# 1NC vs Sage MP

### 1NC – off

#### Interpretation: topical affs must fiat an action through the World Trade Organization

#### Member nations of the WTO make policies as a whole

WTO ND [(World Trade Organization) “Whose WTO is it anyway?”] JL

The WTO is run by its member governments. All major decisions are made by the membership as a whole, either by ministers (who usually meet at least once every two years) or by their ambassadors or delegates (who meet regularly in Geneva).

In this respect, the WTO is different from some other international organizations such as the World Bank and International Monetary Fund. In the WTO, power is not delegated to a board of directors or the organization’s head.

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

Reaching decisions by consensus among some 150 members can be difficult. Its main advantage is that decisions made this way are more acceptable to all members. And despite the difficulty, some remarkable agreements have been reached. Nevertheless, proposals for the creation of a smaller executive body — perhaps like a board of directors each representing different groups of countries — are heard periodically. But for now, the WTO is a member-driven, consensus-based organization.

#### Collective nouns are singular – this means “member nations” refers to a singular entity

MLA 3/8 [“Should I use a singular or plural verb with a collective noun?” MLA Style Center, 3/8/2021] JL

Collective nouns, like *team*, *family, class*, *group*, and *host*, take a singular verb when the entity acts together and a plural verb when the individuals composing the entity act individually. The following examples demonstrate this principle:

The team is painting a mural. (The team collectively paints the mural, so the verb is singular*.*)

#### Violation – they don’t

#### Prefer:

#### Precision – even if Jordan is a member nation, that’s distinct from fiating member nations as a unified actor – outweighs because it justifies jettisoning other words in the rez – prefer our interp – we have evidence from the WTO that explains what coordinated action looks like

#### Limits and ground – explodes the topic to include affs about any country reducing IP – ensuring it is an international reduction of IP which is ensures link magnitude and generics like WTO bad, multilat Ks, negotiations and politics DAs, and circumvention – stretches pre-tournament neg prep too thin and precluding rigorous testing – theory and medicine spec affs solve PICs

#### Topic ed – WTO patent waivers are the topic – their aff is just domestic policy passed in Jordan – proven by their second advantage – none of their internal links are about medical trade secrets which proves their interpretation is a cheap way of getting a relations impact about any two countries – justifies the US-Mexico or China-Japan aff. Outweighs – prep is determined by the lit and we only have 2 months to debate the topic

#### TVA – spec a medicine – ensures nuanced debates while preserving WTO-specific ground

#### Paradigm issues:

#### Drop the debater – their abusive advocacy skewed the debate from the start

#### Competing interps – reasonability invites arbitrary judge intervention and a race to the bottom of questionable argumentation

#### Fairness is a voter ­– necessary to determine the better debater

#### Education is a voter – why schools fund debate

### 1NC – off

#### The aff’s portrayal of a world with reduced IP protections as an “information commons” where medical inequality is solved by deregulation perpetuates the neoliberal myth of a perfect market **Kapczynski 14** [(Amy, a Professor of Law at Yale Law School, Faculty Co-Director of the Global Health Justice Partnership, and Faculty Co-Director of the Collaboration for Research Integrity and Transparency. She is also Faculty Co-Director of the Law and Political Economy Project and cofounder of the Law and Political Economy blog. Her areas of research include information policy, intellectual property law, international law, and global health.) “INTELLECTUAL PROPERTY’S LEVIATHAN” Duke Law, Law & Contemporary problems, 2014. https://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=4710&context=lcp] BC

Over the last decade or so, a powerful set of critiques has emerged to contest the dominant account just sketched out as well as the contemporary state of IP law.12 These arguments have come from many directions, some even arising from scholars who previously were champions of the dominant account.13 The most prominent and potent line of theoretical critique in the legal literature has come in the guise of arguments for free culture and the “information commons” and has been most influentially articulated by Lawrence Lessig and Yochai Benkler.14 Both have stressed the problems with expansive exclusive rights regimes in information and have also sketched a set of actually existing alternatives to market-based exclusionary forms of information and cultural production.

Lessig has written a series of influential books that have made him a “rock star of the information age,”15 particularly for young Internet and free-culture activists. He has argued powerfully, for example, that existing copyright law is in deep conflict with the radical new possibilities for creativity in the digital age. As he points out, when a mother posting a video of her toddler dancing to a Prince song on YouTube is threatened with a $150,000 fine for copyright infringement, something has gone seriously awry.16 Lessig also contends that copyright law today is too long, too expansive, and instantiates a “permission culture” that is antithetical to free expression in the age of the remix.17 As he puts it, “the Internet has unleashed an extraordinary possibility for many to participate in the process of building and cultivating a culture that reaches far beyond local boundaries,” creating the possibility of markets that “include a much wider and more diverse range of creators,” if not stifled by incumbents who use IP law to “protect themselves against this competition.”18

Benkler’s work has also been extraordinarily formative in the field, particularly for his insights into the multiplicity of modes of information production. As he has stressed, the conventional justification for IP does not account for the many successful and longstanding modes of market nonexclusionary information production.19 For example, attorneys write articles to attract clients, software developers sell services customizing free and opensource software for individual clients, and bands give music away for free to increase revenues from touring or merchandise.20 More pathbreaking still is Benkler’s account of the importance of “commons-based peer production,” a form of socially motivated and cooperative production exemplified by the volunteer network that maintains Wikipedia or the groups of coders who create open-source software products such as the Linux operating system.21 In the digital networked age, as Benkler describes, the tools of information production are very broadly distributed, “creating new opportunities for how we make and exchange information, knowledge, and culture.”22 These changes have increased the relative role in our information economy of nonproprietary production and facilitate “new forms of production [that] are based neither in the state nor in the market.”23 Because commons-based peer production is not hierarchically organized and is motivated by social dynamics and concerns, it also offers new possibilities for human development, human freedom, a more critical approach to culture, and more democratic forms of political participation.24

This line of critique has been profoundly generative and has helped launch an important new conceptualization of the commons as a paradigm. That paradigm, as a recent book puts it, “helps us ‘get outside’ of the dominant discourse of the market economy and helps us represent different, more wholesome ways of being.”25 Proponents of the commons concept draw upon contemporary articulations of successful commons-based resource management by Elinor Ostrom and her followers.26 They do mobilize retellings of the political and economic history of the commons in land in Europe before enclosure,27 and recent evidence from psychology and behavioral economics that suggests that humans have deep tendencies toward cooperation and reciprocation.28 They argue that A key revelation of the commons way of thinking is that we humans are not in fact isolated, atomistic individuals. We are not amoebas with no human agency except hedonistic “utility preferences” expressed in the marketplace. No: We are commoners—creative, distinctive individuals inscribed within larger wholes. We may have unattractive human traits fueled by individual fears and ego, but we are also creatures entirely capable of self-organization and cooperation; with a concern for fairness and social justice; and willing to make sacrifices for the larger good and future generations.29

This stands, of course, as a powerful rebuke to the neoliberal imaginary, which “constructs and interpellates individuals as . . . rational, calculating creatures whose moral autonomy is measured by their capacity for ‘self-care’— the ability to provide for their own needs and service their own ambitions.”30

III

Given this radical—and, in my view, critically important—attempt to rethink the subject at the core of neoliberal accounts, it is all the more striking that proponents of the commons often appear to adopt a neoliberal image of the state. For example, the introduction to a recently edited volume that gathers writings on the commons from seventy-three authors in thirty countries (entitled, tellingly, The Wealth of the Commons: A World Beyond Market and State) has this to say:

The presumption that the state can and will intervene to represent the interests of citizens is no longer credible. Unable to govern for the long term, captured by commercial interests and hobbled by stodgy bureaucratic structures in an age of nimble electronic networks, the state is arguably incapable of meeting the needs of citizens as a whole.31

The commons, they suggest, is a concept that seeks not only to liberate us from predatory and dysfunctional markets, but also from predatory and dysfunctional states. Something immediately seems incongruous here. If people are inherently cooperative reciprocators, why are states irredeemably corrupt? After all, as Harold Demsetz famously wrote in his 1967 attack on Arrow’s optimism about state production of information, “[g]overnment is a group of people.”32

Lessig, one of the progenitors of the language of the commons in the informational domain, often leads with a similar view of the state:

[I]f the twentieth century taught us one lesson, it is the dominance of private over state ordering. Markets work better than Tammany Hall in deciding who should get what, when. Or as Nobel Prize-winning economist Ronald Coase put it, whatever problems there are with the market, the problems with government are more profound.33

Lessig reveals his own sense of the power of this conception of the state when he seeks to tar IP law with the same brush; we should rebel against current IP law, he suggests, because we should “limit the government’s role in choosing the future of creativity.”34

Benkler is more measured but admits as well to viewing the state as “a relatively suspect actor.”35 We should worry, he suggests, that direct governmental intervention “leads to centralization in the hands of government agencies and powerful political lobbies,”36 a view that echoes the neoliberal account described above.

It should perhaps not surprise us that leading critics of neoliberal information policy embrace a neoliberal conception of the state. After all, neoliberalism is not merely an ideology, but also a set of policy prescriptions that may have helped to call forth the state that it has described. As David Harvey puts it, “[t]he neoliberal fear that special-interest groups would pervert and subvert the state is nowhere better realized than in Washington, where armies of corporate lobbyists . . . effectively dictate legislation to match their special interests.”37

There are, it must be said, few areas of law that better exemplify this problem than IP law. For example, Jessica Litman has documented the astonishing process through which the 1976 Copyright Act was drafted, in which Congress delegated most of the drafting to interest groups that were forced to negotiate with one another.38 Other scholars have offered similarly startling accounts of the genesis of the most important IP treaty today, the TradeRelated Aspects of Intellectual Property Rights (TRIPS) Agreement. TRIPS came into force in 1996, revolutionizing international IP law by both imposing new standards and by rendering them enforceable through the WTO’s disputeresolution system, which authorizes trade retaliation to enforce its judgments. Most countries in the world are members of TRIPS, and the Agreement introduced, for developing countries in particular, substantial new obligations, such as the obligation to grant patents on medicines and food-related inventions. Several excellent histories of the treaty have been written, documenting its beginnings as a brash idea proposed by “twelve chief executive officers (representing pharmaceutical, entertainment, and software industries).”39 As Susan Sell has described, the TRIPS Agreement was a triumph of industry organizing. Through TRIPS, Industry revealed its power to identify and define a trade problem, devise a solution, and reduce it to a concrete proposal that could be sold to governments.

