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## 1AC

#### Resolved: The United States Federal Government should substantially increase prohibitions on anticompetitive business practices by expanding the scope of its core antitrust laws to account for “total welfare” including establishing a “green antitrust policy” with an upstream carbon fee on greenhouse gas emissions, with all revenue reimbursed as dividends to the population, that rises with the federal estimates of the Social Cost of Carbon.

#### The consumer welfare relies on a “market failure” approach that is impossible to prove and fails to address systemic risks like climate change. Only expanding the scope of the CWS to account for total welfare can address systematic failure.

Miazad 21 (Amelia Miazad is Founding Director and Senior Research Fellow of the Business in Society Institute at Berkeley Law., “PROSOCIAL ANTITRUST”, Prosocial Antitrust (March 11, 2021). Available at SSRN: https://ssrn.com/abstract=3802194 or http://dx.doi.org/10.2139/ssrn.3802194)

While courts routinely dismiss noneconomic or “non-welfare” justifications, precisely what procompetitive reasons come into play is, as Justice Stevens famously stated, “an absolute mystery”.242 As Professor John Newman points out, the “relevant case law reveals multiple competing approaches and seemingly irreconcilable opinions” on what constitutes “beneficial”.243 After all, whether a particular activity is beneficial necessarily begs the question— beneficial to what end? Professor Newman traces this confusion to the use of three different tests by courts:

Under the “market failure” approach, a valid justification is present if—and only if—the challenged restraint alleviates a market failure. Alternatively, the “competitive process” approach attempts to condemn restraints that harm (and bless restraints that benefit) “competition” itself or the so-called “competitive process”. Lastly, the “type of effect” approach appears to offer a shortcut: simply identify the effects of the challenged restraint, then ascertain whether they align with a pre-approved typology of virtuous marketplace effects (e.g., higher output, lower prices, etc.).244

This Article agrees with Professor Newman’s doctrinal, normative, and practical arguments in favor of the market failure test.245 Most contemporary courts also hold that “alleviating a market failure is an acceptable procompetitive justification.”246 But the market failure test is fundamentally at odds with the market reality of increasing universal ownership. Two limitations explain its inability to account for systematic and portfolio-wide risks. First, the market failure test relies on the prevailing consumer welfare standard.247 That generally means that a particular restraint of trade must alleviate a market failure by increasing consumer surplus in order for courts to deem it a valid procompetitive justification.248 By fastening market failure to consumer welfare, the market failure test becomes indistinguishable from the “type of effect” approach, which also focuses on measurable impacts on consumers including output and price. Second, the market failure test assumes the perspective of a single market, preventing it from capturing portfolio-wide systemic risks like climate change.

To be clear, this Article is not arguing that antitrust law should abandon the consumer welfare standard and expand its purview to encompass noneconomic impacts. Rather, it argues that the consumer welfare standard is too narrow to account for economic impacts on a portfolio-wide level. The total welfare standard is most closely aligned with the market reality of universal ownership, although it has been largely abandoned by courts.249 It seeks to maximize the total surplus of all participants in a market, including consumers and producers. The total welfare test’s aggregate value approach is more closely aligned with universal ownership, but it also analyzes an individual market—as opposed to market-wide impacts— because a so-called “general equilibrium analysis” is impractical. Developing a standard that aligns with the market reality of concentrated ownership is beyond the scope of this Article. This Article does argue, however, that the current consumer welfare standard impedes collaboration to address systematic economic risks, as the next Part explores.

#### Climate change is a system disruptor and a risk amplifier---only mitigation prevents biodiversity loss, marine ecosystem collapse, resource wars, global food scarcity, and extreme weather events. Uniquely—has disparate impacts.

