forces we might think could derail them, like crime, war, or our own excesses, also follow these emerging patterns. In this book I describe a dozen of these inevitable technological forces that will shape the next 30 years. “Inevitable” is a strong word. It sends up red flags for some people because they object that nothing is inevitable. They claim that human willpower and purpose can— and should!— deflect, overpower, and control any mechanical trend. In their view, “inevitability” is a free will cop-out we surrender to. When the notion of the inevitable is forged with fancy technology, as I do here, the objections to a preordained destiny are even more fierce and passionate. One definition of “inevitable” is the final outcome in the classic rewinding thought experiment. If we rewound the tape of history back to the beginning of time and reran our civilization from the start again and again, a strong version of inevitability says that, no matter how many times we reran it, every time we end up with teenagers tweeting every five minutes in 2016. That’s not what I mean. I mean inevitable in a different way. There is bias in the nature of technology that tilts it in certain directions and not others. All things being equal, the physics and mathematics that rule the dynamics of technology tend to favor certain behaviors. These tendencies exist primarily in the aggregate forces that shape the general contours of technological forms and do not govern specifics or particular instances. For example, the form of an internet— a network of networks spanning the globe— was inevitable, but the specific kind of internet we chose to have was not. The internet could have been commercial rather than nonprofit, or a national system instead of international, or it could have been secret instead of public. Telephony— long-distance electrically transmitted voice messages— was inevitable, but the iPhone was not. The generic form of a four-wheeled vehicle was inevitable, but SUVs were not. Instant messaging was inevitable, but tweeting every five minutes was not. Tweeting every five minutes is not inevitable in another way. We are morphing so fast that our ability to invent new things outpaces the rate we can civilize them. These days it takes us a decade after a technology appears to develop a social consensus on what it means and what etiquette we need to tame it. In another five years we’ll find a polite place for twittering, just as we figured out what to do with cell phones ringing everywhere. (Use silent vibrators.) Just like that, this initial response will disappear quickly and we’ll see it was neither essential nor inevitable. The kind of inevitability I am speaking of here in the digital realm is the result of momentum. The momentum of an ongoing technological shift. The strong tides that shaped digital technologies for the past 30 years will continue to expand and harden in the next 30 years. These apply to not just North America, but to the entire world. Throughout this book I use examples from the United States because readers will be more familiar with them, but for each I could have easily found a corresponding example in India, Mali, Peru, or Estonia. The true leaders in digital money, for example, are in Africa and Afghanistan, where e-money is sometimes the only functioning currency. China is way ahead of everyone else in developing sharing applications on mobile. But while culture can advance or retard the expression, the underlying forces are universal.

### Sustainable — 2AC

#### Growth is sustainable – climate change is shifting economic incentives towards reducing emissions due to portfolio risks and consumer backlash. Companies will self-regulate and shift political currents towards reform.

Henderson 20, John and Natty McArthur University Professor @ Harvard (Rebecca, May/June Issue, “The Unlikely Environmentalists: How the Private Sector Can Combat Climate Change,” Foreign Affairs, https://www.foreignaffairs.com/articles/world/2020-04-13/unlikely-environmentalists)

There’s a reason climate change is often described as a “wicked problem.” Fully decarbonizing the economy will require not only completely transforming the global energy infrastructure, at a cost of many trillions of dollars, but also retrofitting all of the world’s buildings, remaking the planet’s agricultural practices, and revolutionizing transportation systems. It is difficult to see how this can be accomplished without some kind of global carbon tax or regulatory regime. But putting such a system in place is proving to be enormously difficult. The 2015 Paris agreement on climate change was a good first step, but many countries show little sign of meeting the commitments they made as part of that agreement, and the United States’ withdrawal from the process has presented a significant barrier to further progress. Given the slowing global economy and the slide toward populism and nationalism in much of the world, the prospects for any kind of comprehensive global accord seem increasingly remote. So far, at least, the public sector is failing to confront the problem.

But the private sector has begun to step in to fill the vacuum. In January, Larry Fink, the CEO of BlackRock, the largest asset manager in the world, declared that “climate risk is investment risk” and announced that going forward BlackRock would ask every firm in its portfolio to disclose its carbon emissions. BlackRock has roughly $7 trillion under management and is one of the largest shareholders in nearly every publicly traded firm in the world. So companies around the world paid attention when Fink went on to say that BlackRock would consider voting against boards whose firms “do not make sufficient progress” in addressing climate-related risks and would cease to invest altogether in some fossil fuel projects.

Fink is not alone. Many of the world’s largest asset owners are coming to the conclusion that climate change is the most important risk to the long-term health of their portfolios. More than a third of global invested capital—about $19 trillion—is controlled by the world’s 100 largest asset owners. Nearly two-thirds of this money is in pension funds; the remaining third is in sovereign wealth funds. These funds are now so large that they are sometimes referred to as “universal owners” or “universal investors” since, in effect, they hold the entire market. For that reason, they cannot diversify away from the risk of climate change—a risk that Mark Carney, who until earlier this year was the governor of the Bank of England, suggested could result in an abrupt financial collapse, potentially wiping out as much as $20 trillion of assets. To avert that kind of calamity, major asset owners are starting to push the companies in their portfolios to address climate change.

This trend is not driven by altruism or a deep commitment to the environment: it’s a function of economic interests. For the world’s largest asset owners, climate change is not an externality—it is a profound threat to their long-term returns. It will, after all, be significantly harder to make money in a world where most of the major ports are underwater, harvests are failing on a routine basis, and hundreds of millions of people are on the move.

As more and more major asset owners come to this realization, it is creating increasingly strong incentives for them to cooperate with one another in support of large-scale decarbonization. Together, they are pressing the firms in their portfolios to set concrete targets for emission reductions and to make progress toward meeting those targets, potentially solving the problem posed by firms’ unwillingness to cut their emissions unless they can be assured that their competitors will follow suit. Someone, however, will need to monitor that progress and sanction firms that lag behind—a role that would be best filled by government regulators. The need for such public-sector involvement will likely increase private-sector support for the policy changes required to drastically reduce carbon emissions. In this way, private-sector pressure may serve as the force that finally breaks the political logjam that has long blocked the public action needed to solve the climate crisis.

MONEY TALKS

One of the most promising examples of what this might look like in practice is Climate Action 100+, a nonprofit affiliation of more than 300 investors who collectively control nearly half of the world’s invested capital. The group was founded in 2017 with the goal of persuading the world’s 100 largest private-sector carbon emitters to “cut the financial risk associated with catastrophe” by putting in place board-level processes to assess their climate-related risks and oversee plans for dealing with them, pledging to clearly disclose those risks, and taking action to reduce greenhouse gas emissions across their value chains rapidly enough to help meet the Paris agreement’s goal of limiting the increase in the global average temperature to well below two degrees Celsius.

In December 2018, a group of investors belonging to Climate Action 100+ published a letter in the Financial Times listing some specific steps they were demanding of companies in which they invest, including “the rapid elimination of coal use by utilities in EU and OECD [Organization for Economic Cooperation and Development] countries by no later than 2030.” Six months later, investors from the consortium pushed the oil giant Shell to announce short-term targets for limiting its greenhouse gas emissions and persuaded BP to support a shareholder resolution that binds the oil company to disclose the carbon intensity of its products, the methodology it uses to consider the climate impact of new investments, and its plans for setting and measuring emission targets. More than half of the 40 oil and gas companies with which the group has engaged have set long-term quantitative targets for reducing their emissions. And the group has helped persuade the shipping giant Maersk and two of the world’s largest mining companies, ArcelorMittal and Thyssenkrupp, to commit to becoming carbon neutral by 2050.

These kinds of commitments are sometimes dismissed as mere greenwashing: public relations stunts designed to buy time. And sometimes they are. But they might also help catalyze an economic transformation that could play a major role in arresting climate change.

Of course, large asset holders are not the only players who shape a company’s incentives: employees and consumers do, as well, and they are increasingly insisting that firms go green—and rewarding them when they do. For example, after the consumer goods giant Unilever announced that it planned to cut its carbon footprint in half and double its revenue at the same time—and then followed through by transforming its operations, brand by brand—the firm joined Facebook, Google, and Microsoft on LinkedIn’s list of the ten most desirable employers in the world. Sales of Unilever’s “sustainable living” brands—which include Ben & Jerry’s, Dove, and Vaseline and which Unilever claims “contribute to achieving the company’s ambition of halving its environmental footprint”—are growing 69 percent faster than the rest of the business and providing 75 percent of the company’s growth.

Shifting public attitudes about climate change and public policies intended to combat it have also created clear business opportunities. Solar and wind energy are both multibillion-dollar businesses. The market for plant-based alternatives to meat is exploding. And global recycling could generate close to $400 billion in the next five years.

RISKY BUSINESS

But embracing the innovation that is required to exploit new opportunities is often risky and expensive. The venture capital industry lost at least $10 billion between 2005 and 2011 investing in clean energy technology. An electric utility that commits to phasing out coal plants might reap the benefits of declining solar and wind energy costs, but it could also misjudge the market and significantly increase its costs. An automobile company that invests in developing electric vehicles might leap ahead of its competitors, but it could also risk losing out to more cautious rivals.

Universal investors can help mitigate those risks by funneling capital to firms that are willing to make the first move. This can be transformational in itself, since companies that decide to embrace new opportunities can often persuade an entire industry to follow them. Walmart’s massive investments in energy saving and waste reduction, for example, have helped persuade many other companies to take similar steps. Since 2010, the price of battery storage has fallen by at least 73 percent, a change driven largely by the electric vehicle company Tesla’s significant investments in the technology, which spurred the company’s competitors to invest more than $90 billion in the development of electric vehicles.

Major asset holders can also push companies to commit to aggressive targets for decarbonizing their business models and insist that they report on their progress. In this way, universal investors may be able to force every firm in an industry to act, solving the collective action problem inherent in tackling climate change. Firms don’t naturally act collectively—for all kinds of reasons, including antitrust law. But when there exists a clear business case for doing so and cooperation can be credibly enforced, voluntary cooperation can be an effective means of creating or preserving public goods. Nearly half of the world’s inshore fisheries are managed through some form of cooperative agreement. Most of the rules governing international trade are designed and enforced by the International Chamber of Commerce, a voluntary association founded in 1919.