#### Attempts to reform the WTO are neoliberal attempts to sustain the US regime of accumulation – the contradictions of capitalism are why credibility is low, not IP protection

Bachand 20 [(Remi, Professor of International Law, Département des sciences juridiques, member of the Centre d’études sur le droit international et la mondialisation (CÉDIM), Université du Québec à Montréal, Canada) “What’s Behind the WTO Crisis? A Marxist Analysis” The European Journal of International Law, 8/12/2020. https://academic.oup.com/ejil/article-abstract/31/3/857/5920920?redirectedFrom=fulltext] BC

To offer our own explanation, we must recall two aspects of our theoretical framework. The first is Robert Cox’s claim113 that the function of international organizations is to ensure the creation and reproduction of hegemony. To be more accurate, they serve, if we follow his argument, to defend and to expand the ‘mode of production’ (we elected to substitute this term for the concept of ‘regime of accumulation’ that appears to be more appropriate for our means) of the dominant social classes of the dominant state. Joining this idea with the école de la régulation and social structure of accumulation theory writing114 according to which a regime of accumulation needs some regulation institutions to help resolve its contradictions (and ensure profits and capital accumulation to dominant social classes), we can conclude that the Geneva organization’s function in the US hegemonic order is to make sure that neoliberalism works well enough to provide a satisfying rate of profit for US capitalists.

Going in that direction, Kristen Hopewell shows that the WTO’s creation participated in a shift in global governance from ‘embedded liberalism’ to neoliberalism115 and was slated to be an important part of that governance. Using the conceptual framework developed earlier, we can infer that the WTO was thus given a regulation function that was to ensure the operationalization of counteracting factors to the fall of the rate of profit for US capitalists. Now, as we have seen, the US rate of profit has been extremely unstable in the last two decades and Chinese expansion (and that of other ‘emerging countries’) allows one to predict that the situation could easily worsen in the future. Consequently, it should come as no surprise that the crisis that has been striking neoliberalism for the last 20 years may also result in a crisis of the organizations that are supposed to manage its contradictions, especially the WTO. Concretely, this organization seems unable to fulfil its regulatory function anymore, which is to ensure US capitalists a good rate of profit and opportunities to operationalize enough counteracting factors to negate its fall.

To go further, we now need to return to Stephen Gill’s claim that the function of an international organization is to limit political and economic possibilities. It is to exclude, in other words, options that are incompatible with the social order promoted by the hegemon from what is possible and achievable.116 Effectively, the WTO was created to play such a role. Indeed, promoting liberalization of goods and services, protecting (notably intellectual) property rights and attacking subsidies (in non-agriculture sectors), just to give a few examples, all serve to severely reduce state interventions into the economy and to circumscribe or at least to strongly impede the turn towards an alternative model to neoliberalism

#### Neoliberal exploitation causes extinction.

Clark 18 (Brett, associate professor of sociology and sustainability studies at the University of Utah; Stefano B. Longo, Assistant Professor specializing in Environmental Sociology at NC State; “Land–Sea Ecological Rifts”, Land–Sea Ecological Rifts, https://monthlyreview.org/2018/07/01/land-sea-ecological-rifts/)

Covering approximately 70 percent of the Earth’s surface, the World Ocean is “the largest ecosystem.”1 Today all areas of the ocean are affected by multiple anthropogenic effects—such as overfishing, pollution, and emission of greenhouse gases, causing warming seas as well as ocean acidification—and over 40 percent of the ocean is strongly affected by human actions. Furthermore, the magnitude of these impacts and the speed of the changes are far greater than previously understood.2 Biologist Judith S. Weis explains that “the most widespread and serious type of [marine] pollution worldwide is eutrophication due to excess nutrients.”3 The production and use of fertilizers, sewage/waste from humans and farm animals, combustion of fossil fuels, and storm water have all contributed to dramatic increases in the quantity of nutrients in waterways and oceans. Research in 2008 indicated that there were over 400 “dead zones,” areas of low oxygen, mostly near the mouths of rivers.4 Nutrient overloading thus presents a major challenge to maintaining healthy aquatic ecosystems.

Nutrients are a basic source of nourishment that all organisms need to survive. Plants require at least eighteen elements to grow normally; of these, nitrogen, phosphorus, and potassium are called macronutrients, because they are needed in larger quantities. While all essential nutrients exist in the biosphere, these three are the ones most commonly known to be deficient in commercial agricultural production systems. Beginning in the early twentieth century with the Haber-Bosch process, atmospheric nitrogen was converted into ammonia to create synthetic nitrogen fertilizer. The fixation of nitrogen, an energy-intensive process, made the nutrient far more widely available for use in agriculture. This in turn dramatically changed production systems, which no longer depended on legumes and manures to biologically supply nitrogen for other crops such as wheat, corn, and most vegetables.

In the modern era, particularly since the Second World War, the increased production and use of fertilizers served to greatly expand food production and availability. Major macronutrients are routinely applied to soils in order to maintain and increase the growth of plant life on farms, as well as private and public landscapes such as golf courses, nurseries, parks, and residences. They are used to produce fruits, vegetables, and fibers for human and non-human consumption, expand areas of recreation, and beautify communities. However, like many aspects of modern production, given the larger social dynamics and determinants that shape socioecological relationships, these technological and economic developments have generated serious negative—often unforeseen—consequences. The wide expansion and increasing rates of nitrogen and phosphorus application have caused severe damage to aquatic systems in particular. Rivers, streams, lakes, bays (estuaries), and ocean systems have been inundated with nutrient runoff, which has had far-reaching effects.

Here we examine the socioecological relationships and processes associated with the transfer of nutrients from terrestrial to marine systems. We employ a metabolic analysis to highlight the interchange of matter and energy within and between socioecological systems. In particular, we show how capitalist agrifood production contributes to distinct environmental problems, creating a metabolic rift in the soil nutrient cycle. We emphasize how the failure to mend nutrient cycles in agrifood systems has led to approaches that produce additional ruptures, such as those associated with nutrient overloading in marine systems. This analysis reveals the ways that the social relations of capitalist agriculture tend to produce interconnected ecological problems, such as those in terrestrial and aquatic systems. Further, we contend that these processes undermine the basic conditions of life on a wide-ranging scale. It is important to recognize that nutrient pollution of groundwater as well as surface waters has been a major concern since the rise of modern capitalist agriculture and the development of the global food regime.5 The failure to address the metabolic rupture in the soil nutrient cycle and the contradictions of capital are central to contemporary land-sea ecological rifts.

#### The alternative is a socialist movement that ends globalization

Galant 19 [(Michael, a coordinator of the Wire Pillar of the Progressive International, former economics and trade fellow at Young Professionals in Foreign Policy, MPP from Harvard University’s Kennedy School and BA in political economy from Brown University) “The Battle of Seattle: 20 years later, it's time for a revival” Open Democracy, 11/30/2019. https://www.opendemocracy.net/en/oureconomy/battle-seattle-20-years-later-its-time-revival/] BC

20 years ago today, the streets of Seattle became front lines in the global class war.

Over the course of five days, some 40,000 individuals, representing unions, environmental groups, and Leftist organizations from around the world came together in an attempt to disrupt the Ministerial Conference of the World Trade Organization (WTO).

Using direct action tactics, activists physically delayed access to the meeting and led marches, rallies, and teach-ins that drew massive crowds. Protesters of all stripes were attacked by a violent police force – attracting international media coverage. The demonstrations outside became a wedge that would help drive the negotiations inside to collapse. The Battle of Seattle was won.

But the war continued. Seattle was about more than any single organization. The WTO was a symbol of the larger project of neoliberal globalization that was, in 1999, well on its way to reshaping the world in the interest of capital. The Battle of Seattle would become an equally potent symbol of resistance. The WTO protests marked the moment that the Alter-Globalization Movement (AGM), also known as the Global Justice, or disparagingly, the Anti-Globalization Movement, was launched into the public consciousness.

Much has changed in the two decades since. The AGM won many meaningful victories and experienced many more profound losses. Eventually, the movement faded. Today’s global economy resembles the neoliberal nightmare the Seattle protesters were fighting against more than the world they were fighting for. But recent years have revealed cracks in the surface. With an opportunity to finish what was started, it’s time to revive the spirit of Seattle.

Globalization and its dissent

Neoliberal globalization is a political project intended to raise the power of capital to the international level – to cement its supremacy as an immutable universal law beyond the reach of political communities. “Free trade” agreements and WTO rules establish the primacy of profit over democracy, labor, environmental, and consumer protections. World Bank and IMF loan conditions impose austerity, privatization, and deregulation on nations of the Global South. An international system of tax havens allows corporations and wealthy individuals to hoard their plundered resources. Global supply chain fragmentation shields multinationals from accountability for their abuses. Investment treaties unleash finance and corporations to cross borders in search of opportunities for exploitation, setting off a regulatory race to the bottom. If there was doubt before that capitalism must be confronted at the global level to be defeated, the power grab that is neoliberal globalization puts those doubts to rest. Capital is global. Labor must be too.

Yet there are forces preventing such global solidarity. Beginning during the Cold War, the majority of Northern labor accepted a compromise: support a foreign policy that enacts the interests of capital, and benefit from a share of the spoils in the form of minor concessions, a tempered welfare state, and cheap consumer goods. This tacit agreement survived largely intact into the neoliberal era – dividing the interests of a global working class and quelling demands for systemic global change.

The Alter-Globalization Movement rejected the compromise. While activists in the Global South had long resisted destructive free trade agreements and World Bank austerity, occasionally with solidarity from the North, the extremity of turn-of-the-century neoliberalism led to the explosion of a movement that refused to accept the mere crumbs of neocolonial extraction, and sought instead to build an alternative global economy for the many, both North and South.

This was a movement that brought together American anarchists with Korean peasants; libertarian socialist indigenous groups in Mexico with US anti-sweatshop activists; the International Confederation of Free Trade Unions with the Industrial Workers of the World; the Brazilian Movement for Landless Workers with Greenpeace; Filipino anti-capitalist scholars with French farmer activists best known for physically dismantling a McDonald’s. Their demands were many and varied – from land redistribution to the abolition of the World Bank, from a renegotiated NAFTA to the protection of indigenous knowledge of seeds from privatization – but all shared a vision of a global solidarity that would overcome the forces of neoliberal globalization.

Organizing under such a big tent, the AGM is better understood as a dispersed, informal network – a “movement of movements” – than a unified political structure. This fluid network manifested in many forms. The flagship World Social Forum regularly convened activists in an alternative to the annual World Economic Forum. Transnational advocacy networks campaigned on issues such as Global South debt relief. Northern activists used their positions of relative privilege to support local campaigns in the South, fighting water privatization in Bolivia and indigenous displacement from hydroelectric dams in India. And, as in Seattle, meetings of international organizations became rallying points for major global demonstrations.

With these organizing methods, the movement achieved substantial victories. The Jubilee 2000 campaign led to significant debt relief for Southern nations. Potentially disastrous trade agreements from the FTAA to TPP have been, at least temporarily, defeated. International Financial Institutions like the IMF and World Bank – while still agents of global capital – have vastly improved their lending practices since the 90’s. But its greatest successes were intangible: the AGM undermined the hegemonic ambitions embodied in Thatcher’s “There Is No Alternative”, slowed neoliberal globalization’s seemingly inexorable onslaught, and kept alive the flame of resistance during an otherwise nadir of Leftist politics.