IPCC 22 (Climate Change 2022 Impacts, Adaptation and Vulnerability Working Group II Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change Edited by Hans-Otto Pörtner Working Group II Co-Chair Debra C. Roberts Working Group II Co-Chair Melinda M.B. Tignor Head Elvira Poloczanska Science Advisor to the WGII Co-Chairs and TSU Katja Mintenbeck Director of Science https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC\_AR6\_WGII\_SummaryForPolicymakers.pdf)

B.3 Global warming, reaching 1.5°C in the near-term, would cause unavoidable increases in multiple climate hazards and present multiple risks to ecosystems and humans (very high confidence). The level of risk will depend on concurrent nearterm trends in vulnerability, exposure, level of socioeconomic development and adaptation (high confidence). Near-term actions that limit global warming to close to 1.5°C would substantially reduce projected losses and damages related to climate change in human systems and ecosystems, compared to higher warming levels, but cannot eliminate them all (very high confidence). (Figure SPM.3, Box SPM.1) {16.4, 16.5, 16.6, CCP1.2, CCP5.3, CCB SLR, WGI AR6 SPM B1.3, WGI AR6 Table SPM.1}

B.3.1 Near-term warming and increased frequency, severity and duration of extreme events will place many terrestrial, freshwater, coastal and marine ecosystems at high or very high risks of biodiversity loss (medium to very high confidence, depending on ecosystem). Near-term risks for biodiversity loss are moderate to high in forest ecosystems (medium confidence), kelp and seagrass ecosystems (high to very high confidence), and high to very high in Arctic sea-ice and terrestrial ecosystems (high confidence) and warm-water coral reefs (very high confidence). Continued and accelerating sea level rise will encroach on coastal settlements and infrastructure (high confidence) and commit low-lying coastal ecosystems to submergence and loss (medium confidence). If trends in urbanisation in exposed areas continue, this will exacerbate the impacts, with more challenges where energy, water and other services are constrained (medium confidence). The number of people at risk from climate change and associated loss of biodiversity will progressively increase (medium confidence). Violent conflict and, separately, migration patterns, in the near-term will be driven by socioeconomic conditions and governance more than by climate change (medium confidence). (Figure SPM.3) {2.5, 3.4, 4.6, 6.2, 7.3, 8.7, 9.2, 9.9, 11.6, 12.5, 13.6, 13.10, 14.6, 15.3, 16.5, 16.6, CCP1.2, CCP2.1, CCP2.2, CCP5.3, CCP6.2, CCP6.3, CCB MIGRATE, CCB SLR}

B.3.2 In the near term, climate-associated risks to natural and human systems depend more strongly on changes in their vulnerability and exposure than on differences in climate hazards between emissions scenarios (high confidence). Regional differences exist, and risks are highest where species and people exist close to their upper thermal limits, along coastlines, in close association with ice or seasonal rivers (high confidence). Risks are also high where multiple non-climate drivers persist or where vulnerability is otherwise elevated (high confidence). Many of these risks are unavoidable in the near-term, irrespective of emissions scenario (high confidence). Several risks can be moderated with adaptation (high confidence). (Figure SPM.3, Section C) {2.5, 3.3, 3.4, 4.5, 6.2, 7.1, 7.3, 8.2, 11.6, 12.4, 13.6, 13.7, 13.10, 14.5, 16.4, 16.5, CCP2.2, CCP4.3, CCP5.3, CCB SLR, WGI AR6 Table SPM.1}

B.3.3 Levels of risk for all Reasons for Concern (RFC) are assessed to become high to very high at lower global warming levels than in AR5 (high confidence). Between 1.2°C and 4.5°C global warming level very high risks emerge in all five RFCs compared to just two RFCs in AR5 (high confidence). Two of these transitions from high to very high risk are associated with near-term warming: risks to unique and threatened systems at a median value of 1.5 [1.2 to 2.0] °C (high confidence) and risks associated with extreme weather events at a median value of 2.0 [1.8 to 2.5] °C (medium confidence). Some key risks contributing to the RFCs are projected to lead to widespread, pervasive, and potentially irreversible impacts at global warming levels of 1.5–2°C if exposure and vulnerability are high and adaptation is low (medium confidence). Near-term actions that limit global warming to close to 1.5°C would substantially reduce projected losses and damages related to climate change in human systems and ecosystems, compared to higher warming levels, but cannot eliminate them all (very high confidence). (Figure SPM.3b) {16.5, 16.6, CCB SLR}