Some of the world’s largest firms are increasingly exploring whether these kinds of voluntary agreements might be an effective way to reduce emissions. For example, after Unilever came under pressure from activists to stop using palm oil, the cultivation of which contributes to deforestation, Paul Polman, who was then the company’s CEO, was able to persuade many of his fellow consumer goods CEOs that continuing to purchase conventionally produced palm oil presented a significant threat to their own brands. Partly as a result, more than 60 percent of the world’s traded palm oil is now covered by sustainability commitments. Similar agreements with respect to soy and beef have greatly slowed rates of deforestation in the Amazon River basin. And companies in industries as diverse as airlines, food, retail, apparel, travel, hospitality, construction, health care, and high technology have begun to coordinate to reduce carbon emissions across supply chains, so that no single firm is placed at a disadvantage by going green.

Such arrangements produce a wealth of knowledge about what effective decarbonization might look like on the ground. As one might expect, however, they are often unstable and difficult to enforce, since no mechanism exists through which to punish firms that drag their feet or refuse to conform. Here, universal investors might be able to make a significant difference by acting as enforcers. If BlackRock, for example, follows through on its threat to vote against the boards of companies that do not adequately disclose their climate emissions, every major firm in every industry will be forced to report—in an auditable, replicable way—the degree to which it is meeting its commitments. And if the world’s major investors then vote against the boards of those companies that are falling behind, investors could catalyze the transformation of entire industries.

THE EARTH LOBBY

Arresting climate change will still require government action, of course, and the changes afoot in finance and the corporate world could ease the path. As firms commit to reducing their carbon emissions, they are increasingly recognizing that the most effective way to ensure that they are not undercut by lagging companies is to press for regulation. Together, they are creating a constituency for effective climate policy.

In 2017, for example, when U.S. President Donald Trump declared that he was going to withdraw the United States from the Paris agreement, the CEOs of more than 50 U.S. companies, including Apple, Gap, Google, HP, and Levi Strauss, published an open letter urging him to rethink the decision. When Trump stuck to his plan, Elon Musk, the CEO of Tesla, and Bob Iger, then the CEO of Disney, resigned from some of the president’s advisory councils in protest. More than 2,000 companies have joined a collaborative effort called “We Are Still In,” a group working to ensure that the United States meets its commitments under the agreement despite the administration’s withdrawal. The group includes not only businesses but also states, cities, religious organizations, and universities. Together, they represent 68 percent of U.S. GDP, 65 percent of the U.S. population, and the source of more than half of all U.S. carbon emissions. Such action independent of the federal government could make a big difference. According to America’s Pledge, a nongovernmental organization that tracks local progress toward emission reductions, the “full achievement of already on-the-books policies from state and local actors—paired with rapidly shifting economics in the power sector—would reduce emissions 19 percent below 2005 levels by 2025 and 25 percent below 2005 levels by 2030.” This would be a significant step toward the approximately 50 percent reduction in emissions that the UN’s Intergovernmental Panel on Climate Change estimates is necessary to avoid the most dangerous potential outcomes of climate change.

These efforts and others like them also have the potential to change the nature of the political conversation around climate change. In an increasingly partisan world, firms occupy a unique position. According to the 2019 Edelman Trust Barometer, an annual survey measuring credibility and trust, business is now the world’s most trusted institution, and 71 percent of employees around the world agree that “it is critically important” for the CEOs of their companies “to respond to challenging times.” A broad-based movement among the world’s biggest companies to tackle climate change could help legitimate the idea that climate change is a real danger, that acting to avert it could be a major driver of innovation and economic growth, and that appropriate public policy could be enormously helpful.

Such a movement could also put increasing pressure on companies that resist decarbonizing. One of the reasons that climate regulation has stalled in the United States is that a small minority of firms have invested billions of dollars in actively lobbying against it. If their peers start to push for regulation and highlight the dangers inherent in continuing with business as usual, those laggards will be compelled to change their behavior. One day soon, flooding the political process with money to defend the burning of fossil fuels could be seen as an unacceptable reputational risk—or even as morally indefensible.

For many years, experts have assumed that the fastest and most efficient route to global decarbonization is coordinated state action. But as the world’s political institutions have come under pressure, such action has become increasingly elusive. Against this background, the growing understanding that climate change presents a profound threat to the long-term returns of the world’s largest asset owners provides some reason for hope. As investors push for change and the realization dawns in more and more boardrooms that the benefits of climate action will outweigh the costs, it is possible that leading-edge firms could trigger a cascade of reinforcing reforms, transforming the economics of individual industries and creating a significant constituency for political action. For decades, when it came to addressing climate change, large asset holders and big companies acted more as obstacles than as catalysts. Those days may soon be over.

### Tech Solves — 2AC

#### Growth solves warming – global trends in price and diffusion guarantee a confluence of emission reducing technologies that will stave off catastrophic climate change.

Azevedo et al. 20, Associate Professor of Energy Resources Engineering @ Stanford (Inês, Michael R. Davidson, Jesse D. Jenkins, Valerie J. Karplus, and David G. Victor, May/June Issue, “The Paths to Net Zero: How Technology Can Save the Planet,” *Foreign Affairs*, https://www.foreignaffairs.com/articles/2020-04-13/paths-net-zero)

For 30 years, diplomats and policymakers have called for decisive action on climate change—and for 30 years, the climate crisis has grown worse. There are a multitude of reasons for this failure. The benefits of climate action lie mostly in the future, they are diffuse and hard to pin down, and they will accrue above all to poor populations that do not have much of a voice in politics, whether in those countries that emit most of the world’s warming pollution or at the global level. The costs of climate action, on the other hand, are evident here and now, and they fall on well-organized interest groups with real political power. In a multipolar world without a responsible hegemon, any collective effort is difficult to organize. And the profound uncertainty about what lies ahead makes it hard to move decisively.

These political hurdles are formidable. The good news is that technological progress can make it much easier to clear them by driving down the costs of action. In the decades to come, innovation could make severe cuts in emissions, also known as “deep decarbonization,” achievable at reasonable costs. That will mean reshaping about ten sectors in the global economy—including electric power, transportation, and parts of agriculture—by reinforcing positive change where it is already happening and investing heavily wherever it isn’t.

In a few sectors, especially electric power, a major transformation is already underway, and low-emission technologies are quickly becoming more widespread, at least in China, India, and most Western countries. The right policy interventions in wind, solar, and nuclear power, among other technologies, could soon make countries’ power grids far less dependent on conventional fossil fuels and radically reduce emissions in the process.

Technological progress in clean electricity has already set off a virtuous circle, with each new innovation creating more political will to do even more. Replicating this symbiosis of technology and politics in other sectors is essential. In most other high-emission industries, however, deep decarbonization has been much slower to arrive. In sectors such as transportation, steel, cement, and plastics, companies will continue to resist profound change unless they are convinced that decarbonization represents not only costs and risks for investors but also an opportunity to increase value and revenue. Only a handful have grasped the need for action and begun to test zero-emission technologies at the appropriate scale. Unless governments and businesses come together now to change that—not simply with bold-sounding international agreements and marginal tweaks such as mild carbon taxes but also with a comprehensive industrial policy—there will be little hope of reaching net-zero emissions before it’s too late.

THE FUTURE IS ELECTRIC

From today’s vantage point, no single domain offers greater opportunities for deep decarbonization than electric power. The use of electricity does not increase or reduce emissions in itself; electricity delivers energy that may or may not be clean depending on how it was generated. An electric car, for instance, doesn’t do much good against global warming if all the electricity comes from conventional coal plants. Still, electrifying the economy—in other words, designing more processes to run on electricity rather than the direct combustion of fuels—is essential. This is because, compared with trying to reduce emissions in millions of places where they might occur, it is far easier and more efficient to reduce emissions at a modest number of power plants before distributing the clean electricity by wire. Today, Western economies convert about 30 percent of their energy into electric power. If they want to get serious about decarbonization, that fraction will need to double or more.

Getting there will require progress on two fronts. The first is the electrification of tasks that use vast amounts of energy but still rely on fossil fuels, such as transportation and heating. Overall, transportation accounts for 27 percent of global energy use, and nearly all of it relies on oil. The car industry has had some success in changing this: the latest electric vehicles rival high-end conventional cars in performance and cost, and electric cars now make up around eight percent of new sales in California (although only 1.3 percent nationwide) and nearly 56 percent in Norway, where the government offers massive subsidies to buyers. With improved batteries, heavier-duty vehicles, including buses and trucks, could soon follow. In fact, China already fields a fleet of over 420,000 electric buses. By contrast, aviation—which makes up only two percent of global emissions but is growing rapidly and creates condensation trails in the sky that double its warming effect—presents a tougher challenge. A modern battery can store only two percent of the energy contained in a comparable weight of jet fuel, meaning that any electric airplane would need to carry an extremely heavy load in batteries to travel any reasonable distance. Even in the best-case scenario, commercial electric aviation at significant scale is likely decades away, at least for long-haul flights. Long-distance shipping also faces challenges so daunting that electrification is unlikely to be the best route. And in each of these areas, electrification is all the more difficult because it requires not only changing the conveyances but also building new charging infrastructures.

Besides transportation, the most important electrification frontier is heating—not just in buildings but as part of industrial production, too. All told, heating consumes about half the raw energy that people and firms around the world use. Of that fraction, some 50 percent goes into industrial processes that require very high temperatures, such as the production of cement and steel and the refining of oil (including for plastics). These sectors will continue to rely on on-site fossil fuel combustion for the foreseeable future, since electricity cannot match the temperature and flexibility of direct fuel combustion. Yet in other areas, such as lower-temperature industrial processes and space heating for buildings, electrification is more practical. Heat pumps are a case in point: whereas conventional heaters work by heating up indoor air, heat pumps act like reversible air conditioners, moving heat (or, if necessary, cold) indoors or outdoors—a far more efficient approach.