The AGM should not, however, be romanticized. Emerging in a moment when the failures of 20th century socialist politics weighed heavily on the Left’s imagination, the AGM turned too far in the opposing direction. Big-tentism led to a dilution of demands and paved the way for the NGO-ization of the World Social Fora. A preference for all things decentralized made grabbing headlines easy, but building lasting political structures difficult. Resistance was often treated as an intrinsically valuable ends, rather than a means to taking power. And criticisms of “neoliberalism” typically fell short of identifying the true enemy – capitalism – or advancing a coherent alternative – socialism.

Ultimately, the neoliberal plan for the global economy succeeded more than not. While resistance to neoliberal globalization would rage on in the South, Northern solidarity faded. The September 11th attacks were the beginning of the end. Energy shifted to the anti-war movement, the state expanded its repression of Leftist organizing, and increased pressures toward “patriotism” led some to reconsider the old foreign policy compromise. By the mid-2000’s, little was left of what the AGM once was.

A call for revival

It’s time to rekindle the flame.

The global economy is still structured in the interest of capital. But the neoliberal consensus has begun to waver under the weight of its own contradictions.

The Right has a response to the crisis. Reactionary nationalists like Trump and Johnson seize upon existing systems of oppression to scapegoat the symptoms of a failed economic model. The problem is not that the global working class has lost out to a global capital class. The problem is that “we” – White, Christian, cishet, native-born Americans – have lost out to “them” – People of Color, immigrants, entire foreign countries, feminists, LGBTQ+ folks, and all those who threaten our supremacy in their struggles for liberation.

The Left must offer an alternative vision. The dramatic growth of socialist organizing and rise in popularity of social democratic politicians should offer great hope. But as the AGM understood, social democracy for the North is not enough. Our socialism must not mean merely a greater share of neocolonial extraction for Northern workers. Our socialism must rightly identify the global nature of our challenge, and unite across borders to confront a globalized capital.

That means internationalizing labor organizing to confront multinational corporations. Changing the rules of trade and investment. Ending tax havens. Building alternatives to the existing intellectual property regime. Holding corporations accountable for abuses in their supply chains. Supporting the struggles of peasants, indigenous peoples, and all global subaltern groups. Democratizing global governance. Opening borders to those displaced by the ravages of global capitalism. Advancing alternative models of development. Transforming, if not abolishing and replacing, the Bretton Woods Institutions. And confronting the all-important threat of climate collapse with, to begin with, a global Green New Deal. These are not minor addendums to a socialist platform. Class war is global. Internationalist demands are fundamental.

Organizations that remain from the AGM, international labor, and newcomers like Justice Is Global, the Fight Inequality Alliance, and Bernie Sanders and Yanis Varoufakis’s Progressive International, are already struggling for this vision. But its fruition depends on the backing of a far broader movement.

Like the AGM, we must take a global frame of analysis, and see neoliberal globalization as a concerted effort to undermine our power. Unlike the AGM, we must understand that neoliberalism is merely one manifestation of a greater enemy.

Like the AGM, we must build diverse, anti-racist, anti-sexist, anti-xenophobic movements that transcend borders. Unlike the AGM, we must not allow fears of centralization to undermine a coherent platform.

Like the AGM, we must reject a class compromise that sacrifices the possibility of a better world for the crumbs of colonialism. Unlike the AGM, we must build lasting political structures that back our rejection with political power.

20 years ago, the streets of Seattle echoed with a chant that would become the defining motto of the movement: “another world is possible!” It still is – if we’re willing to fight for it.

## Case

#### Their Silverstein evidence is about Israel-Iran war:

#### They haven’t read an internal link for Jordan-Israel tensions spilling over to Iran

#### Alt causes

DW 20 [(Deutsche Welle, German public state-owned international broadcaster funded by the German federal tax budget) “Israel-Iran conflict to be major Middle East issue in 2020,” 1/2/2020] JL

European signatories to the JCPOA have been unable to effectively lift the renewed embargoes on trade with Iran, prompting Tehran to gradually restart uranium enrichment as the deal crumbled in mid-2019. Meanwhile, tit-for-tat confrontations on Iranian and US proxies in the Persian Gulf, along with Israeli attacks on Iranian proxies in Syria and Iraq, have escalated.

Israel and Iran have been antagonists since the 1980s. But, after the US's 2003 invasion of Iraq and the formal withdrawal of American troops in 2011, the regional balance of power was broken, leaving the Middle East without a clear hegemon. That created a vacuum that has brought the countries into increasing conflict.

Despite their aggressive rhetoric, officials in neither country seek an all-out, direct war. But differences in perception, deteriorating commitment to the vestiges of the JCPOA, and the vagaries of elections in Israel, Iran and the US all ratchet up the prospect that an inadvertent clash could escalate the conflict.

Ali Vaez, an Iran analyst for the International Crisis Group, told DW that the conflict has become "a screw that only turns in one direction, getting tenser and tenser over time."

"There are serious risks of miscalculation that could push the parties into even greater and more direct confrontation," Vaez said.

In recent years, Iran has expanded its influence in the region. In Syria, it has bolstered the operations of President Bashar Assad. In Iraq, it has supported political parties and various militias since the US invasion in 2003 and, according to anonymous US officials cited by *The New York Times*, has recently been building up an arsenal of short-range ballistic missiles there. In Yemen, it has backed the Houthis against Saudi Arabia; in December the US claimed it had intercepted a transfer of advanced Iranian missile parts to the Houthis.

To Israel's north, Iran has maintained strategic support for Hezbollah, Lebanon's strongest political party, with a paramilitary wing widely considered to be more powerful than the Lebanese army.

Tehran is trying to establish a balance in a region where Saudi Arabia and the United Arab Emirates massively outspend Iran militarily and Israel already possesses nuclear weapons, Trita Parsi, the executive vice president of the Washington-based think tank Quincy Institute for Responsible Statecraft, told DW. With a limited, aging air force that cannot compete with regional and US combat aircraft, missiles are Iran's only conventional deterrent.

Israel has long carried out undeclared strikes on Iranian targets in Syria, but recent months have seen officials publicly claim the operations, intensify the attacks and expand the theater of war.

Israel's military hit more than 200 Iran-backed targets in Syria in 2017 and 2018. In a rare public admission in late November, the military claimed one of the largest strikes in recent years on Iranian and Syrian targets in Damascus, in the midst of a flare-up of violence with Gaza.

The intensity of the operations has increased since the latest standoff in the Persian Gulf started in May, when the United States deployed military assets around the Strait of Hormuz, a number of tankers were sabotaged and seized, and rival drones were shot down in what appeared to be active if indirect engagement between forces operating on behalf of the US and Iran.

#### No Israel-Iran war

Safaei 9/17 [(Sajjad, postdoctoral fellow at Germany’s Max Planck Institute for Social Anthropology) “Israel Isn’t Strong Enough to Attack Iran,” Foreign Policy, 9/17/2021] JL

To be sure, Israel has in the past carried out relatively limited operations against Iran—such as raids on Iranian allies in Syria and nuclear sabotage—and may continue to do so in the future. But to what extent should we believe Tel Aviv is truly ready and willing to launch a strike on Iran because of advances in the Iranian nuclear program, knowing full well that this is likely to push the two countries and their allies into war? The political and military constraints on Israeli decision-makers suggests such a military showdown is highly unlikely.

To speak of an imminent and undisguised IDF strike deep inside Iranian territory is to overlook a long-established norm that has for decades governed U.S.-Israel relations: Israel cannot simply ignore the wishes and concerns of its chief patron, especially when core U.S. foreign policy priorities are at stake.

This norm was expressed in clear terms by no less a figure than Israel’s former premier and Defense Minister Ehud Barak in his autobiography *My Country, My Life*. Here, Barak spelled out the paradigm that has shaped—and will likely continue to shape—the contours of Israeli action against Iran. “There were only two ways,” he explained, that Israel could stop the Iranians from getting a nuclear weapon (read: “nuclear program,” for Barak willfully ignores U.S. intelligence assessments that Iran had halted pursuits for nuclear weapons in 2003). One way was “for the Americans to act.” The only other option was “for [the United States] not to hinder Israel from doing so.”

But according to Barak, “hinder” is precisely what consecutive U.S. administrations have done—and are still likely to do.

Even during the military interventionism of the George W. Bush presidency, Israel did not have a blank check to do as it pleased. As Barak notes in his memoirs, when Bush learned in 2008 of Israeli efforts to purchase heavy munitions from the United States, he confronted Barak and then-premier Ehud Olmert. “I want to tell both of you now, as president,” Bush warned, “We are totally against any action by you to mount an attack on the [Iranian] nuclear plants.”

“I repeat,” Bush further clarified, “in order to avoid any misunderstanding. We expect you not to do it. And we’re not going to do it, either, as long as I am president. I wanted it to be clear.” It deserves mention that according to Barak, Bush issued this warning despite knowing that Israel did not even possess the military capacity to assault Iran at the time.

According to Barak, this staunch opposition to a strike on Iran had a “dramatic” effect on him and Olmert since the Bush administration had supported Israel’s 2007 bombing of Syria’s nascent nuclear program just a year before. In both cases, Washington’s approval, or lack thereof, was demonstrably consequential.

Barak’s memoirs show that the same dynamic continued to govern U.S.-Israel relations during Obama’s presidency. He recalls how then-U.S. Secretary of Defense Leon Panetta “made no secret of the fact he didn’t want us to launch a military strike” at a time when the Obama administration was focused on putting international political and economic pressure on Iran. Panetta “urged me to ‘think twice, three times,’ before going down that road,” Barak wrote, and saw it as a given that Tel Aviv would keep Washington abreast of its decisions. “If you do decide to attack the Iranian facilities, when will we know?” he allegedly asked Barak.

According to Barak’s account, Israel was dissuaded from going forward with a supposed strike on Iran’s nuclear installations in summer 2012 “because of the damage it would do to our ties with the United States.” Washington’s demands continued to limit Tel Aviv after the finalization of the nuclear deal in 2015. Even then, Barak recalls, the Israelis could not simply act against Iran without a green light from the Obama administration: “We needed to reach agreement with the Americans about what kind of military strike we, or they, might have to take if the Iranians again moved to get nuclear weapons.”

As evinced by Barak’s autobiography, U.S. presidents are not taciturn about making their views and wishes known to Israeli officials, especially when primary U.S. foreign policy objectives are involved. Nor can Tel Aviv afford to ignore Washington’s express demands and concerns on such matters. And today, any flagrant Israeli violation of Iranian sovereignty will instantly clash with two mutually reinforcing goals that have come to define the Biden administration’s foreign policy: curbing Iran’s nuclear program through non-military means (efforts currently focused on reviving the 2015 Iranian nuclear deal) and winding down U.S. military presence in the Middle East.