Beyond 2040 and depending on the level of global warming, climate change will lead to numerous risks to natural and human systems (high confidence). For 127 identified key risks, assessed mid- and long-term impacts are up to multiple times higher than currently observed (high confidence). The magnitude and rate of climate change and associated risks depend strongly on near-term mitigation and adaptation actions, and projected adverse impacts and related losses and damages escalate with every increment of global warming (very high confidence). (Figure SPM.3) {2.5, 3.4, 4.4, 5.2, 6.2, 7.3, 8.4, 9.2, 10.2, 11.6, 12.4, 13.2, 13.3, 13.4, 13.5, 13.6, 13.7, 13.8, 14.6, 15.3, 16.5, 16.6, CCP1.2, CCP2.2, CCP3.3, CCP4.3, CCP5.3, CCP6.3, CCP7.3}

B.4.1 Biodiversity loss and degradation, damages to and transformation of ecosystems are already key risks for every region due to past global warming and will continue to escalate with every increment of global warming (very high confidence). In terrestrial ecosystems, 3 to 14% of species assessed33 will likely face very high risk of extinction34 at global warming levels of 1.5°C, increasing up to 3 to 18% at 2°C, 3 to 29% at 3°C, 3 to 39% at 4°C, and 3 to 48% at 5°C. In ocean and coastal ecosystems, risk of biodiversity loss ranges between moderate and very high by 1.5°C global warming level and is moderate to very high by 2°C but with more ecosystems at high and very high risk (high confidence), and increases to high to very high across most ocean and coastal ecosystems by 3°C (medium to high confidence, depending on ecosystem). Very high extinction risk for endemic species in biodiversity hotspots is projected to at least double from 2% between 1.5°C and 2°C global warming levels and to increase at least tenfold if warming rises from 1.5°C to 3°C (medium confidence). (Figure SPM.3c, d, f) {2.4, 2.5, 3.4, 3.5,12.3, 12.5, Table 12.6, 13.4, 13.10, 16.4, 16.6, CCP1.2, Figure CCP1.6, Figure CCP1.7, CCP5.3, CCP6.3, CCB PALEO}

B.4.2 Risks in physical water availability and water-related hazards will continue to increase by the mid- to long-term in all assessed regions, with greater risk at higher global warming levels (high confidence). At approximately 2°C global warming, snowmelt water availability for irrigation is projected to decline in some snowmelt dependent river basins by up to 20%, and global glacier mass loss of 18 ± 13% is projected to diminish water availability for agriculture, hydropower, and human settlements in the mid- to long-term, with these changes projected to double with 4°C global warming (medium confidence). In Small Islands, groundwater availability is threatened by climate change (high confidence). Changes to streamflow magnitude, timing and associated extremes are projected to adversely impact freshwater ecosystems in many watersheds by the mid- to long-term across all assessed scenarios (medium confidence). Projected increases in direct flood damages are higher by 1.4 to 2 times at 2°C and 2.5 to 3.9 times at 3°C compared to 1.5°C global warming without adaptation (medium confidence). At global warming of 4°C, approximately 10% of the global land area is projected to face increases in both extreme high and low river flows in the same location, with implications for planning for all water use sectors (medium confidence). Challenges for water management will be exacerbated in the near, mid and long term, depending on the magnitude, rate and regional details of future climate change and will be particularly challenging for regions with constrained resources for water management (high confidence). {2.3, 4.4, 4.5, Box 4.2, Figure 4.20, 15.3, CCP5.3, CCB DISASTER, SROCC 2.3}