Electrification, of course, will not on its own reduce emissions by much unless the power grid that generates and distributes the electricity gets cleaner, too. Ironically, some countries have made modest progress on this front even as they have doubled down on fossil fuels. China, for instance, has swapped out aging coal plants with newer, more efficient ones, cutting emission rates in the process. (The country’s most efficient coal plants now emit less carbon dioxide per unit of electricity than comparable U.S. plants.) The United States, for its part, has cut down on its emissions thanks to innovations in horizontal drilling and fracking that have made it economically viable to extract shale gas. In 2005, when this technology first became commercially relevant, coal accounted for half of all the electricity produced in the United States; today, coal’s share is down to one-quarter, with much cleaner and inexpensive natural gas and renewables making up the difference.

In theory, fossil fuels could still become much cleaner, even nearly emission free. This could be possible with the help of so-called carbon capture and storage (CCS) technologies, which capture the carbon dioxide emissions created by industrial processes and pump it safely underground. In practice, investors have remained wary of this approach, but in both the United States and some European countries, recently introduced subsidies are expected to unleash a wave of new CCS projects in the years ahead. One CCS scheme, currently being tested by a group of engineering and energy firms, completely rethinks the design of power plants, efficiently generating electricity from natural gas while capturing nearly all the carbon dioxide produced in the process at little extra cost. In regions where natural gas is cheap and abundant, this technology could be a game changer.

For now, improved fossil fuel technology has amounted to shallow decarbonization: it has reduced emissions enough to slow the rate of climate change—in the United States, emissions from the power sector have dropped by 29 percent since 2005 thanks mainly to the shale gas revolution and growth of renewables—but not enough to stop it. To prevent the world from warming further will require much more focus on technologies that have essentially zero emissions, such as wind, solar, hydroelectric, and nuclear power, in addition to CCS, if it proves commercially scalable. According to the United Nations’ Intergovernmental Panel on Climate Change, these low-carbon technologies would need to generate 80 percent of the world’s electricity by 2050 (up from about one-third today) in order to limit warming to two degrees Celsius above preindustrial levels.

Renewables, in particular, will play a central role. Thanks to decreases in the cost of wind and solar power equipment—and thanks to a mature hydroelectric power industry—renewable energy already accounts for over one-quarter of global electricity production. (Nuclear provides another ten percent.) In the United States, the cost of electricity from large solar farms has tumbled by 90 percent since 2009, and wind energy prices have fallen by nearly 70 percent—and both continue to drop.

Given those plunging costs, the main challenge is no longer to make renewables cheap; it is to integrate them into the power grid without disruptions. To avoid blackouts, a power grid must align supply and demand at all times. Energy output from wind and solar plants, however, varies with the weather, the season, and the daily rise of the sun. The more a power grid relies on renewables, then, the more often the supply will not match the demand. In the extreme, extra power must be dumped—meaning that valuable capital and land were used inefficiently. To be less vulnerable to such shocks, utility companies will need to expand the size of their power grids, so that each can draw on a larger and more diverse array of energy sources. In order to deal with excess supply from renewables—a condition that will become much more frequent as the share of renewables rises—they must also create incentives for users to vary their demand for power more actively and find ways to store surplus electricity on a much larger scale. Today, nearly all bulk storage capacity takes the form of hydroelectric pumps, which store electricity by moving water uphill and recovering about 80 percent of the power when it flows back down. In the years ahead, soaring demand for electric vehicles will drive down the cost of lithium-ion batteries; those batteries could become an affordable way to store energy at the grid level, too. And as the need for storage increases, even cheaper methods may come on the market.

To better integrate renewables, policymakers can also rely on the strategic use of another zero-emission technology: nuclear energy. Although most efficient when running flat out 24 hours a day, nuclear power plants can also operate flexibly to cover the supply gaps from wind and solar power. Some of France’s nuclear reactors, for instance, already cycle from about one-quarter to full power and back again, sometimes twice a day, to compensate for fluctuations in the supply and demand of renewables.

Independent of renewables, nuclear power already contributes massively to cleaner grids. Every year, some 440 operational nuclear reactors account for lower global carbon dioxide emissions of an estimated 1.2 billion metric tons. In the United States, research suggests that keeping most existing nuclear plants open would be far less expensive than many other policy options. In fact, most countries would do well to expand their nuclear power even further to cut back on their emissions. In the West, however, major expansions are not on the horizon: public opposition is strong, and the cost of building new reactors is high, in part because countries have built too few reactors to benefit from the savings that come with repetition and standardization. Yet in other parts of the world—especially China and South Korea, which have more active nuclear power programs—the costs are much lower and public opposition is less pronounced. Moreover, whereas countries once designed and built their own reactors, today many simply import them. That model can create new risks—the sector’s leading exporter today is Russia, a country not renowned for its diligence regarding reactor safety or the security of nuclear materials—but it also has the potential to make commercial nuclear technology available to many countries that could not develop and deploy it safely on their own. Abu Dhabi’s purchase of four gigantic South Korean–built reactors, the first of which is set to start operating next year, shows the promise of this model. The same approach could work for other countries that currently satisfy their large energy needs with fossil fuels, such as Saudi Arabia.

When it comes to the precise technological makeup of a future decarbonized economy, expert opinions diverge. Engineers and economists, for the most part, imagine solutions that bundle several approaches, with both CCS and nuclear power acting as important complements to renewables. Political scientists, on the other hand, tend to see a bigger role for renewables—one of the few areas in energy policy that usually garners support from across the ideological spectrum, including in the United States. Yet even this rather popular solution can prove divisive. Fierce debates rage over where to locate generators such as wind turbines, including among putative environmentalists who support the technology only if they don’t have to look at it. Public opposition to new wind turbines in Norway—even in already industrialized areas—and to offshore wind parks in the eastern United States are harbingers of tough siting fights to come. The same issue arises when it comes to power lines: making the most of renewables requires longer, more numerous power lines that can move renewable power wherever it will be needed, but public opposition can make such grid expansions a bureaucratic nightmare. In California, for example, the most recent big power line designed to move renewable power where it will be useful—in that case, from the sunny desert to San Diego—took a decade to build, even though the technical engineering and construction portion of the project should have consumed no more than two years. China, by contrast, has blown past the efforts of the United States and Europe, with dozens of ultrahigh-voltage lines, most of them built in the last decade, crisscrossing the country.

THE GREAT UNKNOWNS

Political obstacles notwithstanding, expanding the electrification of transportation and heat and the production of low-carbon electricity offers the surest path to a clean economy to date. The latest analysis by the Intergovernmental Panel on Climate Change, for instance, suggests that more pervasive use of clean electricity in the global economy would cover more than half the cuts needed for deep decarbonization. Yet just how big a role electrification will ultimately play is hard to predict—in part because its impact will depend on the future trajectory of rival solutions that are only just beginning to emerge and whose potential is impossible to assess precisely.

Hydrogen, in particular, could serve much the same function as electricity does now in carrying energy from producers to users—and it offers crucial advantages. It is easier to store, making it ideal for power systems dependent on ever-fluctuatingsupplies of renewable energy. And it can be burned—without producing any new emissions—to generate the high levels of heat needed in heavy industry, meaning that it could replace on-site fossil fuel combustion in sectors that are hard to electrify. Hydrogen (either in its pure form or mixed with other chemicals) could also serve as liquid fuel to power cars, trucks, ships, and airplanes. A zero-emission economy could integrate the two carriers—electricity and hydrogen—using each depending on its suitability for different sectors.

The technology needed to turn hydrogen into an energy carrier already exists in principle. One option is to break up (or electrolyze) water into its constituent elements, hydrogen and oxygen. The hydrogen could then be stored or transported through the natural gas pipeline networks that already string across all advanced economies. Once it reached its user, it would be burned for heat or used as an input for a variety of chemical processes. So far, this approach is too expensive to be viable on a large scale, but growing investment, especially in Europe, is poised to drive down the cost rapidly. Initial tests, including planned networks of hydrogen pipelines outside Stockholm (for making steel), Port Arthur in Texas (for industrial chemistry), the British city of Leeds (for residential heat), and the Teesside area (for several applications, including power generation) and numerous other ventures, will soon yield more insights into how a real-world hydrogen economy would fare.

CCS is somewhat of a wildcard, too. Some industrial processes produce prodigious and highly concentrated streams of carbon dioxide emissions that should be relatively easy to isolate and capture. The production of cement, which accounts for a whopping four percent of global carbon dioxide emissions, is a good example. But firms operating in global commodity markets, where missteps can be economically disastrous, are hesitant to invest in fledgling systems such as CCS. To change that, state-supported real-world testing is overdue. A nascent Norwegian project to collect carbon dioxide from various industrial sources in several northern European countries and inject it underground may provide some answers.

Another promising area for reducing emissions is agriculture, a field in which advances on the horizon could yield large cuts. More precise control over the diets of animals raised for food—which will probably require more industrial farming and less free grazing—could lead cows, sheep, and other livestock to emit less methane, a warming gas that, pound for pound, is 34 to 86 times as bad as carbon dioxide. (It would also help if people ate less meat.) Meanwhile, a host of changes in crop cultivation—such as altering when rice fields are flooded to strategically determining which engineered crops should be used—could also lower emissions.

Agriculture’s biggest potential contribution, however, lies belowground. Plants that engage in photosynthesis use carbon dioxide from the air to grow. The mass cultivation of crops that are specially bred to grow larger roots—a concept being tested on a small scale right now—along with farming methods that avoid tilling the soil, could store huge amounts of carbon dioxide as underground biomass for several decades or longer.

As the hard reality of climate change has set in, some have begun to dream of technologies that could reverse past emissions, such as “direct air capture” machines, which would pull carbon dioxide from the atmosphere and store it underground. Pilot projects suggest that these options are very costly—in part because it is thermodynamically difficult to take a dilute gas from the atmosphere and compress it into the high concentrations needed for underground storage. But cost reductions are likely, and the more dire the climate crisis becomes, the more such emergency options must be taken seriously.