These political realities make it unlikely Israel will pursue an overt strike on Iran. Just as important, however, are the military constraints that Israel faces.

To be sure, even without its ready-to-launch nuclear warheads, Israel is more than capable of delivering swift and devastating blows to Iran’s armed forces, both in the skies and seas. Its fleet of American fighter jets and bombers alone can irreparably trounce Iran’s air defenses as well as its dilapidated air force. Even Iran’s increasingly powerful, accurate, and far-reaching missile and drone systems don’t radically alter the balance of power in the skies. In short, in terms of military hardware, the IDF’s superiority over Iran’s armed forces is indisputable, not to mention otherworldly.

But this prodigious superiority will be rendered far less consequential in the event of an all-out war that lures the IDF ground forces into the battlefield. Why? Ever since the IDF’s embarrassing defeat during the 2006 war with Hezbollah, Israel’s top military brass have become acutely aware that the country’s land forces are ill-prepared for a full-scale war with a fighting force even moderately capable of packing a punch.

#### The US would first strike Russia – they could eliminate their nuclear arsenal with a conventional strike

Plesch 18 [(Dan, Director of the Centre for International Studies and Diplomacy, SOAS, University of London) “Could the US win World War III without using nuclear weapons?” The Conversation, 4/19/2018] BC

As the US, Russia and China test each other’s patience and strategic focus, speculation about the chances of a world war has hit a new high. But many of the people seriously engaged in this weighty discussion often get it wrong.

When it comes to estimating military capability, the Western media is principally concerned with the weapons capabilities of weaker states – and it rarely pays much attention to the colossal capability of the US, which still accounts for most of the world’s defence spending.

Any sensible discussion of what a hypothetical World War III might look like needs to begin with the sheer size and force of America’s military assets. For all that China and Russia are arming up on various measures, US commanders have the power to dominate escalating crises and counter opposing forces before they can be used.

Take missile warfare alone. The US Navy already has 4,000 Tomahawk cruise missiles, and the Navy and Air Force are currently taking delivery of 5,000 JASSM conventional cruise missiles with ranges from 200-600 miles. Barely visible to radar, these are designed to destroy “hardened” targets such as nuclear missile silos. Russia and China, by contrast, have nothing of equivalent quantity or quality with which to threaten the US mainland.

The same holds true when it comes to maritime forces. While much is made of Russia’s two frigates and smaller vessels stationed off the Syrian coast, France alone has 20 warships and an aircraft carrier in the Mediterranean – and US standing forces in the area include six destroyers equipped with scores of cruise missiles and anti-missile systems. At the other end of Europe, the Russian military is threatening the small Baltic states, but it is rarely noted that the Russian Baltic fleet is the same size as Denmark’s and half the size of Germany’s.

Meanwhile, China’s aggressively expansionist behaviour in the South China Sea is reported alongside stories of its first aircraft carrier and long-range ballistic missiles. But for all that the Chinese navy is large and growing, according to the International Institute for Strategic Studies, it’s still only numerically equivalent to the combined fleets of Japan and Taiwan, while the US boasts 19 aircraft carriers worldwide if its marine assault ships are included.

But overhanging all this, of course, is the nuclear factor.

Out of the sky

The US, Russia and China are all nuclear-armed; Vladimir Putin recently unveiled a new fleet of nuclear-capable missiles which he described as “invincible in the face of all existing and future systems”, and some have suggested that China may be moving away from its no-first-use policy. This is all undeniably disturbing. While it has long been assumed that the threat of nuclear weapons acts as a deterrent to any war between the major powers, it’s also possible that the world may simply have been riding its luck. But once again, the US’s non-nuclear capabilities are all too often overlooked.

US leaders may in fact believe they can remove Russia’s nuclear deterrent with an overwhelming conventional attack backed up by missile defences. This ability was cultivated under the Prompt Global Strike programme, which was initiated before 9/11 and continued during the Obama years. Organised through the US Air Force’s Global Strike Command, it is to use conventional weapons to attack anywhere on Earth in under 60 minutes.

This is not to say the task would be small. In order to destroy Russia’s nuclear missiles before they can be launched, the US military would need to first blind Russian radar and command and communications to incoming attack, probably using both physical and cyber attacks. It would then have to destroy some 200 fixed and 200 mobile missiles on land, a dozen Russian missile submarines, and Russian bombers. It would then need to shoot down any missiles that could still be fired.

Russia is not well positioned to survive such an attack. Its early warning radars, both satellite and land-based, are decaying and will be hard to replace. At the same time, the US has and is developing a range of technologies to carry out anti-satellite and radar missions, and it has been using them for years. (All the way back in 1985, it shot down a satellite with an F15 jet fighter.) That said, the West is very dependent on satellites too, and Russia and China continue to develop their own anti-satellite systems.

The air war

Russia’s bomber aircraft date back to the Soviet era, so despite the alarm they provoke when they nudge at Western countries’ airspace, they pose no major threat in themselves. Were the Russian and US planes to face each other, the Russians would find themselves under attack from planes they couldn’t see and that are any way out of their range.

US and British submarine crews claim a perfect record in constantly shadowing Soviet submarines as they left their bases throughout the Cold War. Since then, Russian forces have declined and US anti-submarine warfare has been revived, raising the prospect that Russian submarines could be taken out before they could even launch their missiles.

The core of the Russia’s nuclear forces consists of land-based missiles, some fixed in silos, others mobile on rail and road. The silo-based missiles can now be targeted by several types of missiles, carried by US planes almost invisible to radar; all are designed to destroy targets protected by deep concrete and steel bunkers. But a problem for US war planners is that it might take hours too long for their missile-carrying planes to reach these targets – hence the need to act in minutes.

One apparently simple solution to attacking targets very quickly is to fit quick nuclear ballistic missiles with non-nuclear warheads. In 2010, Robert Gates, then serving as secretary of defence under Barack Obama, said that the US had this capability. Intercontinental ballistic missiles take just 30 minutes to fly between the continental US’s Midwest and Siberia; if launched from well-positioned submarines, the Navy’s Tridents can be even quicker, with a launch-to-target time of under ten minutes.

From 2001, the US Navy prepared to fit its Trident missiles with either inert solid warheads – accurate to within ten metres – or vast splinter/shrapnel weapons. Critics have argued that this would leave a potential enemy unable to tell whether they were under nuclear or conventional attack, meaning they would have to assume the worst. According to US Congressional researchers, the development work came close to completion, but apparently ceased in 2013.

Nonetheless, the US has continued to develop other technologies across its armed services to attack targets around the world in under an hour – foremost among them hypersonic missiles, which could return to Earth at up to ten times the speed of sound, with China and Russia trying to keep up.

Missile envy

The remainder of Russia’s nuclear force consists of missiles transported by rail. An article on Kremlin-sponsored news outlet Sputnik described how these missile rail cars would be so hard to find that Prompt Global Strike might not be as effective as the US would like – but taken at face value, the article implies that the rest of the Russian nuclear arsenal is in fact relatively vulnerable.

Starting with the “Scud hunt” of the First Gulf War, the US military has spent years improving its proficiency at targeting mobile ground-based missiles. Those skills now use remote sensors to attack small ground targets at short notice in the myriad counter-insurgency operations it’s pursued since 2001.

If the “sword” of Prompt Global Strike doesn’t stop the launch of all Russian missiles, then the US could use the “shield” of its own missile defences. These it deployed after it walked out of a treaty with Russia banning such weapons in 2002.

While some of these post-2002 missile defence systems have been called ineffective, the US Navy has a more effective system called Aegis, which one former head of the Pentagon’s missile defence programs claims can shoot down intercontinental ballistic missiles. Some 300 Aegis anti-ballistic missiles now equip 40 US warships; in 2008, one destroyed a satellite as it fell out of orbit.

War mentality

In advance of the Iraq war, various governments and onlookers cautioned the US and UK about the potential for unforeseen consequences, but the two governments were driven by a mindset impervious to criticism and misgivings. And despite all the lessons that can be learned from the Iraq disaster, there’s an ample risk today that a similarly gung-ho attitude could take hold.

Foreign casualties generally have little impact on domestic US politics. The hundreds of thousands of Iraqi civilians who died under first sanctions and then war did not negatively impact presidents Clinton or George W. Bush. Neither might the prospect of similar casualties in Iran or North Korea or other states, especially if “humanitarian” precision weapons are used.

But more than that, an opinion poll run by Stanford University’s Scott Sagan found that the US public would not oppose the preemptive use of even nuclear weapons provided that the US itself was not affected. And nuclear Trident offers that temptation.

The control of major conventional weapons as well as WMD needs urgent attention from international civil society, media and political parties. There is still time to galvanise behind the Nobel-winning International Campaign to Abolish Nuclear Weapons and the nuclear ban treaty, and to revive and globalise the decaying arms control agenda of the Organisation for Security and Co-operation in Europe, which played a vital part in bringing the Cold War to a largely peaceful end.

Like the Kaiser in 1914, perhaps Trump or one of his successors will express dismay when faced with the reality a major US offensive unleashes. But unlike the Kaiser, who saw his empire first defeated and then dismembered, perhaps a 21st-century US president might get away with it.

**Successful preemptive strike forces a surrender – solves further escalation**

Sarah **Johnson 17**, "U.S. Nuclear First Strike Policy; Be Afraid", Bill Track 50, https://www.billtrack50.com/blog/in-the-news/u-s-nuclear-first-strike-policy-be-afraid/

The second situation is a [preemptive strike](http://www.dictionary.com/browse/preemptive-strike) — a first-strike attack with nuclear weapons carried out to destroy an enemy’s capacity to respond. Preemptive strikes can be based on the assumption that the enemy is planning an **imminent attack**, but don’t have to be. The methodology behind a preemptive nuclear strike is to attack the enemy’s **strategic nuclear weapon facilities** (missile silos, submarine bases, bomber airfields), command and control sites and storage depots first. By hitting these targets first the enemy will be **so wounded** with **so little of their resources left** that they will be **forced to surrender** with minimal damage to the attacking party.