B.4.3 Climate change will increasingly put pressure on food production and access, especially in vulnerable regions, undermining food security and nutrition (high confidence). Increases in frequency, intensity and severity of droughts, floods and heatwaves, and continued sea level rise will increase risks to food security (high confidence) in vulnerable regions from moderate to high between 1.5°C and 2°C global warming level, with no or low levels of adaptation (medium confidence). At 2°C or higher global warming level in the mid-term, food security risks due to climate change will be more severe, leading to malnutrition and micro-nutrient deficiencies, concentrated in Sub-Saharan Africa, South Asia, Central and South America and Small Islands (high confidence). Global warming will progressively weaken soil health and ecosystem services such as pollination, increase pressure from pests and diseases, and reduce marine animal biomass, undermining food productivity in many regions on land and in the ocean (medium confidence). At 3°C or higher global warming level in the long term, areas exposed to climate-related hazards will expand substantially compared with 2°C or lower global warming level (high confidence), exacerbating regional disparity in food security risks (high confidence). (Figure SPM.3) {1.1, 3.3, 4.5, 5.2, 5.4, 5.5, 5.8, 5.9, 5.12, 7.3, 8.3, 9.11, 13.5, 15.3, 16.5, 16.6, CCB MOVING PLATE, CCB SLR}

B.4.4 Climate change and related extreme events will significantly increase ill health and premature deaths from the near- to long-term (high confidence). Globally, population exposure to heatwaves will continue to increase with additional warming, with strong geographical differences in heat-related mortality without additional adaptation (very high confidence). Climate-sensitive food-borne, water-borne, and vector-borne disease risks are projected to increase under all levels of warming without additional adaptation (high confidence). In particular, dengue risk will increase with longer seasons and a wider geographic distribution in Asia, Europe, Central and South America and sub-Saharan Africa, potentially putting additional billions of people at risk by the end of the century (high confidence). Mental health challenges, including anxiety and stress, are expected to increase under further global warming in all assessed regions, particularly for children, adolescents, elderly, and those with underlying health conditions (very high confidence). {4.5, 5.12, Box 5.10, 7.3, Figure 7.9, 8.4, 9.10, Figure 9.32, Figure 9.35, 10.4, Figure 10.11, 11.3, 12.3, Figure 12.5, Figure 12.6, 13.7, Figure 13.23, Figure 13.24, 14.5, 15.3, CCP6.2}

B.4.5 Climate change risks to cities, settlements and key infrastructure will rise rapidly in the mid- and long-term with further global warming, especially in places already exposed to high temperatures, along coastlines, or with high vulnerabilities (high confidence). Globally, population change in low-lying cities and settlements will lead to approximately a billion people projected to be at risk from coastal-specific climate hazards in the mid-term under all scenarios, including in Small Islands (high confidence). The population potentially exposed to a 100-year coastal flood is projected to increase by about 20% if global mean sea level rises by 0.15 m relative to 2020 levels; this exposed population doubles at a 0.75 m rise in mean sea level and triples at 1.4 m without population change and additional adaptation (medium confidence). Sea level rise poses an existential threat for some Small Islands and some low-lying coasts (medium confidence). By 2100 the value of global assets within the future 1-in-100 year coastal floodplains is projected to be between US$7.9 and US$12.7 trillion (2011 value) under RCP4.5, rising to between US$8.8 and US$14.2 trillion under RCP8.5 (medium confidence). Costs for maintenance and reconstruction of urban infrastructure, including building, transportation, and energy will increase with global warming level (medium confidence), the associated functional disruptions are projected to be substantial particularly for cities, settlements and infrastructure located on permafrost in cold regions and on coasts (high confidence). {6.2, 9.9, 10.4, 13.6, 13.10, 15.3, 16.5, CCP2.1, CCP2.2, CCP5.3, CCP6.2, CCB SLR, SROCC 2.3, SROCC CCB9}

B.4.6 Projected estimates of global aggregate net economic damages generally increase non-linearly with global warming levels (high confidence).35 The wide range of global estimates, and the lack of comparability between methodologies, does not allow for identification of a robust range of estimates (high confidence). The existence of higher estimates than assessed in AR5 indicates that global aggregate economic impacts could be higher than previous estimates (low confidence).36 Significant regional variation in aggregate economic damages from climate change is projected (high confidence) with estimated economic damages per capita for developing countries often higher as a fraction of income (high confidence). Economic damages, including both those represented and those not represented in economic markets, are projected to be lower at 1.5°C than at 3°C or higher global warming levels (high confidence). {4.4, 9.11, 11.5, 13.10, Box 14.6, 16.5, CWGB ECONOMIC}