## K---Logistics

### 2AC---Link

#### Activism against logistics is possible, good, and can use the state, but it requires engaging and understanding the details of the system to form strategies of diversion at the individual and macro level

Quet 18

(Mathieu, CEPED at Paris Descartes University – IRD and CSSP at Jawaharlal Nehru University, “Pharmaceutical Capitalism and its Logistics: Access to Hepatitis C Treatment,” Theory, Culture & Society, Volume 35, Issue 2, March 2018, Snider)

Greg Jefferys’ story illustrates the modalities of individual engagement with logistical capitalism. One might note that as soon as he went back to Australia he started receiving emails from people from around the world so that his individual act acquired a collective importance. It invites us to look at engagement with circulation not only as an individual gesture but as a broader collective practice of critique and contestation of certain forms of organization. This practice of critique can be analyzed at different levels. Here I will discuss two: the level of self-organized patients’ groups and the level of the state. The first level of opposition and conflict that can be presented here is the level of civil society, through the experience of ‘buyers’ clubs’. The principle of a buyers’ club is to organize parallel imports between countries, understanding different levels of pricing or accessibility to medicines. This activity, being mostly based upon health access activism, generates little or no profit for those involved, yet every treatment channeled this way constitutes a loss for the patent owner. Of course the pharmaceutical companies are aware of the financial risk raised by tiered pricing and geographical restrictions. Therefore, they also tolerate this as part of their strategy – and yet the line between ‘some leakage’ and ‘large leaks’ is not easily drawn. The executive vice president for corporate and medical affairs of Gilead declared: ‘Some leakage is a given, our goal isn’t to stop it 100 percent; if we wanted that, we’d do it the draconian way and not be in the country at all. But we do want to stop large leaks.’12 Interestingly, this practice is not new: it had been developed in the 1990s and early 2000s, particularly with anti-HIV treatment, for reasons of cost or availability (Nguyen, 2010; Egrot, 2014; Taverne and Egrot, 2014). It has subsequently been practiced in different ways: from Brazil or India to sub-Saharan Africa and from Europe to sub-Saharan Africa, most notably. It has been common practice in the networks of AIDS activism, as this remark from an Indian AIDS activist illustrates: ‘Since hepatitis C came, this thing [buyers’ clubs] comes up. But I have been doing this for the last 10 to 15 years!’ (AIDS activist 1, interview). However, in the case of anti-hepatitis C medicines, several aspects indicate the novelty or renewal of this practice. First, the use of the internet has offered the possibility to create networks of buyers and distributors very easily. As another activist involved in a buyers’ club in India explained to me: ‘this is the beauty of internet. We are people from different continents, taking part in the same project. We have met only once but we managed to set up a very efficient organization’ (AIDS activist 2, interview). It has offered the possibility of connecting many people to buyers’ clubs without their having to actually move to another country. Greg Jefferys is, for instance, offering through his blog to connect patients to his contacts in India in order to get cheaper medicines. He also emphasizes the fact that many people are contacting him from all over the world. The second aspect of this renewal is the pressure applied by anti-hepatitis C groups on their governments, with the threat of resorting to buyers’ clubs, given the huge differences in price and the selection processes put in place by national health insurances. For instance in France, the group SOS He´patites threatened the Ministry of Health in an open letter to resort to parallel imports if nothing was done in the shortest time possible: We made tests showing no difficulty to import generic treatment for individuals. We therefore imported such treatments. SOS He´patites is available for questions regarding further analysis. We are well aware that importing medicines is regulated by the law, and we know the risks of counterfeiting. This is your responsibility.13 The third aspect of this renewal was mentioned by an activist during an interview and shows that the fight for access to medicines is also pushed by newly emerging strategies: I think a lot of activists who are part of anti-HIV movements got institutionalized. They get so stuck on ‘quality issues’ that they cannot move. But new people are coming who have no idea about all these rules, and they say: ‘OK the medicines are available let’s go and get them’. And that’s what I really like about Hep C because a lot of us in the HIV movement are always waiting for the drugs to be prequalified by MSF or WHO before even offering to try to get it for persons who are dying. With Hep C these questions, the fear of quality and rules have disappeared and the new activists don’t conform to rules, because we have no time and we have to make choices now. (AIDS activist 2, interview) The last important point of renewal concerns growing interest in the question of importing only the active principle ingredients (and not the finished product) in order to compound the medicine by oneself. Greg Jefferys explains: Up until December 2015 [before the availability of Indian generics] a lot of people did take the Hep C API treatment option and imported APIs from China, mostly from Mesochem, a large company that specializes in making the APIs for all kinds of drugs, including Hep C medicines. Mesochem made the pure active ingredients; 99.9% pure Sofosbuvir and Ledipasvir and Daclatasvir.14 For these reasons, the organization of buyers’ clubs in the case of hepatitis C treatment gives ‘diversion’ as a mode of political engagement a particular and somehow new meaning. One central issue raised by the people involved in buyers’ clubs is that of diverting logistics. One activist told me he started sending Indian generic sofosbuvir abroad in September 2015. At the time of the interview in May 2016 he was sending about 100 treatments a month to patients around the world: in European countries, in South America, in Central Asia and so forth. He first mentioned very clearly the importance of logistical knowledge in such an activity: What helped me in running the buyers’ club is the work I have been doing in my former organization on the logistics of medicines, the knowledge I got there. And that helped me to go out and assist other patients too. (AIDS activist 3, interview) Most of the time he spent on the issue was dedicated to finding out: 1) how to organize the transit and deposit of money; 2) how a treatment could cross the borders of a country: For instance if you are asking from Serbia it can be difficult. But if you have a friend in Romania it’s easier: I can send the medicines there. Many Serbian people have friends in Romania, then they can come to Romania and go back. Because the custom officers will not allow the medicines alone to get in Serbia, even with a prescription. So I see with the Serbian patients if they have friends that can help them in Romania and then I send the packages. Getting the medicines to a given country also implies the ability of first getting them out of India, and therefore organizing shipments in order not to raise the customs’ interest: From where I am based now, we are getting from three ports. It goes through different customs officers and that is a very good point. I also segregated my parcels via different transporters in order to make them less visible. Most importantly, this logistical activity is definitely considered as a way of overcoming the restrictions imposed by the pharmaceutical firms and the governments: I told my family: ‘bear very clearly in mind that I am not dealing with narcotics. These are completely legal drugs. What we are fighting is the geographical restrictions which have been laid down by the Big Pharma. ...I know there are grey areas through which I’m working but it has to be done. Someone has to take the sword in his hands. It’s not possible to sit back and relax and to let the companies or the capitalists make the rules and regulations on who survives and who doesn’t.’ Patients abroad also become involved in these logistic issues, therefore participating in a collective movement. As my interlocutor explained: ‘My contacts are other people. For instance, in the UK, one hepatitis C patient came to know me via another friend and now he is arranging with other people from his country. It is similar in other countries.’ One can mention here the case of C, a French patient who received the treatment before the French government declared there would be universal access – a declaration followed in the first time only by an improvement in access and not by full coverage, as noted by Chabrol et al. (2017). C was 15 in 2013 when she was diagnosed with hepatitis C. She had to wait for two and a half years before getting the treatment, and she got weaker and very depressed. But she followed a lot of Hep C advocacy groups via multiple online forums. She learned about Greg Jefferys’ experience and decided to take it upon herself to obtain the medicines. First, her parents had to be convinced – since they were not keen on infringing the law and were cautious about the quality of medicines bought from abroad in an illegal way. Once C convinced them, she contacted someone via a forum and this person sent her the first part of the treatment from someone based in England. Only two-thirds of the treatment were available at the time, and so a few weeks later she travelled to Paris with her father and boyfriend to get the remainder of the treatment, from another person whose contact she got via a buyers’ club and who was a French national coming back to France after a journey to India (Hep C patient, interview). In this short story, diversion logistics are far from simple: medicines move in segments and follow different routes, and people have to be able to move to benefit from them. However, what remains is the idea that simultaneously these erratic trajectories recompose access conditions within the context of enclosed markets. The story of Greg Jefferys and the case of buyers’ clubs illustrate stimulating ways of engaging with logistic regimes. They underline the importance of locating protest within supply chains and distribution routes as an answer to the limitations imposed by the regimes. In this sense, trajectories matter as much as access per se. However, one should not overstate such individual or collective actions and thus underplay the importance of the state, which exists as another crucial level of critical engagement against the logistic regime. At the state level, we have seen earlier that Gilead had imposed prices given its strong position on the market. In a way, statism and capitalism cooperate together.

### 2AC---Impact---Defense

#### Their terminal impact is so reductive that’s it’s useless for political analysis – ignores context and history.

Chandler 09 [David, Professor of International Relations at the Department of Politics and International Relations, University of Westminster, War Without End(s): Grounding the Discourse of `Global War', Security Dialogue 2009; 40; 243] JCH-PF