**Otherwise, Russia will broadly scale up military AI – extinction**

Mike **Rogers 17**, former US Representative from Michigan, chairman of the House Permanent Select Committee on Intelligence, "Artificial intelligence — the arms race we may not be able to control", TheHill, https://thehill.com/opinion/technology/351725-artificial-intelligence-is-the-new-arms-race-we-may-not-be-able-to-control

“Whoever becomes the leader in this sphere will **become ruler of the world**,” [said](https://www.theverge.com/2017/9/4/16251226/russia-ai-putin-rule-the-world) Vladimir Putin. The sphere the President of Russia is referring to is **artificial intelligence** (AI) and his comments should give you a moment of pause. Addressing students at the beginning of our Labor Day weekend, Putin remarked “Artificial intelligence is the future, not only for Russia, but for all humankind,” adding, “It comes with colossal opportunities, but also threats that are difficult to predict.” For once, I find myself in agreement with the President of Russia, but just this once. Artificial Intelligence offers **incredible** promise and **peril**. **Nowhere is this clearer than in the realm of national security**. Today un-crewed systems are a fact of modern warfare. Nearly every country is adopting systems where personnel are far removed from the conflict and wage war by remote control. AI [stands](https://www.nytimes.com/2016/10/26/us/pentagon-artificial-intelligence-terminator.html) to sever that ground connection. Imagine a **fully autonomous Predator or Reaper drone**. Managed by an AI system, the drone could **identify targets**, **determine their legitimacy**, and **conduct a strike** all **without human intervention.** Indeed, the Ministry of Defence of the United Kingdom issued a press [statement](https://www.theverge.com/2017/9/12/16286580/uk-government-killer-robots-drones-weapons) in September that the country “does not possess fully autonomous weapon systems and has no intention of developing them,” and that its weapons systems “will always be under control as an absolute guarantee of human oversight and authority and accountability.” Let’s think smaller. Imagine a tiny insect-sized drone loaded with explosive. Guided by a [pre-programmed AI](https://www.amazon.com/Life-3-0-Being-Artificial-Intelligence/dp/1101946598), it could hunt down a specific target — a politician, a general, or an opposition figure — determine when to strike, how to strike, and if to strike based on its own learning. Howard Hughes Medical Center [recently](https://qz.com/1000011/scientists-attached-an-electronic-backpack-to-a-genetically-modified-dragonfly-and-turned-it-into-a-drone/) attached a backpack to a genetically modified dragonfly and flew it remotely. These examples are, however, where humans are involved and largely control the left and right limits of AI. **Yet, there are examples of AI purposely and independently going beyond programed parameters.** Rogue algorithms led to a [flash crash](http://gizmodo.com/rogue-algorithm-blamed-for-historic-crash-of-the-britis-1787523587) of the British Pound. In 2016, in-game AIs **created super AIs weapons** and [**hunted down**](http://www.kotaku.co.uk/2016/06/03/elites-ai-created-super-weapons-and-started-hunting-players-skynet-is-here) **human players**, and AIs have [**created**](https://www.forbes.com/sites/tonybradley/2017/07/31/facebook-ai-creates-its-own-language-in-creepy-preview-of-our-potential-future/#1cf69787292c) **their own languages** that were **indecipherable to humans**. AIs proved more effective than their human counterparts in producing and catching users in **spear phishing programs**. Not only did the AIs create more content, they successfully [captured](https://www.blackhat.com/docs/us-16/materials/us-16-Seymour-Tully-Weaponizing-Data-Science-For-Social-Engineering-Automated-E2E-Spear-Phishing-On-Twitter.pdf) more users with their deception. While seemingly simple and low stakes in nature, **extrapolate these scenarios into more significant and risky areas and the consequences become much greater.** Cybersecurity is no different. Today we are focused on the hackers, trolls, and cyber criminals (officially sanctioned and otherwise) who seek to penetrate our networks, steal our intellectual property, and leave behind malicious code for activation in the event of a conflict. Replace the individual with an AI and imagine how fast hacking takes place; networks against networks, at machine speed all without a human in the loop. Sound far-fetched? **It’s not**. In 2016, the Defense Advanced Research Projects Agency held an AI on AI capture the flag contest called the [Cyber Grand Challenge](https://www.youtube.com/watch?v=qSgYu3w3DMM) at the DEF CON event. AI networks against AI networks. In August of this year the founders of 116 AI and robotics companies signed a letter petitioning the United Nations [to ban](https://www.theverge.com/2017/8/21/16177828/killer-robots-ban-elon-musk-un-petition) lethal autonomous systems. Signatories to this letter included Google DeepMind’s co-founder Mustafa Suleyman and Elon Musk who, in response to Putin’s quote [tweeted](https://twitter.com/elonmusk/status/904638455761612800), “Competition for AI superiority at national level most likely cause of WW3 imo (sic)”. AI is not some far off future challenge. It is a challenge today and one with which we must grapple. I am in favor of fielding any system that enhances our national security, but we must have an open and honest conversation about the implications of AI, the consequences of which **we do not**, **and may not**, **fully understand**. This is not a new type of bullet or missile. This is a potentially **fully autonomous system** that even with human oversight and guidance will make its own decisions on the battlefield and in cyberspace. How can we ensure that the system does not **escape our control?** How can we prevent such systems from falling into the hands of terrorists or insurgents? Who controls the source code? How and can we build in so-called impenetrable kill switches? AI and AI-like systems are slowly being introduced into our arsenal. Our adversaries, China, Russia, and others are also introducing AI systems into their arsenals as well. Implementation is happening faster than our ability to fully **comprehend the consequences.** Putin’s new call spells out a new arms race. **Rushing to AI weapon systems without guiding principles is a dangerous**. It risks an **escalation** that we do not fully understand and may not be able to control. The cost of limiting AI intelligence being weaponized [**could vastly exceed**](https://www.belfercenter.org/sites/default/files/files/publication/AI%20NatSec%20-%20final.pdf) **all of our nuclear proliferation efforts to date**. More troubling, the **consequences of failure are equally existential.**

#### AI causes extinction.

Bilton 14 [(Nick, a Special Correspondent for Vanity Fair, where he writes about technology, politics, business and culture. A columnist and reporter for The New York Times for over a decade, Bilton is a bestselling author, screenwriter, CNBC contributor and host of the Vanity Fair podcast, Inside the Hive.) Internally cites Bostrom (Nick, Professor, University of Oxford, Director, Future of Humanity Institute, Director, Governance of AI program) Musk (Elon, known for founding Tesla Motors and SpaceX, which launched a landmark commercial spacecraft in 2012.) Hawking (Steven, an English theoretical physicist, cosmologist, and author who was director of research at the Centre for Theoretical Cosmology at the University of Cambridge at the time of his death.) Docherty (Bonnie, a lecturer on law at Harvard University and a senior researcher at Human Rights Watch) Hassabis (Demis, founder and chief executive of DeepMind) “Artificial Intelligence as a Threat” The New York Times 11/5/2014] BC

Ebola sounds like the stuff of nightmares. Bird flu and SARS also send shivers down my spine. But I’ll tell you what scares me most: artificial intelligence.

The first three, with enough resources, humans can stop. The last, which humans are creating, could soon become unstoppable.

Before we get into what could possibly go wrong, let me first explain what artificial intelligence is. Actually, skip that. I’ll let someone else explain it: Grab an iPhone and ask Siri about the weather or stocks. Or tell her “I’m drunk.” Her answers are artificially intelligent.

Right now these artificially intelligent machines are pretty cute and innocent, but as they are given more power in society, these machines may not take long to spiral out of control.

In the beginning, the glitches will be small but eventful. Maybe a rogue computer momentarily derails the stock market, causing billions in damage. Or a driverless car freezes on the highway because a software update goes awry.

But the upheavals can escalate quickly and become scarier and even cataclysmic. Imagine how a medical robot, originally programmed to rid cancer, could conclude that the best way to obliterate cancer is to exterminate humans who are genetically prone to the disease.

Nick Bostrom, author of the book “Superintelligence,” lays out a number of petrifying doomsday settings. One envisions self-replicating nanobots, which are microscopic robots designed to make copies of themselves. In a positive situation, these bots could fight diseases in the human body or eat radioactive material on the planet. But, Mr. Bostrom says, a “person of malicious intent in possession of this technology might cause the extinction of intelligent life on Earth.”

Artificial-intelligence proponents argue that these things would never happen and that programmers are going to build safeguards. But let’s be realistic: It took nearly a half-century for programmers to stop computers from crashing every time you wanted to check your email. What makes them think they can manage armies of quasi-intelligent robots?

I’m not alone in my fear. Silicon Valley’s resident futurist, Elon Musk, recently said artificial intelligence is “potentially more dangerous than nukes.” And Stephen Hawking, one of the smartest people on earth, wrote that successful A. I. “would be the biggest event in human history. Unfortunately, it might also be the last.” There is a long list of computer experts and science fiction writers also fearful of a rogue robot-infested future.

Two main problems with artificial intelligence lead people like Mr. Musk and Mr. Hawking to worry. The first, more near-future fear, is that we are starting to create machines that can make decisions like humans, but these machines [don’t have morality](http://ethicbots.na.infn.it/meetings/kom/veruggio.pdf) and likely never will.

The second, which is a longer way off, is that once we build systems that are as intelligent as humans, these intelligent machines will be able to build smarter machines, often referred to as superintelligence. That, experts say, is when things could really spiral out of control as the rate of growth and expansion of machines would increase exponentially. We can’t build safeguards into something that we haven’t built ourselves.

“We humans steer the future not because we’re the strongest beings on the planet, or the fastest, but because we are the smartest,” said James Barrat, author of “Our Final Invention: Artificial Intelligence and the End of the Human Era.” “So when there is something smarter than us on the planet, it will rule over us on the planet.”

What makes it harder to comprehend is that we don’t actually know what superintelligent machines will look or act like. “Can a submarine swim? Yes, but it doesn’t swim like a fish,” Mr. Barrat said. “Does an airplane fly? Yes, but not like a bird. Artificial intelligence won’t be like us, but it will be the ultimate intellectual version of us.”

Perhaps the scariest setting is how these technologies will be used by the military. It’s not hard to imagine countries engaged in an arms race to build machines that can kill.

Bonnie Docherty, a lecturer on law at Harvard University and a senior researcher at Human Rights Watch, said that the race to build autonomous weapons with artificial intelligence — which is already underway — is reminiscent of the early days of the race to build nuclear weapons, and that treaties should be put in place now before we get to a point where machines are killing people on the battlefield.

“If this type of technology is not stopped now, it will lead to an arms race,” said Ms. Docherty, who has written several reports on the dangers of killer robots. “If one state develops it, then another state will develop it. And machines that lack morality and mortally should not be given power to kill.”

So how do we ensure that all these doomsday situations don’t come to fruition? In some instances, we likely won’t be able to stop them.

But we can hinder some of the potential chaos by following the lead of Google. Earlier this year when the search-engine giant acquired DeepMind, a neuroscience-inspired, artificial intelligence company based in London, the two companies put together an artificial intelligence safety and ethics board that aims to ensure these technologies are developed safely.

Demis Hassabis, founder and chief executive of DeepMind, said in a video interview that anyone building artificial intelligence, including governments and companies, should do the same thing. “They should definitely be thinking about the ethical consequences of what they do,” Dr. Hassabis said. “Way ahead of time.”