B.4.7 In the mid- to long-term, displacement will increase with intensification of heavy precipitation and associated flooding, tropical cyclones, drought and, increasingly, sea level rise (high confidence). At progressive levels of warming, involuntary migration from regions with high exposure and low adaptive capacity would occur (medium confidence). Compared to other socioeconomic factors the influence of climate on conflict is assessed as relatively weak (high confidence). Along long-term socioeconomic pathways that reduce non-climatic drivers, risk of violent conflict would decline (medium confidence). At higher global warming levels, impacts of weather and climate extremes, particularly drought, by increasing vulnerability will increasingly affect violent intrastate conflict (medium confidence). {TS B.7.4, 7.3, 16.5, CCB MIGRATE }

Complex, Compound and Cascading Risks

B.5 Climate change impacts and risks are becoming increasingly complex and more difficult to manage. Multiple climate hazards will occur simultaneously, and multiple climatic and non-climatic risks will interact, resulting in compounding overall risk and risks cascading across sectors and regions. Some responses to climate change result in new impacts and risks. (high confidence) {1.3, 2.4, Box 2.2, Box 9.5, 11.5, 13.5, 14.6, Box 15.1, CCP1.2, CCP2.2, CCB COVID, CCB DISASTER, CCB INTEREG, CCB SRM, }

B.5.1 Concurrent and repeated climate hazards occur in all regions, increasing impacts and risks to health, ecosystems, infrastructure, livelihoods and food (high confidence). Multiple risks interact, generating new sources of vulnerability to climate hazards, and compounding overall risk (high confidence). Increasing concurrence of heat and drought events are causing crop production losses and tree mortality (high confidence). Above 1.5°C global warming increasing concurrent climate extremes will increase risk of simultaneous crop losses of maize in major food-producing regions, with this risk increasing further with higher global warming levels (medium confidence). Future sea level rise combined with storm surge and heavy rainfall will increase compound flood risks (high confidence). Risks to health and food production will be made more severe from the interaction of sudden food production losses from heat and drought, exacerbated by heat-induced labour productivity losses (high confidence). These interacting impacts will increase food prices, reduce household incomes, and lead to health risks of malnutrition and climate-related mortality with no or low levels of adaptation, especially in tropical regions (high confidence). Risks to food safety from climate change will further compound the risks to health by increasing food contamination of crops from mycotoxins and contamination of seafood from harmful algal blooms, mycotoxins, and chemical contaminants (high confidence). {Figure TS.10c, 5.2, 5.4, 5.8, 5.9, 5.11, 5.12, 7.2, 7.3, 9.8, 9.11, 10.4, 11.3, 11.5, 12.3, 13.5, 14.5, 15.3, Box 15.1, 16.6, CCP1.2, CCP6.2, , WGI AR6 SPM A.3.1, WGI AR6 SPM A.3.2, WGI AR6 SPM C.2.7}

B.5.2 Adverse impacts from climate hazards and resulting risks are cascading across sectors and regions (high confidence), propagating impacts along coasts and urban centres (medium confidence) and in mountain regions (high confidence). These hazards and cascading risks also trigger tipping points in sensitive ecosystems and in significantly and rapidly changing social-ecological systems impacted by ice melt, permafrost thaw and changing hydrology in polar regions (high confidence). Wildfires, in many regions, have affected ecosystems and species, people and their built assets, economic activity, and health (medium to high confidence). In cities and settlements, climate impacts to key infrastructure are leading to losses and damages across water and food systems, and affect economic activity, with impacts extending beyond the area directly impacted by the climate hazard (high confidence). In Amazonia, and in some mountain regions, cascading impacts from climatic (e.g., heat) and non-climatic stressors (e.g., land use change) will result in irreversible and severe losses of ecosystem services and biodiversity at 2°C global warming level and beyond (medium confidence). Unavoidable sea level rise will bring cascading and compounding impacts resulting in losses of coastal ecosystems and ecosystem services, groundwater salinisation, flooding and damages to coastal infrastructure that cascade into risks to livelihoods, settlements, health, well-being, food and water security, and cultural values in the near to long-term (high confidence). (Figure SPM.3) {Figure TS.10, 2.5, 3.4, 3.5, Box 7.3, Box 8.7, Box 9.4, 11.5, Box 11.1, 12.3, 13.9, 14.6, 15.3, 16.5, 16.6, CCP1.2, CCP2.2, CCP5.2, CCP5.3, CCP6.2, CCP6.3, Box CCP6.1, Box CCP6.2, CCB EXTREMES, WGI AR6 Figure SPM.8d}