For many critical post-structuralist theorists, the ‘global war on terror’ reveals the essence of liberal modernity and fully reveals the limits of its universalist ontology of peace and progress, where the reality of Kant’s ‘perpetual peace’ is revealed to be perpetual war (Reid, 2006: 18). Perhaps the most radical abstract framing of global war is that of Giorgio Agamben. In his seminal work, Homo Sacer, he reframed Foucault’s understanding of biopower in terms of the totalizing control over bare life, arguing that the ‘exemplary places of modern biopolitics [were] the concentration camp and the structure of the great totalitarian states of the twentieth century’ (Agamben, 1998: 4; see also Chandler, 2009a). Agamben’s view of liberal power is that of the concentration camp writ globally, where we are all merely objects of power, ‘we are all virtually homines sacri’ (Agamben, 1998: 115). In focusing on biopower as a means of critiquing universalist policy discourses of global security, critical theorists of global war from diverse fields such as security studies (Jabri, 2007), development (Duffield, 2007) or critical legal theory (Douzinas, 2007) are in danger of reducing their critique of war to abstract statements instrumentalizing war as a technique of global power. These are abstract critiques because the political stakes are never in question: instrumentality and the desire for regulation and control are assumed from the outset. In effect, the critical aspect is merely in the reproduction of the framework of Foucault – that liberal discourses can be deconstructed as an exercise of regulatory power. Without deconstructing the dominant framings of global security threats, critical theorists are in danger of reproducing Foucault’s framework of biopower as an ahistorical abstraction. Foucault (2007: 1) himself stated that his analysis of biopower was ‘not in any way a general theory of what power is. It is not a part or even the start of such a theory’, merely the study of the effects of liberal governance practices, which posit as their goal the interests of society – the population – rather than government. In his recent attempt at a ground-clearing critique of Foucauldian international relations theorizing, Jan Selby (2007) poses the question of the problem of the translation of Foucault from a domestic to an international context. He argues that recasting the international sphere in terms of global liberal regimes of regulation is an accidental product of this move. This fails to appreciate the fact that many critical theorists appear to be drawn to Foucault precisely because drawing on his work enables them to critique the international order in these terms. Ironically, this ‘Foucauldian’ critique of ‘global wars’ has little to do with Foucault’s understanding or concerns, which revolved around extending Marx’s critique of the ‘freedoms’ of liberal modernity. In effect, the post-Foucauldians have a different goal: they desire to understand and to critique war and military intervention as a product of the regulatory coercive nature of liberalism. This project owes much to the work of Agamben and his focus on the regulation of ‘bare life’, where the concentration camp, the totalitarian state and (by extension) Guantánamo Bay are held to constitute a moral and political indictment of liberalism (Agamben, 1998: 4). In these critical frameworks, global war is understood as the exercise of global aspirations for control, no longer mediated by the interstate competition that was central to traditional ‘realist’ framings of international relations. This less-mediated framework understands the interests and instrumental techniques of power in global terms. As power becomes understood in globalized terms, it becomes increasingly abstracted from any analysis of contemporary social relations: viewed in terms of neoliberal governance, liberal power or biopolitical domination. In this context, global war becomes little more than a metaphor for the operation of power. This war is a global one because, without clearly demarcated political subjects, the unmediated operation of regulatory power is held to construct a world that becomes, literally, one large concentration camp (Agamben, 1998: 171) where instrumental techniques of power can be exercised regardless of frameworks of rights or international law (Agamben, 2005: 87). For Julian Reid (2006: 124), the ‘global war on terror’ can be understood as an inevitable response to any forms of life that exist outside – and are therefore threatening to – liberal modernity, revealing liberal modernity itself to be ultimately a ‘terrorising project’ arraigned against the vitality of life itself. For Jabri, and other Foucauldian critics, the liberal peace can only mean ‘unending war’ to pacify, discipline and reconstruct the liberal subject:

#### The political model we defend cannot be equated with imperialism.

Ikenberry, Professor of Geopolitics, 04.

[G. John Ikenberry. “Illusions of Empire: Defining the New American Order” Foreign Affairs, March/April 2004.]

Is the United States an empire? If so, Ferguson's liberal empire is a more persuasive portrait than is Johnson's military empire. But ultimately, the notion of empire is misleading -- and misses the distinctive aspects of the global political order that has developed around U.S. power. The United States has pursued imperial policies, especially toward weak countries in the periphery. But U.S. relations with Europe, Japan, China, and Russia cannot be described as imperial, even when "neo" or "liberal" modifies the term. The advanced democracies operate within a "security community" in which the use or threat of force is unthinkable. Their economies are deeply interwoven. Together, they form a political order built on bargains, diffuse reciprocity, and an array of intergovernmental institutions and ad hoc working relationships. This is not empire; it is a U.S.-led democratic political order that has no name or historical antecedent.To be sure, the neoconservatives in Washington have trumpeted their own imperial vision: an era of global rule organized around the bold unilateral exercise of military power, gradual disentanglement from the constraints of multilateralism, and an aggressive effort to spread freedom and democracy. But this vision is founded on illusions of U.S. power. It fails to appreciate the role of cooperation and rules in the exercise and preservation of such power. Its pursuit would strip the United States of its legitimacy as the preeminent global power and severely compromise the authority that flows from such legitimacy. Ultimately, the neoconservatives are silent on the full range of global challenges and opportunities that face the United States. And as Ferguson notes, the American public has no desire to run colonies or manage a global empire. Thus, there are limits on American imperial pretensions even in a unipolar era. Ultimately, the empire debate misses the most important international development of recent years: the long peace among great powers, which some scholars argue marks the end of great-power war. Capitalism, democracy, and nuclear weapons all help explain this peace. But so too does the unique way in which the United States has gone about the business of building an international order. The United States' success stems from the creation and extension of international institutions that have limited and legitimated U.S. power.

### 2AC---Impact---Offense

#### Capitalism is responsible for a broad, global decline in war and imperialism.

Chatagnier and Castelli 16 (J. Tyson, Assistant Professor in the Department of Political Science at the University of Houston, and Emanuele, Bruno Kessler Foundation, "A Modern Peace? Schumpeter, the Decline of Conflict, and the Investment–War Trade-Off", Political Research Quarterly, 2016, University of Utah, DOA: 7-26-2017) //Snowball

For this reason, Schumpeter explains the decline of war since 1945 particularly well. While other authors (e.g., Angell [1909] 2010; Rosecrance 1986) have advanced similar arguments,3 Schumpeter alone provides a domestic, process-oriented explanation for the way in which industrialization would render war unprofitable (which is precisely what happened after the end of the Second World War), caused by a change in both material and cultural attitudes toward war, with the latter brought about by the former.4 Indeed, adopting an economic interpretation of history, Schumpeter claims (like Marx) that the industrial mode of production determines the cultural superstructure; contrary to Marx, he argues that values do not adjust immediately to the new environment (Schumpeter [1919] 1955, 65, Footnote 172). For this reason, war may still occur as an atavistic remnant of the previous economic structure. However, as Schumpeter ([1919] 1955, 69) later wrote, “A purely capitalist world . . . can offer no fertile soil to imperialist impulses.”5 But why should industrial modernity promote peace?

The change envisioned by Schumpeter is, first and foremost, a socioeconomic, material change. He assumes that the shift to an industry-based mode of production changes people’s everyday lives, as they become “inevitably democratized, individualized, and rationalized” (Schumpeter [1919] 1955, 68). This creates a new, economically oriented leadership, whose interests and impulses tend to be profit-seeking and strongly antiimperialist (Schumpeter [1919] 1955, 69–73). These rational attitudes filter down to the working masses, whose energies are fully absorbed by the new system of production, leaving little energy for war. According to Schumpeter, these socioeconomic changes have several important implications for foreign policy.

First, the government realizes that waging war is no longer profitable because industrialization alters its calculus (Kaysen 1990). Although war is profitable in agrarian societies, where land and resources are necessary for economic growth, industrialized societies grow by improving upon resources. In other words, the shift to industry would leave fewer states with a “concrete interest” in waging war (Schumpeter [1919] 1955, 4). This tends to be particularly intense in modern societies, since industrialization may enhance the destructiveness of war (Biddle 2004), rendering it even less useful. Writing some years earlier, Norman Angell ([1909] 2010) noted this point, but failed to account for the broader cultural change that amplifies the distaste for war in the modern world.

Second, the government must gain support from these new, economically-oriented, politically-relevant, and nearly-pacifist social strata: an increase in the demand for labor raises “the economic level and social power of the workers, until this class [is] able to assert itself in a political sense,” while the new elite “compel[s] state policy to adapt itself to their needs” and “[fights] the former ruling circles for a share in state control, for leadership in the state” (Schumpeter [1919] 1955, 67).

Third, and relatedly, once industrialized, continuous investment is necessary to sustain economic growth. This is achieved through Schumpeter’s process of “creative destruction” (Schumpeter 1942), by which the state is further removed from the previous economic order. To sustain growth (a basic requirement for every industrialized economy), governments and entrepreneurs must reinvest profits in innovation. Political leaders also benefit, as they can extract more revenue from a richer society. Within industrialized economies, war threatens this virtuous mechanism of investment, innovation, profits, and taxes, rendering it materially unprofitable. Indeed, as North, Wallis, and Weingast (2009, 23) have suggested, wealth creation in natural states usually comes from rent (exploitation of land, labor, and natural resources). Since the Industrial Revolution, however, with the shift to openaccess societies, traditional sources of rent have gradually eroded, and innovation itself has become a source of rent. Taken together, these changes suggest that there exists an investment–war trade-off for industrialized countries: each dollar spent engaging in militarized conflict—regardless of the money devoted to overall military spending, which tends to increase as a state modernizes— is one dollar less to spend on the necessary activities of innovation and economic growth.

We would suggest that our Schumpeterian theory may explain diverse findings by realist scholars (e.g., Mearsheimer 2001, 63), “conquest pays” authors (Liberman 1998),6 and lateral pressure theorists (Choucri and North 1975), who claimed that industrialization may increase the likelihood of war. We posit that their findings need not imply a link between industrialization and aggressive foreign behavior. While realists make the point that industrialized states are more capable of taking what they want, we note that highly capable status quo powers can more easily signal their commitment to fight when challenged, deterring conflict. With respect to the cumulativity argument, we would point out that the very nature of industrialization has changed as the shift “from smokestack to knowledge-based, high-technology production . . . has reduced the cumulativity of industrial base” (Van Evera 1999, 115). Finally, we observe empirically that no developed country has seized another during the last sixty years, and we would argue that this is because industrial domestic resources (such as heavy industrial assets, industrial outputs, and machinery) have become less lootable and reusable. Therefore, contrary to the Leninist thesis, imperialist attitudes are simply the result of atavistic ideologies, which can remain powerful factors that fan the flames of conflict, even within relatively modern societies. For this reason, imperialist or expansionist ideologies may still emerge within modern states (Schumpeter [1919] 1955, 98). Indeed, such outdated ideologies were the primary motivations for the Second World War.