#### No water wars - drought diplomacy solves

AFP 8/31 [(Agence France-Presse, international news agency headquartered in Paris, world's oldest news agency) “Drought diplomacy boosts Israel-Jordan ties,” Al Jazeera, 8/31/2021] JL

But, experts say, instead of the pressure provoking arguments, Israel and Jordan could be poised for an unprecedented boom in water cooperation amid technological advancements and climate pressures.

Warnings about looming “water wars”, including in the Middle East, were often inflated, said Duke University professor Erika Weinthal.

“Water is a resource that allows for adversaries to actually find ways to cooperate,” said Weinthal, a specialist in global environmental politics, who has worked extensively on Israel-Jordan issues.

“If you look at the data, you see more cooperation over water than conflict, and where there is conflict, it is usually verbal.”

Jordan is one of the world’s most water-deficient countries, suffering from extreme droughts, and water cooperation with Israel long pre-dates a 1994 peace deal between the two.

The issue came to prominence in 1921, when Pinhas Rutenberg, a Russian-Jewish engineer who had moved to Palestine, convinced British authorities and Hashemite royals to approve a hydropower station where the Yarmuk tributary meets the Jordan River.

It continued after Israel’s founding in 1948, through decades when the nations were officially at war.

Water deals, like all bilateral ties, suffered in recent years under former Israeli prime minister Benjamin Netanyahu, whom critics have accused of neglecting Jordan as he pursued deeper ties with Iran’s foes in the Gulf.

But there have been signs of progress since Prime Minister Naftali Bennett’s government took office in June, with the countries agreeing to their largest-ever water transaction.

New technologies reducing costs have made seawater desalination “a profitable concern”, with investors from Israel, Jordan and the United Arab Emirates – which just normalised ties with the Jewish state – showing interest, said Gidon Bromberg, Israel director at EcoPeace Middle East.

“The people that are going to invest in more desalination very much see the opportunities for profit,” Bromberg said.

It means that Israel – one of the world’s desalination leaders – can sell more water, including natural freshwater from the Sea of Galilee, to Jordan without threatening domestic demand, he said.

And Israel has a new incentive to do so, because it now needs something from Jordan in return, according to analysts.

To meet the 2015 Paris climate accord commitments, Bennett’s government has approved a target of reducing greenhouse gas emissions in the energy sector by at least 85 percent. Multiple assessments show Israel does not have enough land to ramp up the necessary solar production, so it will have to buy solar power from Jordan to hit its targets.

“For the very first time, all sides will have something to sell and something to buy,” said Bromberg, whose organisation works in Israel, Jordan and the occupied Palestinian territory, which is also struggling from a worsening water crisis.

This unprecedented alignment of interests could help repair semi-fractured diplomatic relations, he argued.

“There are relatively few opportunities to try and rebuild trust,” Bromberg added. “Water and energy are one of those rare opportunities.”

#### Middle East war is good—it raises oil prices

Lynch 18 [Michael Lynch spent nearly 30 years at MIT as a student and then researcher at the Energy Laboratory and Center for International Studies. He then spent several years at what is now IHS Global Insight and was chief energy economist. Currently, Lynch serves as the president of Strategic Energy and Economic Research, Inc., and lectures MBA students at Vienna University. He’s been president of the US Association for Energy Economics and serves on the editorial boards of three publications. Will Oil Prices Blow Up With The Middle East? April 12, 2018. https://www.forbes.com/sites/michaellynch/2018/04/12/will-the-oil-price-blow-up-with-the-middle-east/#166754c23d19]

It's said that a woman once approached 19th century German Chancellor Bismarck and asked him to explain the controversy over Schleswig-Holstein, to which Bismarck responded, “Madam, only three people have ever understood Schleswig-Holstein. One is dead, the second has gone mad, and I’m the third and I’ve quite forgot.” This summarizes how I feel about the current Middle East situation. The public rhetoric (including tweets) suggests that the U.S. and Russia are both willing to attack each other’s forces -- the U.S. is planning an attack on Syrian forces that might affect Russian personnel and Russia is apparently threatening to shoot down U.S. planes. This is obviously concerning, and while incidental Russia casualties might not lead to a direct military response, if Russia shot down a U.S. plane (as opposed to an unmanned missile), the U.S. would almost certainly respond. Given that the Russians know this, they are unlikely to take such a step. An additional factor is the possibility that Iranian forces in Syria would be hit by any U.S. attack, which might invite retaliation. Iran is unlikely to be able to attack U.S. forces in the Mediterranean directly, but forces in Iraq and Syria might be subject to ‘asymmetrical warfare,’ i.e., small-scale attacks, possibly including suicide bombers. The threat to oil markets come if Iranian actions encourage President Trump to refuse to recertify the Iranian nuclear agreement in mid-May. While many of Iran’s customers in Asia would not be concerned, there might be some drop in sales from companies fearful of U.S. legal action. Sanctions on financial transfers would also deter the more conventional customers, but the Iranians should be able to work around that after a brief pause. Could this also mean an escalation in the conflict between Iran and Saudi Arabia (or more broadly but less accurately, Shia versus Sunni regimes)? Given that the Saudis have been attacking Iranian-supported Houthis in Yemen without direct response by Iran for some time now, any Saudi actions in Syria seem unlikely to be a provocation that would worsen the situation in the Gulf. FDR’s comment that ‘we have nothing to fear but fear itself’ seems appropriate for oil traders. Bombs and missiles flying in the greater Middle East always creates a bullish impetus on prices, even if the oil fields remain distant from the actual violence. The death of Russian personnel would worsen this, as it implies a greater probability of retaliation and continuation of the conflict which, again, would push up oil prices. And naturally, should Iranian personnel be affected, there would be very rational concerns that they might respond with some sort of attack that could affect Gulf oil trade. The worst case scenarios -- ongoing U.S.-Russian combat or direct Saudi-Iranian fighting -- seem very unlikely to happen. But as long as the possibility exists, oil prices will remain elevated, with WTI perhaps hitting $70 or higher, and only coming down when it has become clear that the violence is diminishing and will not spread. Until then, expect a bumpy ride.

#### High prices solve warming –

Sen 10/26 [(Amrita, founding Partner and Chief Oil Analyst at Energy Aspects. Amrita leads Energy Aspects’ analysis and forecasting of crude and products markets. Her specialism is in energy commodities, particularly oil and oil products. Amrita’s deep understanding of the complex relationships within the global energy sector, her wealth of industry contacts and 10 years of experience, allow for a unique perspective on market outlook. She holds an MPhil in Economics from Cambridge University, a BSc in Economics from the University of Warwick, and is pursuing a PhD in Economics at the School of Oriental and African Studies, University of London. She is a Non-resident Senior Fellow at the Atlantic Council and was formerly Chief Oil Analyst for Barclays Capital. She is frequently featured in leading media outlets, including the Financial Times, BBC News, Reuters, Bloomberg, CNBC, Wall Street Journal, and Sky News, and at leading industry events as a speaker, and is regarded as a leading authority on oil markets.) “Embrace high fossil fuel prices because they are here to stay” Financial Times, 10/26/2021. https://www.ft.com/content/a15e7ade-dad0-4ed3-a172-1974ac9d5b23] BC

Due to long lead times between investment and supplies, we are yet to see the full impact of this slowdown in spending on conventional oil and gas production. In other words, supplies will continue to lag behind demand for the next few years. This is particularly true as US shale producers are focusing on shareholder returns and preserving cash flow — a significant change from the past 10 years.

But the focus on ESG hasn’t had the same impact on demand. Oil demand — and energy demand in general — is extremely sticky. Fossil fuels accounted for 84 per cent of global energy demand in 2020, unchanged from 1980. The only real change was a slight shift from coal to gas. Renewables are making inroads, but largely in developed economies. From a global perspective, hydrocarbons remain in pole position. Energy demand will continue rising as the world’s population grows and income levels rise.

During the peak of lockdowns last year, oil consumption fell 20 per cent year on year, but it is expected to return to pre-pandemic levels in the second half of 2022. The IEA and OPEC secretariat agree on this timeframe. Anyone who three years ago thought Elon Musk would have made oil obsolete by now must feel a little confused.

The truth is, global demand is responding far more slowly than supply to growing environmental concerns. This means sharply higher prices for fossil fuels — coal prices today are at a record high.

Technological leaps aside, higher prices are the most effective catalyst of changes in demand-side behaviour. After all, there is always a price that ensures demand equals supply. True, this can lead to pain for consumers and prompt panic among governments. Already, China, Germany and the US are designing measures to ease the green energy burden. The US is even considering tapping into its strategic petroleum reserve to ease oil prices at the pump. But keeping oil, gas and electricity prices artificially lower prevents consumers from adjusting their demand patterns and implies a slower shift to green energy.

Shifting capital from hydrocarbon production is crucial for a successful transition. But global emissions will not drop if fossil fuel demand does not decline, and prices will be high so long as demand is high.

So, if governments are serious about climate change, the focus cannot just be on legislation that shifts supply. They must tackle demand. High energy prices, even if unpopular with voters, will be needed if we are to have any chance of meeting the ambitious energy targets set by governments.

Complex debates surround the transition, but there are two certainties: the transition is inflationary and achieving it will require stark trade-offs. Tackling climate change will be costly.

**Warming causes extinction – any reduction should be prioritized above every other impact**

**Ramanathan et al. 17** [Veerabhadran Ramanathan is Victor Alderson Professor of Applied Ocean Sciences and director of the Center for Atmospheric Sciences at the Scripps Institution of Oceanography, University of California, San Diego, Dr. William Collins is an internationally recognized expert in climate modeling and climate change science. He is the Director of the Climate and Ecosystem Sciences Division (CESD) for the Earth and Environmental Sciences Area (EESA) at the Lawrence Berkeley National Laboratory (LBNL), Prof. Dr Mark Lawrence, Ph.D. is scientific director at the Institute for Advanced Sustainability Studies (IASS) in Potsdam, Örjan Gustafsson is a Professor in the Department of Environmental Science and Analytic Chemistry at Stockholm University, Shichang Kang is Professor, Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences (CAS); CAS Center for Excellence in Tibetan Plateau Earth Sciences, and Molina, M.J., Zaelke, D., Borgford-Parnell, N., Xu, Y., Alex, K., Auffhammer, M., Bledsoe, P., Croes, B., Forman, F., Haines, A., Harnish, R., Jacobson, M.Z., Lawrence, M., Leloup, D., Lenton, T., Morehouse, T., Munk, W., Picolotti, R., Prather, K., Raga, G., Rignot, E., Shindell, D., Singh, A.K., Steiner, A., Thiemens, M., Titley, D.W., Tucker, M.E., Tripathi, S., & Victor, D., authors come from the following 9 countries - US, Switzerland, Sweden, UK, China, Germany, Australia, Mexico, India, “Well Under 2 Degrees Celsius: Fast Action Policies to Protect People and the Planet from Extreme Climate Change,” Report of the Committee to Prevent Extreme Climate Change, September 2017, http://www.igsd.org/wp-content/uploads/2017/09/Well-Under-2-Degrees-Celsius-Report-2017.pdf] TDI

Climate change is becoming an existential threat with warming in excess of 2°C within the next three decades and 4°C to 6°C within the next several decades. Warming of such magnitudes will expose as many as 75% of the world’s population to deadly heat stress in addition to disrupting the climate and weather worldwide. Climate change is an urgent problem requiring urgent solutions. This paper lays out urgent and practical solutions that are ready for implementation now, will deliver benefits in the next few critical decades, and places the world on a path to achieving the longterm targets of the Paris Agreement and near-term sustainable development goals. The approach consists of four building blocks and 3 levers to implement ten scalable solutions described in this report by a team of climate scientists, policy makers, social and behavioral scientists, political scientists, legal experts, diplomats, and military experts from around the world. These solutions will enable society to decarbonize the global energy system by 2050 through efficiency and renewables, drastically reduce short-lived climate pollutants, and stabilize the climate well below 2°C both in the near term (before 2050) and in the long term (post 2050). It will also reduce premature mortalities by tens of millions by 2050. As an insurance against policy lapses, mitigation delays and faster than projected climate changes, the solutions include an Atmospheric Carbon Extraction lever to remove CO2 from the air. The amount of CO2 that must be removed ranges from negligible, if the emissions of CO2 from the energy system and SLCPs start to decrease by 2020 and carbon neutrality is achieved by 2050, to a staggering one trillion tons if the carbon lever is not pulled and emissions of climate pollutants continue to increase until 2030.