B.5.3 Weather and climate extremes are causing economic and societal impacts across national boundaries through supply-chains, markets, and natural resource flows, with increasing transboundary risks projected across the water, energy and food sectors (high confidence). Supply chains that rely on specialized commodities and key infrastructure can be disrupted by weather and climate extreme events. Climate change causes the redistribution of marine fish stocks, increasing risk of transboundary management conflicts among fisheries users, and negatively affecting equitable distribution of food provisioning services as fish stocks shift from lower to higher latitude regions, thereby increasing the need for climate-informed transboundary management and cooperation (high confidence). Precipitation and water availability changes increases the risk of planned infrastructure projects, such as hydropower in some regions, having reduced productivity for food and energy sectors including across countries that share river basins (medium confidence). {Figure TS.10e-f, 3.4, 3.5, 4.5, 5.8, 5.13, 6.2, 9.4, Box 9.5,14.5, Box 14.5, Box 14.6, CCP5.3, CCB DISASTER, CCB EXTREMES, CCB INTEREG, CCB MOVING PLATE} B.5.4 Risks arise from some responses that are intended to reduce the risks of climate change, including risks from maladaptation and adverse side effects of some emissions reduction and carbon dioxide removal measures (high confidence). Deployment of afforestation of naturally unforested land, or poorly implemented bioenergy, with or without carbon capture and storage, can compound climate-related risks to biodiversity, water and food security, and livelihoods, especially if implemented at large scales, especially in regions with insecure land tenure (high confidence). {Box 2.2, 4.1, 4.7, 5.13, Table 5.18, Box 9.3, Box 13.2, CCB NATURAL, CWGB BIOECONOMY}

B.5.5 Solar radiation modification approaches, if they were to be implemented, introduce a widespread range of new risks to people and ecosystems, which are not well understood (high confidence). Solar radiation modification approaches have potential to offset warming and ameliorate some climate hazards, but substantial residual climate change or overcompensating change would occur at regional scales and seasonal timescales (high confidence). Large uncertainties and knowledge gaps are associated with the potential of solar radiation modification approaches to reduce climate change risks. Solar radiation modification would not stop atmospheric CO2 concentrations from increasing or reduce resulting ocean acidification under continued anthropogenic emissions (high confidence). {CWGB SRM}

Impacts of Temporary Overshoot

37 In this report, overshoot pathways exceed 1.5°C global warming and then return to that level, or below, after several decades. 38 Despite limited evidence specifically on the impacts of a temporary overshoot of 1.5°C, a much broader evidence base from process understanding and the impacts of higher global warming levels allows a high confidence statement on the irreversibility of some impacts that would be incurred following such an overshoot. B.6 If global warming transiently exceeds 1.5°C in the coming decades or later (overshoot)37, then many human and natural systems will face additional severe risks, compared to remaining below 1.5°C (high confidence). Depending on the magnitude and duration of overshoot, some impacts will cause release of additional greenhouse gases (medium confidence) and some will be irreversible, even if global warming is reduced (high confidence). (Box SPM.1, Figure SPM.3) {2.5, 3.4, 12.3, 16.6, CCB DEEP, CCB SLR}

#### Climate change is a regressive social inequity

Levy & Patz 15 (Barry S.LevyMD, MPH Jonathan A.PatzMD, MPH, “Climate Change, Human Rights, and Social Justice”, Annals of Global Health Volume 81, Issue 3, May–June 2015, Pages 310-322)

The environmental and health consequences of climate change, which disproportionately affect low-income countries and poor people in high-income countries, profoundly affect human rights and social justice. Environmental consequences include increased temperature, excess precipitation in some areas and droughts in others, extreme weather events, and increased sea level. These consequences adversely affect agricultural production, access to safe water, and worker productivity, and, by inundating land or making land uninhabitable and uncultivatable, will force many people to become environmental refugees. Adverse health effects caused by climate change include heat-related disorders, vector-borne diseases, foodborne and waterborne diseases, respiratory and allergic disorders, malnutrition, collective violence, and mental health problems.