### 2AC — Alt — AT: Undercommons

#### Their strategy peters out at best and gets coopted at worst---it trades off with our capacity to use debate to generate utopian imaginaries of concrete alternatives that mobilize systemic change outside the university

Webb 18—Senior Lecturer in Education at the University of Sheffield (Darren, “Bolt-holes and breathing spaces in the system: On forms of academic resistance (or, can the university be a site of utopian possibility?),” Review of Education, Pedagogy, and Cultural Studies, 40:2, 96-118, dml)

It is easy to be seduced by the language of the undercommons. Embodying and enacting it, however, is difficult indeed. Being within and against the university, refusing the call to order through insolent obstructive unprofessionalism, is almost impossible to sustain. Halberstam (2009, 45) describes the undercommons as “a marooned community of outcast thinkers who refuse, resist, and renege on the demands of rigor, excellence, and productivity.” A romantic and appealing notion for sure but refusing and reneging on “the university of excellence” will cost you your job. When Moten describes subversion as a “series of immanent upheavals” expressed through “vast repertoires of high-frequency complaints, imperceptible frowns, withering turns, silent sidesteps, and ever-vigilant attempts not to see and hear” (2008, 1743), one is reminded instantly of Thomas Docherty, disciplined and suspended for his negative vibes.7 Being with and for the maroon community is difficult too. First of all, “Where and how can we find/see the Undercommons at work?” (Ĉiĉigoj, Apostolou-Hölscher, and Rusham 2015, 265). Where and how can one find those liminal spaces of sabotage and subversion, and how does one occupy them in a spirit of hapticality, study, and militant arrhythmia that brings the utopic underground to the surface of the fierce and urgent now? Beautiful language, but how does one live it? Networks do, of course, exist—the Undercommoning Collective, the Edu-Factory Collective, the International Network for Alternative Academia, to name but a few. These are promising spaces for bringing together and harboring the maroons and the fugitives. But networks are typically short-lived, and—as Harney and Moten warned—there is a danger of institutionalization, of taking institutional practices with you into alternative spaces “because we’ve been inside so much” (Harney and Moten 2013, 148). And so, predictably, meetings of the fugitives come with structure, order, an official agenda, and circulated minutes. The outcasts convene in conventional academic conferences, with parallel sessions, panels of papers, lunch breaks, wine and nibbles (e.g., Edu-Factory 2012). These spaces offer time out, welcome respite, a breathing space, a trip abroad, and then one returns to work. If hapticality, the touch of the undercommons, is “a visceral register of experience … the feel that what is to come is here” (Bradley 2014, 129–130), then this seems elusive. It is hard to detect a sense of the utopic undercommons rising to the surface of the corporate-imperial university. Moten describes the call to disorder and to study as a way to “excavate new aesthetic, political, and economic dispositions” (Moten 2008, 1745). But this notion of excavating is highly problematic. It is common within the discourse of “everyday utopianism”—finding utopia in the everyday, recovering lost or repressed transcendence in “everydayness” (Gardiner 2006)—to describe the process of utopian recovery in terms of excavating: excavating repressed desires, submerged longings, suppressed histories, untapped possibilities. But the fundamental questions of where to dig and how to identify a utopian “find” are never adequately addressed (see Webb 2017). Gardiner defines utopia as “a series of forces, tendencies and possibilities that are immanent in the here and now, in the pragmatic activities of everyday life” (2006, 2). But how are these forces, tendencies and possibilities to be identified and recovered? For Harney and Moten, it is through study, hapticality and militant arrhythmia. These are slippy concepts, however, evading concrete material referents. What is it to inhabit the undercommons? Those who have written of their experiences refer to “small acts of marronage” such as poaching resources and redeploying them in ways at odds with the university’s designs and demands (Reddy 2016, 7), or exploiting funding streams “to form cracks in the institution that enable the Others to invade the university” (Smith, Dyke, and Hermes 2013, 150). For Adusei-Poku (2015), the undercommons is a space of refuge which is all about survival (2015, 4–5). We who feel homeless in the university are forced into refuge. We gather together to survive. We may gain satisfaction from small acts of marronage, but this is less about bringing the utopic common underground to the surface as it is a form of “radical escapism” (Adusei-Poku 2015, 4). Benveniste (2015, v) tells us that: “The undercommons has no set location and no return address. There is no map for entering and no guide for staying. The only condition is a living appetite. Listen to its hunger for difference.” We need more than poetry, however. And we need more than a series of minor acts of resistance. As Srnicek and Williams rightly emphasize, resistance is a defensive, reactive gesture, resisting against. Resistance is not a utopian endeavour: “We do not resist a new world into being” (Srnicek and Williams 2016, 47). The undercommons, when one can find it, is a bolt hole, a place of refuge, a breathing space in the system. We need something more. The occupation Can the occupied building operate as a site of utopian possibility within the corporate-imperial university? Reflections on, and theorizations of, two recent waves of occupation—“Occupied California” 2009–2010 and the UK Occupations 2010–2011—have answered this question affirmatively. The “occupation” should not be understood here as solely or necessarily “student occupation.” It goes without saying—though sadly so often does need saying —that “faculty also have a responsibility to fight with and for students” (Smeltzer and Hearn 2015, 356). Though led by a new historical subject, “the graduate without a future” (Schwarz-WeinStein 2015, 11), the importance of faculty support for the occupations was emphasized on both sides of the Atlantic (Research and Destroy 2010, 11; Dawson 2011, 112; Holmes and R&D and Dead Labour 2011, 14; Ismail 2011, 128; Newfield and EduFactory 2011, 26). Long before Occupy took shape in Zuccotti Park, “occupation” was being heralded as the harbinger of a new society and a new way of being. If we return to the notion of creating utopian spaces, the key aim for some of the occupiers was to create communes within the university walls—to communize space (Inoperative Committee 2011, 6).8 Communization here is understood as a form of insurrectionary anarchism that refuses to talk of a transition to communism, insisting instead upon the immediate formation of zones of activity removed from exchange, money, compulsory labor, and the impersonal domination of the commodity form (Anon 2010a, 5). As one pamphlet declared: We will take whatever measures are necessary both to destroy this world as quickly as possible and to create, here and now, the world we want: a world without wages, without bosses, without borders, without states. (Anon 2010d, 34) This is a revolutionary anarchism that takes the university campus as the site for a practice—communization—that not only prefigures but also realizes the vision of a free society. Heavily influenced by The Coming Insurrection (Invisible Committee 2009), but tapping into a long tradition of anarchist theory and practice from Hakim Bey’s Temporary Autonomous Zones (Bey 1985) to David Graeber’s Direct Action (Graeber 2009), occupation becomes “the creation of a momentary opening in capitalist time and space, a rearrangement that sketches the contours of a new society” (Research and Destroy 2010, 11). It is “an attempt to imagine a new kind of everyday life” (Hatherley 2011, 123). Firth (2012) refers to these momentary openings as critical, experimental utopias: Such utopias are … simultaneously immanent and prefigurative. They are immanent insofar as they allow space for the immediate expression of desires, satisfaction of needs and also the articulation of difference or dissent. They are prefigurative to the extent that they allow one to practice and exemplify what one would like to see at a more proliferative range in the future (26) The ultimate aim is for the practice to spread beyond the campus through a dual process of provocative rupture—the idea that insurrectionary moments can unleash the collective imagination and stimulate an outpouring of creativity that blows apart common sense and offers glimpses of a future world (Gibson-Graham 2006, 51; Shukaitis and Graeber 2007, 37)—and “contaminationism,” that is, spreading by means of example (Graeber 2009, 211). It may well have been the case that communism was realized on the campuses of Berkeley and UCL, that a momentary opening in capitalist space/time appeared through which another world could be glimpsed. The occupation, however—whether California, London, or anywhere else—is likely always to remain a localized temporary disruptive practice. A practice with utopian potency, for sure, in terms of suspending normalized forms of discipline and opening new egalitarian discursive spaces (Rheingans and Hollands 2013; Nişancioğlu and Pal 2016). In terms of wider systemic change, however, “small interventions consisting of relatively non-scalable actions are highly unlikely to ever be able to reorganise our socioeconomic system” (Srnicek and Williams 2016, 29). What “the occupation” demonstrates more than anything is the reality of the corporate-imperial university, as the institutional hierarchy, backed by the carceral power of the police and criminal justice system, inevitably disperses the occupiers—often using militarized force—and repossesses the occupied space in a strong assertion of its ownership rights not only to university buildings but also to what constitutes legitimate thought and behavior within them (on this see Docherty 2015, 90). The significance, and utopian potential, one attaches to campus occupations depends in part upon the significance one attaches to the university as a site of struggle. For the Edu-Factory Collective: As was the factory, so now is the university. Where once the factory was a paradigmatic site of struggle between workers and capitalists, so now the university is a key space of conflict, where the ownership of knowledge, the reproduction of the labour force, and the creation of social and cultural stratifications are all at stake. This is to say the university is not just another institution subject to sovereign and governmental controls, but a crucial site in which wider social struggles are won and lost. (Caffentzis and Federici 2011, 26) Clearly, if this is true, then the form the struggle takes, and the example it sets, is of immense significance. Srnicek and Williams describe as “wishful thinking” the idea that the occupation might spread beyond the campus by means of rupture or contamination (2016, 35). However, if the university really is a key site of class struggle (Seybold 2008, 120; Haiven and Khasnabish 2014, 38), a site through which wider struggles are refracted and won or lost, then the transformative potential of the occupation needs to be attended to seriously. The analysis of the university offered by the Edu-Factory Collective is, however, outdated. Sounding like Daniel Bell writing in 1973 about how universities had become the “axial structures” of post-industrial society (Bell 1973, 12), the analysis does not hold water today. Moten overdoes it when he tells us that “the university is a kind of corpse. It is dead. It’s a dead institutional body” (Moten 2015, 78). What is clear, however, is that “focusing on the university as a site of radical transformation is a mistake” (Holmes and R&D and Dead Labour 2011, 13). As has been widely noted, there is very little distinguishing universities from other for-profit corporations (Readings 1996; Lustig 2005; Washburn 2005; Shear 2008, Tuchman 2009). What does separate them is their inefficiency, due in large part to the fact that universities operate also as medieval guilds, with faculties “ruled by masters who lord over journeymen and apprentices in an artisanal system of production” (Jemielniak and Greenwood 2015, 77). If the university is a sinister hybrid monstrosity—part medieval guild, part criminal corporation—which has no role other than reproducing its own privilege, then no special status can be attributed to campus protests. In this case, “A free university in the midst of a capitalist society is like a reading room in a prison” (Research and Destroy 2010, 10). A reading room in a prison. Another apposite metaphor. The occupation is a safe space, offering temporary respite, a place to hide, a refuge, a bolt-hole, a breathing space. As with the utopian classroom and the undercommons, what the occupation suggests is that “defending small bunkers of autonomy against the onslaught of capitalism is the best that can be hoped for” (Srnicek and Williams 2016, 48). Conclusion Zaslove was right to characterize utopian pedagogy within the corporateimperial university as the search for bolt-holes and breathing spaces in the system. He himself suggests that, “All university classes should become dialogic-experiential models that educate by expanding the zones of contact with wider communities” (2007, 102). Like so many others, Zaslove sees dialogic-experiential models of education beginning in the classroom then expanding outward. The literature is full of references to “exceeding the limits of the university classroom” (Coté, Day, and de Peuter 2007a, 325), “extend [ing] beyond the boundaries of the campus” (Ruben 2000, 211), and “breeching the walls of the university compounds and spilling into the streets” (Research and Destroy 2010, 10). This all brings to mind Giroux’s notion of academics as border crossers (Giroux 1992), but it also paints a picture of academics taking as their starting point the university and from there crossing the border into the community and the street. The University can be the site for fleeting, transitory, small-scale experiences of utopian possibility—in the classroom, the undercommons, the occupation. It cannot be the site for transformative utopian politics. It cannot even be the starting point for this. Given the corporatization and militarization of the university, academics are increasingly becoming “functionaries of elite interests” inhabiting a culture which serves to reproduce these interests (Shear 2008, 56). Within the university, “radical” initiatives or movements will soon be co-opted, recuperated, commodified, and neutralized (Gibson-Graham 2006, xxvi; Seybold 2008, 123; Neary 2012b, 249; Rolfe 2013, 21). Institutional habitus weights so heavily that projects born in the university will be scarred from the outset by a certain colonizing “imaginary of education” (Burdick and Sandlin 2010, 117). And we have long known that the university is but one space of learning, and perhaps not a very important one at that. Identifying the academy as the starting point for a utopian pedagogy privileges this arcane space over sites of public pedagogy such as film, television, literature, sport, advertising, architecture, media in its various forms, political organizations, religious institutions, and the workplace (Todd 1997). Perhaps the emphasis on creating radical experimental spaces within the academy needs to shift toward operating in existing spaces of resistance outside it. Haiven and Khasnabish argue that many social movements function already as “social laboratories for the generation of alternative relationships, subjectivities, institutions and practices” (2014, 62), providing “a space for experiments in knowledge production, radical imagination, subjectification, and concrete alternative-building” (Khasnabish 2012, 237). Why locate utopian pedagogy in the university when “critical utopian politics” can take place in “infrastructures of resistance” such as intentional communities, housing collectives, squats, art centers, community theatres, bars, book shops, health collectives, social centers, independent media and, increasingly of course, the digital sphere (Firth 2012; Shantz 2012; Amsler 2015; Dallyn, Marinetto, and Cederstrom 2015)? Moving beyond short-term, localized, temporary modes of resistance, utopian pedagogy would work across these sites to develop a long-term strategy and vision. There is a role for the academic in utopian politics, but not in the university-as-such. The utopian pedagogue has a responsibility to exploit their own privilege and to work with students, communities and movements outside and divorced from the university. As Shear rightly notes, academics (and especially those working in the humanities and social sciences) “inhabit a privileged space in which critical inquiry concerning social hegemony and political-economic domination” is possible (Shear 2008, 56). Within the university, however, spaces for embodying and enacting this kind of inquiry have become constrained, compromised, monitored, surveilled, co-opted, and recuperated. As I have argued throughout this article, utopian pedagogy has become a search for bolt-holes and breathing spaces in the system. Beyond the academy, however, there is a role to play. As Chomsky (2010) tells us, with privilege comes responsibility. And as Giroux frames it, this is an ethical and political responsibility to provide “theoretical resources and modes of analysis” to help forge “a utopian imaginary” (Giroux 2014a; 153; 2014b, 200). This means putting one’s knowledge and resources to use in the service of a collaborative process of memory- and story-making, pulling together disparate inchoate dreams and yearnings in order to generate a utopian vision that can help inform, guide, and mobilize long-term collective action for systemic change.