There are numerous living laboratories including 53 cities, many universities around the world, the state of California, and the nation of Sweden, who have embarked on a carbon neutral pathway. These laboratories have already created 8 million jobs in the clean energy industry; they have also shown that emissions of greenhouse gases and air pollutants can be decoupled from economic growth. Another favorable sign is that growth rates of worldwide carbon emissions have reduced from 2.9% per year during the first decade of this century to 1.3% from 2011 to 2014 and near zero growth rates during the last few years. The carbon emission curve is bending, but we have a long way to go and very little time for achieving carbon neutrality. We need institutions and enterprises that can accelerate this bending by scaling-up the solutions that are being proven in the living laboratories. We have less than a decade to put these solutions in place around the world to preserve nature and our quality of life for generations to come. The time is now.

The Paris Agreement is an historic achievement. For the first time, effectively all nations have committed to limiting their greenhouse gas emissions and taking other actions to limit global temperature change. Specifically, 197 nations agreed to hold “the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels,” and achieve carbon neutrality in the second half of this century.

The climate has already warmed by 1°C. The problem is running ahead of us, and under current trends we will likely reach 1.5°C in the next fifteen years and surpass the 2°C guardrail by mid-century with a 50% probability of reaching 4°C by end of century. Warming in excess of 3°C is likely to be a global catastrophe for three major reasons:

• Warming in the range of 3°C to 5°C is suggested as the threshold for several tipping points in the physical and geochemical systems; a warming of about 3°C has a probability of over 40% to cross over multiple tipping points, while a warming close to 5°C increases it to nearly 90%, compared with a baseline warming of less than 1.5°C, which has only just over a 10% probability of exceeding any tipping point.

**•** Health effects of such warming are emerging as a major if not dominant source of concern. Warming of 4°C or more will expose more than 70% of the population, i.e. about 7 billion by the end of the century, to deadly heat stress and expose about 2.4 billion to vector borne diseases such as Dengue, Chikengunya, and Zika virus among others. Ecologists and paleontologists have proposed that warming in excess of 3°C, accompanied by increased acidity of the oceans by the buildup of CO2 , can become a major causal factor for exposing more than 50% of all species to extinction. 20% of species are in danger of extinction now due to population, habitat destruction, and climate change.

The good news is that there may still be time to avert such catastrophic changes. The Paris Agreement and supporting climate policies must be strengthened substantially within the next five years to bend the emissions curve down faster, stabilize climate, and prevent catastrophic warmin**g**. To the extent those efforts fall short, societies and ecosystems will be forced to contend with substantial needs for adaptation—a burden that will fall disproportionately on the poorest three billion who are least responsible for causing the climate change problem**.**

Here we propose a policy roadmap with a realistic and reasonable chance of limiting global temperature to safe levels and preventing unmanageable climate change—an outline of specific science-based policy pathways that serve as the building blocks for a three-lever strategy that could limit warming to well under 2°C. The projections and the emission pathways proposed in this summary are based on a combination of published recommendations and new model simulations conducted by the authors of this study (see Figure 2). We have framed the plan in terms of four building blocks and three levers, which are implemented through 10 solutions. The first building block would be fully implementing the nationally determined mitigation pledges under the Paris Agreement of the UN Framework Convention on Climate Change (UNFCCC). In addition, several sister agreements that provide targeted and efficient mitigation must be strengthened. Sister agreements include the Kigali Amendment to the Montreal Protocol to phase down HFCs, efforts to address aviation emissions through the International Civil Aviation Organization (ICAO), maritime black carbon emissions through the International Maritime Organization (IMO), and the commitment by the eight countries of the Arctic Council to reduce black carbon emissions by up to 33%. There are many other complementary processes that have drawn attention to specific actions on climate change, such as the Group of 20 (G20), which has emphasized reform of fossil fuel subsidies, and the Climate and Clean Air Coalition (CCAC). HFC measures, for example, can avoid as much as 0.5°C of warming by 2100 through the mandatory global phasedown of HFC refrigerants within the next few decades, and substantially more through parallel efforts to improve energy efficiency of air conditioners and other cooling equipment potentially doubling this climate benefit.

For the second building block, numerous subnational and city scale climate action plans have to be scaled up. One prominent example is California’s Under 2 Coalition signed by over 177 jurisdictions from 37 countries in six continents covering a third of world economy. The goal of this Memorandum of Understanding is to catalyze efforts in many jurisdictions that are comparable with California’s target of 40% reductions in CO2 emissions by 2030 and 80% reductions by 2050—emission cuts that, if achieved globally, would be consistent with stopping warming at about 2°C above pre-industrial levels. Another prominent example is the climate action plans by over 52 cities and 65 businesses around the world aiming to cut emissions by 30% by 2030 and 80% to 100% by 2050. There are concerns that the carbon neutral goal will hinder economic progress; however, real world examples from California and Sweden since 2005 offer evidence that economic growth can be decoupled from carbon emissions and the data for CO2 emissions and GDP reveal that growth in fact prospers with a green economy.

The third building block consists of two levers that we need to pull as hard as we can: one for drastically reducing emissions of short-lived climate pollutants (SLCPs) beginning now and completing by 2030, and the other for decarbonizing the global energy system by 2050 through efficiency and renewables. Pulling both levers simultaneously can keep global temperature rise below 2°C through the end of the century. If we bend the CO2 emissions curve through decarbonization of the energy system such that global emissions peak in 2020 and decrease steadily thereafter until reaching zero in 2050, there is less than a 20% probability of exceeding 2°C. This call for bending the CO2 curve by 2020 is one key way in which this report’s proposal differs from the Paris Agreement and it is perhaps the most difficult task of all those envisioned here. Many cities and jurisdictions are already on this pathway, thus demonstrating its scalability. Achieving carbon neutrality and reducing emissions of SLCPs would also drastically reduce air pollution globally, including all major cities, thus saving millions of lives and over 100 million tons of crops lost to air pollution each year. In addition, these steps would provide clean energy access to the world’s poorest three billion who are still forced to resort to 18th century technologies to meet basic needs such as cooking. For the fourth and the final building block, we are adding a third lever, ACE (Atmospheric Carbon Extraction, also known as Carbon Dioxide Removal, or “CDR”). This lever is added as an insurance against surprises (due to policy lapses, mitigation delays, or non-linear climate changes) and would require development of scalable measures for removing the CO2 already in the atmosphere. The amount of CO2 that must be removed will range from negligible, if the emissions of CO2 from the energy system and SLCPs start to decrease by 2020 and carbon neutrality is achieved by 2050, to a staggering one trillion tons, if CO2 emissions continue to increase until 2030, and the carbon lever is not pulled until after 2030. This issue is raised because the NDCs (Nationally Determined Contributions) accompanying the Paris Agreement would allow CO2 emissions to increase until 2030. We call on economists and experts in political and administrative systems to assess the feasibility and cost-effectiveness of reducing carbon and SLCPs emissions beginning in 2020 compared with delaying it by ten years and then being forced to pull the third lever to extract one trillion tons of CO2

The fast mitigation plan of requiring emissions reductions to begin by 2020, which means that many countries need to cut now, is urgently needed to limit the warming to well under 2°C. Climate change is not a linear problem. Instead, we are facing non-linear climate tipping points that can lead to self-reinforcing and cascading climate change impacts. Tipping points and selfreinforcing feedbacks are wild cards that are more likely with increased temperatures, and many of the potential abrupt climate shifts could happen as warming goes from 1.5°C in 15 years to 2°C by 2050, with the potential to push us well beyond the Paris Agreement goals.

Where Do We Go from Here?

A massive effort will be needed to stop warming at 2°C, and time is of the essence.

With unchecked business-as-usual emissions, global warming has a 50% likelihood of exceeding 4ºC and a 5% probability of exceeding 6ºC in this century, raising existential questions for most, but especially the poorest three billion people. A 4ºC warming is likely to expose as many as 75% of the global population to deadly heat**.** Dangerous to catastrophic impacts on the health of people including generations yet to be born, on the health of ecosystems, and on species extinction have emerged as major justifications for mitigating climate change well below 2ºC, although we must recognize that the uncertainties intrinsic in climate and social systems make it hard to pin down exactly the level of warming that will trigger possibly catastrophic impacts. To avoid these consequences, we must act now, and we must act fast and effectively. This report sets out a specific plan for reducing climate change in both the near- and long-term. With aggressive urgent actions, we can protect ourselves. Acting quickly to prevent catastrophic climate change by decarbonization will save millions of lives, trillions of dollars in economic costs, and massive suffering and dislocation to people around the world. This is a global security imperative, as it can avoid the migration and destabilization of entire societies and countries and reduce the likelihood of environmentally driven civil wars and other conflicts.

Staying well under 2°C will require a concerted global effort. We must address everything from our energy systems to our personal choices to reduce emissions to the greatest extent possible. We must redouble our efforts to invent, test, and perfect systems of governance so that the large measure of international cooperation needed to achieve these goals can be realized in practice. The health of people for generations to come and the health of ecosystems crucially depend on an energy revolution beginning now that will take us away from fossil fuels and toward the clean renewable energy sources of the future. It will be nearly impossible to obtain other critical social goals, including for example the UN agenda 2030 with the Sustainable Development Goals, if we do not make immediate and profound progress stabilizing climate, as we are outlining here.