These environmental and health consequences threaten civil and political rights and economic, social, and cultural rights, including rights to life, access to safe food and water, health, security, shelter, and culture. On a national or local level, those people who are most vulnerable to the adverse environmental and health consequences of climate change include poor people, members of minority groups, women, children, older people, people with chronic diseases and disabilities, those residing in areas with a high prevalence of climate-related diseases, and workers exposed to extreme heat or increased weather variability. On a global level, there is much inequity, with low-income countries, which produce the least greenhouse gases (GHGs), being more adversely affected by climate change than high-income countries, which produce substantially higher amounts of GHGs yet are less immediately affected. In addition, low-income countries have far less capability to adapt to climate change than high-income countries.

#### Mitigation is the silver bullet increasing levels of climate change exponentially increase its negative consequences

Letzter 19 (Rafi, Staff writer for Live Science citing – Katharine Mach, a climate scientist at the University of Miami and one of several lead authors of the IPCC report., Lini Wollenberg, a University of Vermont climate researcher and leader of the CGIAR Research Program on Climate Change, Agriculture and Food Security, Colin Carlson, an ecologist at Georgetown University who studies how climate change influences infectious diseases, 9/26/19, “Are We Really Running Out of Time to Stop Climate Change?”, https://www.livescience.com/12-years-to-stop-climate-change.html)

But ultimately, all the researchers Live Science contacted said these problems become less catastrophic with less warming. Holding the world to a 1.5-C warming increase by the end of the century creates much more manageable short- and long-term problems than holding it to 2 C of warming, which is much less harmful to Earth than 3 C, which is much more survivable than 4 C, which is still less catastrophic than 6 C … and so on. None of those possible futures necessarily leads to a charred, lifeless global desert in our lifetimes. But each increase is almost unimaginably more dire for life on this planet than the one preceding it.

"It's always worth it to prevent more warming," Mach said.

With regard to the spread of mosquito-borne diseases, Carlson said, "We can stop it. Mitigating climate change is truly the silver bullet. Sometimes it is as simple as, 'If we stop climate change, we can stop a lot of the bad health impacts that are coming.'" (Though the devil is in the details, he added. The level of disease reduction will depend on how fast the carbon-mitigation project moves, and its effects won't be felt immediately or equally everywhere.)

The science points relentlessly to one reality: The best way to deal with climate change is to start cutting emissions now. It's easier to stop warming by keeping CO2 in the ground now than it is to pull carbon out of the air later. And mitigation makes adaptation much more effective.

#### AND--short term mitigation matters--the impact is exponential and increasing.

Desjardins 13 – member of Concordia university Media Relations Department, academic writer, citing Damon Matthews; associate professor of the Department of Geography, Planning and Environment at Concordia University, PhD, Member of the Global Environmental and Climate Change Center

(Cléa, “Global Warming: Irreversible but Not Inevitable,” http://www.concordia.ca/now/what-we-do/research/20130402/global-warming-irreversible-but-not-inevitable.php)