#### Their method of resistance is too ephemeral and can’t escape the academy

Love, 15—R. Jean Brownlee Term Associate Professor at the University of Pennsylvania (Heather, “Doing Being Deviant: Deviance Studies, Description, and the Queer Ordinary”, differences 2015 Volume 26, Number 1: 74-95, dml)

Today, queer studies—prestigious but unevenly institutionalized—still signals absolute refusal or criticality—all anti- and no normativity. In their influential 2004 essay, “The University and the Undercommons” (and in the 2013 book that followed from it), Fred Moten and Stefano Harney rely on such an understanding of queer (as well as concepts borrowed from black studies, feminism, ethnic studies, and anticolonial thought). They call for betrayal, refusal, theft, and marronage as modes of resisting the iron grip of the academy, pointing to an uncharted, underground, and collective space they call the undercommons. “To enter this space,” they write, “is to inhabit the ruptural and enraptured disclosure of the commons that fugitive enlightenment enacts, the criminal, matricidal, queer, in the cistern, on the stroll of the stolen life, the life stolen by enlightenment and stolen back, where the commons give refuge, where the refuge gives commons” (103). Moten and Harney speculate whether the “thought of the outside” (105) is possible inside the university and suggest that if there is an outside, it is along the margins and at the bottom. Yet their imagination of that outside is indebted to the inside, in particular to the conception of deviance produced within sociology. Their account of the undercommons reads like a rap sheet, a list of the traditional topics of deviance studies: theft, homosexuality, prostitution, incarceration.

Moten and Harney do not describe the undercommons, but rather ask their readers to join it, to participate in active revolt against professional and disciplinary protocols. To offer an objective account of the social position of radical academics would be to further business as usual in the academy; dwelling in the undercommons requires giving up on the usual protocols of description. Moten and Harney argue against the traditional role of the “critical academic” (105), which they see as just another turn of the professional screw, since work that opposes the academy does not challenge its basic structure or everyday operations. They argue that “to be a critical academic in the university is to be against the university, and to be against the university is always to recognize it and to be recognized by it, and to institute the negligence of the internal outside, that unassimilated underground, a negligence of it that is precisely, we must insist, the basis of the professions” (105). In contrast to the figure of the critical academic, they forward the image of the “subversive intellectual” who is “in but not of” the academy (101). Without dismissing the galvanizing effect of such a call to the undercommons, it is important to consider the limits of the refusal of objectification as a strategy. To be unlocatable, to be nowhere, to be in permanent revolt: Moten and Harney describe the path that queer inquiry laid out for itself. Objectification—recognition, description, critique—can be a way to reinforce the status quo, but it is also a way of acknowledging one’s institutional position and the real differences between inside and outside. Even the most subversive intellectuals in the academy are “on the stroll” in a metaphorical but not a material sense. The fate of those who came “under false pretenses, with bad documents, out of love” (101), if they survive, is to become “superordinates” in Becker’s sense.

Whose side are we on? Can we hold onto the critical and polemical energy of queer studies as well as its radical experiments in style and thought while acknowledging our implication in systems of power, management, and control? Will a more explicit avowal of disciplinary affiliations and methods snuff out the utopian energies of a field that sees itself as a radical outsider in the university? To date, both the political and the methodological antinormativity of queer studies have made it difficult to address our implication in the violence of knowledge production, pedagogy, and social inequality. Such violence is inevitable, and critical histories of the disciplines—and the production of knowledge about social deviance—are essential. Undertaking such work, however, will not allow escape into a radically different relation to our objects because we are (as Moten and Harney also argue) part of that history—we are its contemporary instantiation. To imagine a social world in which those relations are transformed—in what Moten and Harney refer to as the “prophetic organization” (102)—may be crucial for the achievement of social justice, but to deny our own implication in existing structures is also a form of violence.

# 1AR- round 2

## Case

### 1AR- AT: Black death

#### Biological life is better than death

**Alice Walker 82**[Black activist and Alice Walker, “Only Justice Can Stop a Curse”, Anti-Nuke Rally speech at Grace Cathedral, San Francisco CA, won Pulitzer Prize and lots of other white awards for the Color Purple, other books by her which are also incredible are less known but still great, March 16, 1982]

Life is better than death, I believe, if only because it is less boring, and because it has fresh peaches in it. In any case, Earth is my home—though for centuries white people have tried to convince me I have no right to exist, except in the dirtiest, darkest corners of the globe.¶ ¶ So let me tell you: I intend to protect my home. Praying—not a curse—only the hope that my courage will not fail my love. But if by some miracle, and all our struggle, the earth is spared, only justice to every living thing (and everything alive) will save humankind.¶ ¶ And we are not saved yet.¶ ¶ Only justice can stop a curse.