1. The Building Blocks Approach The 2015 Paris Agreement, which went into effect November 2016, is a remarkable, historic achievement. For the frst time, essentially all nations have committed to limit their greenhouse gas emissions and take other actions to limit global temperature and adapt to unavoidable climate change. Nations agreed to hold “the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels” and “achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century” (UNFCCC, 2015). Nevertheless, the initial Paris Agreement has to be strengthened substantially within fve years if we are to prevent catastrophic warming; current pledges place the world on track for up to 3.4°C by 2100 (UNEP, 2016b). Until now, no specifc policy roadmap exists that provides a realistic and reasonable chance of limiting global temperatures to safe levels and preventing unmanageable climate change. This report is our attempt to provide such a plan— an outline of specifc solutions that serve as the building blocks for a comprehensive strategy for limiting the warming to well under 2°C and avoiding dangerous climate change (Figure 1). The frst building block is the full implementation of the nationally determined mitigation pledges under the Paris Agreement of the UN Framework Convention on Climate Change (UNFCCC) and strengthening global sister agreements, such as the Kigali Amendment to the Montreal Protocol to phase down HFCs, which can provide additional targeted, fast action mitigation at scale. For the second building block, numerous sub-national and city scale climate action plans have to be scaled up such as California’s Under 2 Coalition signed by 177 jurisdictions from 37 countries on six continents. The third building block is targeted measures to reduce emissions of shortlived climate pollutants (SLCPs), beginning now and fully implemented by 2030, along with major measures to fully decarbonize the global economy, causing the overall emissions growth rate to stop in 2020-2030 and reach carbon neutrality by 2050. Such a deep decarbonization would require an energy revolution similar to the Industrial Revolution that was based on fossil fuels. The fnal building block includes scalable and reversible carbon dioxide (CO2 ) removal measures, which can begin removing CO2 already emitted into the atmosphere. Such a plan is urgently needed. Climate change is not a linear problem. Instead, climate tipping points can lead to self-reinforcing, cascading climate change impacts (Lenton et al., 2008). Tipping points are more likely with increased temperatures, and many of the potential abrupt climate shifts could happen as warming goes from 1.5°C to 2°C, with the potential to push us well beyond the Paris Agreement goals (Drijfhout et al., 2015). In order to avoid dangerous climate change, we must address these concerns. We must act now, and we must act fast. Reduction of SLCPs will result in fast, near-term reductions in warming, while present-day reductions of CO2 will result in long-term climate benefts. This two-lever approach—aggressively cutting both SLCPs and CO2 –-will slow warming in the coming decades when it is most crucial to avoid impacts from climate change as well as maintain a safe climate many decades from now. To achieve the nearterm goals, we have outlined solutions to be implemented immediately. These solutions to bend down the rising emissions curve and thus bend the warming trajectory curve follow a 2015 assessment by the University of California under its Carbon Neutrality Initiative (Ramanathan et al., 2016). The solutions are clustered into categories of social transformation, governance improvement, market- and regulation-based solutions, technological innovation and transformation, and natural and ecosystem management. Additionally, we need to intensely investigate and pursue a third lever—ACE (Atmospheric Carbon Extraction). While many potential technologies exist, we do not know the extent to which they could be scaled up to remove the requisite amount of carbon from the atmosphere in order to achieve the Paris Agreement goals, and any delay in mitigation will demand increasing reliance on these technologies. Yet, there is still hope. Humanity can come together, as we have done in the past, to collaborate towards a common goal. We have no choice but to tackle the challenge of climate change. We only have the choice of when and how: either now, through the ambitious plan outlined here, or later, through radical adaptation and societal transformations in response to an ever-deteriorating climate system that will unleash devastating impacts—some of which may be beyond our capacity to fully adapt to or reverse for thousands of years.

2. Major Climate Disruptions: How Soon and How Fast? “Without adequate mitigation and adaptation, climate change poses unacceptable risks to global public health.” (WHO, 2016)

The planet has already witnessed nearly 1°C of warming, and another 0.6°C of additional warming is currently stored in the ocean to be released over the next two to four decades, if climate warming emissions are not radically reduced during that time (IPCC, 2013). The impacts of this warming on extreme weather, droughts, and foods are being felt by society worldwide to the extent that many think of this no longer as climate change but as climate disruption. Consider the business as usual scenario:

15 years from now: In 15 years, planetary warming will reach 1.5°C above pre-industrial global mean temperature (Ramanathan and Xu, 2010; Shindell et al., 2012). This exceeds the 0.5°C to 1°C of warming during the Eemian period, 115,000– 130,000 years ago, when sea-levels reached 6-9 meters (20-30 feet) higher than today (Hansen et al., 2016b). The impacts of this warming will affect us all yet will disproportionately affect the Earth’s poorest three billion people, who are primarily subsistence farmers that still rely on 18th century technologies and have the least capacity to adapt (IPCC, 2014a; Dasgupta et al., 2015). They thus may be forced to resort to mass migration into city slums and push across international borders (U.S. DOD, 2015). The existential fate of lowlying small islands and coastal communities will also need to be addressed, as they are primarily vulnerable to sea-level rise, diminishing freshwater resources, and more intense storms. In addition, many depend on fsheries for protein, and these are likely to be affected by ocean acidifcation and climate change. Climate injustice could start causing visible regional and international conficts. All of this will be exacerbated as the risk of passing tipping points increases (Lenton et al., 2008).

30 years from now: By mid-century, warming is expected to exceed 2°C, which would be unprecedented with respect to historical records of at least the last one million years (IPCC, 2014c). Such a warming through this century could result in sea-level rise of as much as 2 meters by 2100, with greater sea-level rise to follow. A group of tipping points are clustered between 1.5°C and 2°C (Figure 2) (Drijfhout et al., 2015). The melting of most mountain glaciers, including those in the Tibetan-Himalayas, combined with mega-droughts, heat waves, storms, and foods, would adversely affect nearly everyone on the planet.

80 years from now: In 80 years, warming is expected to exceed 4°C, increasing the likelihood of irreversible and catastrophic change (World Bank, 2013b). 4ºC warming is likely to expose as much as 75% of the global population to deadly heat (Mora et al., 2017). The 2°C and 4°C values quoted above and in other reports, however, are merely the central values with a 50% probability of occurrence (Ramanathan and Feng, 2008). There is a 5% probability the warming could be as high as 6°C due to uncertainties in the magnitude of amplifying feedbacks (see Section 4). This in turn could lead to major disruptions to natural and social systems, threatening food security, water security, and national security and fundamentally affecting the great majority of the projected 11.2 billion inhabitants of the planet in 2100 (UN DESA, 2015).

3. What Are the Wild Cards for Climate Disruption? Increasing the concentrations of greenhouse gases in the atmosphere increases radiative forcing (the difference between the amount of energy entering the atmosphere and leaving) and thus increases the global temperature (IPCC, 2013). However, climate wild cards exist that can alter the linear connection with warming and anthropogenic emissions by triggering abrupt changes in the climate (Lenton et al., 2008). Some of these wild cards have not been thoroughly captured by the models that policymakers rely on the most. These abrupt shifts are irreversible on a human time scale (<100 years) and will create a notable disruption to the climate system, condemning the world to warming beyond that which we have previously projected. These climate disruptions would divert resources from needed mitigation and upset mitigation strategies that we have already put in place.

1. Unmasking Aerosol Cooling: The frst such wild card is the unmasking of an estimated 0.7°C (with an uncertainty range of 0.3°C to 1.2°C) of the warming in addition to mitigating other aerosol effects such as disrupting rainfall patterns, by reducing emissions of aerosols such as sulfates and nitrates as part of air pollution regulations (Wigley, 1991; Ramanathan and Feng, 2008). Aerosol air pollution is a major health hazard with massive costs to public health and society, including contributing to about 7 million deaths (from household and ambient exposure) each year (WHO, 2014). While some aerosols, such as black carbon and brown carbon, strongly absorb sunlight and warm the climate, others refect sunlight back into space, which cools the climate (Ramanathan and Carmichael, 2008). The net impact of all manmade aerosols is negative, meaning that about 30% of the warming from greenhouse gases is being masked by co-emitted air pollution particles (Ramanathan and Carmichael, 2008). As we reduce greenhouse gas emissions and implement policies to eliminate air pollution, we are also reducing the concentration of aerosols in the air. Aerosols last in the atmosphere for about a week, so if we eliminate air pollution without reducing emissions of the greenhouse gases, the unmasking alone would lead to an estimated 0.7°C of warming within a matter of decades (Ramanathan and Feng, 2008). We must eliminate all aerosol emissions due to their health effects, but we must simultaneously mitigate emissions of CO2 , other greenhouse gases, and black carbon and co-pollutants to avoid an abrupt and very large jump in the near-term warming beyond 2°C (Brasseur and Roeckner, 2005).

2. Tipping Points**:** It is likely that as we cross the 1.5°C to 2°C thresholds we will trigger so called “tipping points” for abrupt and nonlinear changes in the climate system with catastrophic consequences for humanity and the environment (Lenton, 2008; Drijfhout et al., 2015). Once the tipping points are passed, the resulting impacts will range in timescales from: disruption of monsoon systems (transition in a year), loss of sea ice (approximately a decade for transition), dieback of major forests (nearly half a century for transition), reorganization of ocean circulation (approximately a century for transition), to loss of ice sheets and subsequent sea-level rise (transition over hundreds of years) (Lenton et al., 2008). Regardless of timescale, once underway many of these changes would be irreversible (Lontzek et al., 2015). There is also a likelihood of crossing over multiple tipping points simultaneously. Warming of close to 3°C would subject the system to a 46% probability of crossing multiple tipping points, while warming of close to 5°C would increase the risk to 87% (Cai et al., 2016). Recent modeling work shows a “cluster” of these tipping points could be triggered between 1.5°C and 2°C warming (Figure 2), including melting of land and sea ice and changes in highlatitude ocean circulation (deep convection) (Drijfhout et al., 2015). This is consistent with existing observations and understanding that the polar regions are particularly sensitive to global warming and have several potentially imminent tipping points. The Arctic is warming nearly twice as quickly as the global average, which makes the abrupt changes in the Arctic more likely at a lower level of global warming (IPCC, 2013). Similarly, the Himalayas are warming at roughly the same rate as the Arctic and are thus also more susceptible to incremental changes in temperature (UNEP-WMO, 2011). This gives further justifcation for limiting warming to no more than 1.5°C.

While all climate tipping points have the potential to rapidly destabilize climate, social, and economic systems, some are also self-amplifying feedbacks that once set in motion increase warming in such a way that they perpetuate yet even more warming. Declining Arctic sea ice, thawing permafrost, and the poleward migration of cloud systems are all examples of self-amplifying feedback mechanisms, where initial warming feeds upon itself to cause still more warming acting as a force multiplier (Schuur et al., 2015).