## Logistics

### 1AR-Cap solves poverty

#### Capitalism solves poverty – aggregate data

**Arie 18**(Benjamin, writer for Conservative Tribune, 6/27/18, “Extreme Poverty Has Dropped From 94% of World Pop. to 9.6% Thanks to Capitalism”, <https://www.westernjournal.com/ct/extreme-poverty-has-dropped-from-94-of-world-pop-to-9-6-thanks-to-capitalism/>, AZG)

Capitalism improves people’s lives and has changed the world for the better — but you won’t find many leftists admitting it any time soon. Instead, free-market economics are often blamed for causing the world’s ills, instead of curing them. Take one look at how close openly socialist Bernie Sanders came to being the Democrats’ nominee in the last presidential election to see that capitalism is bizarrely demonized instead of celebrated. It’s the same story in many European countries, while even our neighbors in Mexico appear poised to elect a far-left and socialist-leaning candidate as president on July 1. “The rich are getting richer, and the poor are getting poorer,” is the claim of anti-capitalists everywhere. But is it true? Not according to the facts. **It turns out that worldwide poverty is declining at an incredible rate, and Western-style capitalism is the main reason.** “The speed of poverty alleviation in the last 25 years has been historically unprecedented,” explained the Foundation for Economic Education, a pro-freedom think tank. “Not only is the proportion of people in poverty at a record low, but, in spite of adding 2 billion to the planet’s population, the overall number of people living in extreme poverty has fallen, too,” FEE continued. The numbers speak for themselves. “In 1820, 94 percent of the world’s population lived in extreme poverty,” pointed out Alexander Hammond, a researcher for HumanProgress.org. “In 1990, this figure was 34.8 percent, and in 2015, just 9.6 percent.” We think of the 1800s as “olden times,” but in the large scheme of history and human events, it really wasn’t that long ago. Most of human history, if we’re being honest, was marked by poverty and suffering by the vast majority of people on Earth. Lifespans were short and existence was brutal. Death, frustration, and sadness was the norm, not the exception. Just 200 years ago, almost all of the world’s population was resigned to live in poverty with no way out. There were a handful of elites — mainly the aristocracy — who were able to live relatively well, but even that “luxury” living was rough and uncomfortable by our modern standards. Then something changed — **capitalism spurred advancement, and it wasn’t limited to just the elite.** “In the last quarter century, more than 1.25 billion people escaped extreme poverty. That equates to over 138,000 people being lifted out of poverty every day,” FEE explained. “If it takes you five minutes to read this article, another 480 people will have escaped the shackles of extreme of poverty by the time you finish.” “In order to help the poorest, consider the impact free-market capitalism has had in the last 200 years in alleviating extreme poverty,” the foundation continued. “The Industrial Revolution turned the once-impoverished Western countries into abundant societies. The new age of globalization, which started around 1980, saw the developing world enter the global economy and resulted in the largest escape from poverty ever recorded.” To put it simply, the rich may be getting richer … but the poor are also getting richer. The foundation pointed to India as a prime example of how Western principles and capitalism are accelerating people out of poverty at a rate that is historically unprecedented. “Since its economic liberalization reforms in 1991, India’s average income has increased by 7.5 percent per year,” FEE explained. “That means that average income has more than tripled over the last quarter century. As wealth increased, the poverty rate in India declined by almost 24 percent.” “**It is the people at the very bottom of the social strata who are getting richer faster**,” the foundation summarized. At a time when it’s in vogue to bash capitalism and embrace disastrous socialism, it’s important to step back and look at the bigger picture. Life is getting dramatically, measurably better in almost every part of the world, and Western capitalist principles are at the center of that renaissance.

### 1AR- AT: Cap warming

#### Yes decoupling – study

**Pao 18** (Hsiao-Tien Pao, PhD, Department of Management Science, National Chiao Tung University; Chun-Chih Chen, PhD, Department of Management Science, National Chiao Tung University; “Decoupling strategies: CO emissions, energy resources, and economic growth in 2 the Group of Twenty”, Journal of Cleaner Production, September 2018, DOI: 10.1016/j.jclepro.2018.09.190) \*Brackets added which provide the full version of each of these abbreviations: Hydro = hydropower; CKC = carbon kuznets curve; Ren = new renewable energy consumption; FF = fossil fuels energy consumption; 3Es = environment, energy, and economy, Nuc = nuclear energy consumption, TCE = total clean energy consumption, EG = economic growth

This study selects the G20 as a representative sample of global economic development to assess the CKC [carbon Kuznets curve], the 3Es dynamics, substitutability between Ren [new renewable energy consumption]/Hydro [hydropower] /Nuc [nuclear energy consumption] and FF [fossil fuels energy consumption], and thus to propose decoupling strategies for sustainable development. We extend the literature on the emission-growth nexus in the case of G20 to the 3Es dynamics by examining the rule of Ren [new renewable energy consumption]/Hydro [hydropower] /Nuc [nuclear energy consumption] and FF [fossil fuels energy consumption]. The descriptive statistical analysis suggests the absolute decoupling effect seems to have occurred with the drop in related environmental pressure and the continuation of economic growth. Within a panel EEO model framework, the per capita TCE [total clean energy consumption] /FF [fossil fuels energy consumption] elasticity of demand for carbon emissions is -0.021/1.04. The existence of the CKC [carbon kuznets curve] is consistent with the results of the descriptive statistical analysis. The results of panel VECM models support the Hydroled and Nuc-led growth hypotheses and the feedback hypothesis between EG [economic growth] and Ren [new renewable energy consumption]/FF and suggest the potential **substitutability**/**symbiosis** between Ren/Hydro and FF as evidenced by the negative/positive bidirectional causal relationship between them. Also, note that the use of nuclear energy is a key means of dealing with carbon emissions as evidenced by the positive unidirectional causal relationship running from emissions to Nuc [nuclear energy consumption].

Based on the growing global awareness of environmental protection, these interdependencies between 3Es are not surprising. That provides the main directions of each in the design of energy and energy conservation policies to ensure a diversified, sustainable energy consumption mix and a decoupling of environmental pressure from EG [economic growth]. Policymakers can introduce a wide range of complementary strategies for renewable energy and nuclear energy to improve energy efficiency and safety, reduce CO2 intensity, maintain stable economic growth, and implement the 2030 sustainable development agenda, thus **lead the world to absolute decoupling**. Absolute decoupling is the **only way** to achieve a truly sustainable future.

#### Clean tech solves – CCS- zero-emissions by 2030.

**Seba 14** - MBA @ Stanford, lecturer in distribution and clean energy @ Stanford (Tony, “Clean Disruption of energy and transportation: How silicon valley will make oil, nuclear, natural gas, coal, electric utilities and conventional cars obsolete by 2030,” pg. 2-17)

The Stone Age did not end because humankind ran out of stones. It ended because rocks were disrupted by a superior technology: bronze. Stones didn't just disappear. They just became obsolete for tool-making purposes in the Bronze Age. The horse and carriage era did not end because we ran out of horses. It ended because horse transportation was disrupted by a superior technology, the internal combustion engine, and a new, disruptive 20th century business model. Horses didn't just disappear. They became obso ete for the purposes of mass transportation. The **age of** centralized, command-and-control, extraction-resource-based energy sources (**oil, gas, coal** and nuclear) will not end because we run out of petroleum, natural gas, coal, or uranium. It **will end because** these energy **sources**, the business models they employ, and the products that sustain them **will be** **disrupted by** superior **tech**nologies, product architectures, and business models. Compelling new technologies such as solar, wind, electric vehicles, and autonomous (self-driving) cars will disrupt and sweep away the energy industry as we know it. The same Silicon Valley ecosystem that created bit-based technologies that have disrupted atom-based industries is now creating bit- and electron-based technologies that will disrupt atom-based energy industries.

Clean Disruption of Energy and Transportation.

The industrial era of energy and transportation is **giving way** to an information technology and knowledge-based energy and transportation era. The combination of bit-based and electron-based technologies will put an end to conventional atom-based energy and transportation industries. The disruption will be a clean one and have the following characteristics:

**1. Technology-based disruption**.

The clean disruption is about digital (bit) and clean energy (electron) technologies disrupting resource-based (atom-based) industries. Clean energy (solar and wind) is free. Clean transportation is electric and uses clean energy derived from the sun and wind. The key to the disruption of energy lies in the **exponential** cost and performance improvement of technologies that convert, manage, store, and share clean energy. The clean disruption is also about software and business model innovation.

**2. Flipping the architecture of energy**.

Just as the Internet and the cell phone turned the architecture of information upside-down, the clean disruption will create an energy architecture that is different from the one we know today. The new energy architecture will be distributed, mobile, intelligent, and participatory. It will overturn the existing energy architecture, which is centralized, command-and-control oriented, secretive, and extractive. The conventional energy model is about Big Banks financing Big Energy to build Big Power Plants or refineries in a few selected places. The new architecture is about everyone financing everyone to build smaller, distributed power plants everywhere.

**3. Abundant, cheap, and participatory energy**.

The clean disruption will be about abundant, cheap, and participatory energy. The existing energy business model is based on scarcity, depletion, and command-and-control monopolies. The clean disruption is similar to the information technology revolution that overturned the old publishing and information model and made information abundant, participatory, and essentially free.

**4. Clean disruption is inevitable**.

The clean disruption of energy and transportation is inevitable when you consider the **exponential cost improvement** of disrupting **tech**nologies; the creation of new business models; the democratization of generation, finance, and access; and the exponential market growth.

**5. Clean disruption will be swift.**

**It will be over by 2030**. **Maybe before**. **Oil**, natural **gas** (methane), **coal**, and uranium will simply become **obsolete** for the purposes of generating significant amounts of electricity and powering the automobile. These energy sources will still have uses. For example, uranium will be used to make nuclear weapons and natural gas will be used for cooking and producing fertilizer. Obsolescence and clean disruption will not put an end to incumbent industries. We still have vinyl records, sailboats and jukeboxes. These niche market products will survive, but energy and transportation will not be the multi-trillion dollar energy heavyweights that they are today.

In twenty years we'll wonder how we put up with the horrendous consequences of the incumbent, conventional, $8 trillion-a-year energy industry. If Nikola Tesla and Thomas Alva Edison rose from the dead, they would recognize the industry that they helped build a century ago and they would be disappointed at how little it has changed. Today's versions of Tesla and Edison are creating technologies, products, and business models that will dismantle the extractive, centralized, dirty- energy age in which we live. The first wave of energy disruption has already begun with distributed solar and wind generation. It **won't be long** before the next wave crashes over the remains of the first one. Transportation is a $4 trillion industry globally. The transportation industry is inextricably linked with energy. As this book explains, the internal combustion engine automobile will soon be disrupted, an event which will, in turn, send disruptive shockwaves through the oil industry. The first wave of disruption of the century-old automotive industry is well underway with electric vehicles. The second disruptive wave, the self-driving car, will hit before the first wave is finished crashing. **Transportation will never be the same again**. This book is about how a new technology-based infrastructure and a set of products and services governed by the economics that have made Silicon Valley a source of market disruption over the last generation will disrupt energy industries that have barely evolved over the past hundred years.