Carbon dioxide emission cuts will immediately affect the rate of future global warming Concordia and MIT researchers show Montreal, April 2, 2013 – There is a persistent misconception among both scientists and the public that there is a delay between emissions of carbon dioxide (CO2) and the climate’s response to those emissions. This misconception has led policy makers to argue that CO2 emission cuts implemented now will not affect the climate system for many decades. This erroneous line of argument makes the climate problem seem more intractable than it actually is, say Concordia University’s Damon Matthews and MIT’s Susan Solomon in a recent Science article. The researchers show that immediate decreases in CO2 emissions would in fact result in an immediate decrease in the rate of climate warming. Explains Matthews, professor in the Department of Geography, Planning and Environment, “If we can successfully decrease CO2 emissions in the near future, this change will be felt by the climate system when the emissions reductions are implemented – not in several decades." “The potential for a quick climate response to prompt cuts in CO2 emissions opens up the possibility that the climate benefits of emissions reductions would occur on the same timescale as the political decisions themselves.” In their paper, Matthews and Solomon, Ellen Swallow Richards professor of Atmospheric Chemistry and Climate Science, show that the onus for slowing the rate of global warming falls squarely on current efforts at reducing CO2 emissions, and the resulting future emissions that we produce. This means that there are critical implications for the equity of carbon emission choices currently being discussed internationally. Total emissions from developing countries may soon exceed those from developed nations. But developed countries are expected to maintain a far higher per-capita contribution to present and possible future warming. “This disparity clarifies the urgency for low-carbon technology investment and diffusion to enable developing countries to continue to develop,” says Matthews. “Emission cuts made now will have an immediate effect on the rate of global warming,” he asserts. “I see more hope for averting difficult-to-avoid negative impacts by accelerating advances in technology development and diffusion, than for averting climate system changes that are already inevitable. Given the enormous scope and complexity of the climate mitigation challenge, clarifying these points of hope is critical to motivate change.”

#### Antitrust is historically a weapon of the elite, but it can be revitalized for public goods like climate change

V. Sodano 2010. University of Naples Federico II, Department of Agricultural Economics. “Food system and climate change: the false premises of antitrust Policy”

Introduction

According to recent estimates (IAASTD, 2008), the global food system is currently accountable for at least 30% of the global GHG emissions that cause climate change. Considering also emissions by indirect activities associated with food production and distribution, such as home storage and refrigerators, waste disposal, transportation by final consumers and so on, this estimate may rise dramatically to as high as nearly 50% of total emissions (Grain, 2009). Agribusiness corporations, backing a model of food production and distribution that functions by converting oil into food, are largely responsible for these huge emissions. Influencing the behaviour of food TNCs in such a way as to shift towards a more sustainable food model may greatly contribute to tackling global warming. Actions to induce food corporations to assume a more sustainable form of conduct come from both the private and the public sector. On the private sector side initiatives come from consumers (individuals and consumer associations), environmental associations and non governmental organizations. On the public sector side, there are at least three kinds of intervention: (1) direct regulation, based on a command-and-control approach; (2) ‘soft regulation’, including self-regulation, use of incentives, awards and accreditation systems, market-based initiatives, disclosure obligations and educational campaigns; (3) definitions of duties of corporations, through corporate law and competition policy. The paper stresses that, given that **reducing GHG emissions is comparable to a public good**, only state intervention may be expected to be effective. Moreover, given that corporations cannot be granted the same moral status as natural persons, even soft regulation, which requires some form of corporate social responsibility and therefore of corporate morality, cannot be effective. With regards to state intervention the paper analyzes the role of **competition policy**, showing how it **can help in fighting global warming, provided that it overcomes** the over thirty year lasting dominance of the ‘Chicago paradigm’. Global warming mitigation: the role of public and private sector It is a matter of fact that induced climate change is representative of a tragedy of the commons, a typical collective action problem. Maintaining a stable climate has the structure of a public good exhibiting both the property of non excludability and non rivalry. The free riding problem, i.e. the fact that non contributors can benefit from others’ GHG reductions without taking on costs themselves, prevents private rational actors from engaging in mitigation efforts. Beyond being a public good, the protection of a stable climate that fits human biological and economic needs, can be considered to be a human right. In particular, it is of the kind of second generation human rights, i.e. economic and social rights, grounded in the notion that government has affirmative obligations to protect individuals from deprivation of the basic material necessities of life. In the case of public goods, economic and social theories based on rational choice models hold that the market (i.e. the private sector) fails to supply them. Therefore**,** the only effective provider is the state, as the latter has the precise political mandate to accommodate for general public welfare against scattered private interests. With regards to human rights the general view is that the state has the ultimate duty to uphold them. The state can intervene either directly or indirectly. Direct interventions include: public investments in global warming mitigation; setting compulsory standards in defence of low emission production and consumption activities; imposing human rights duties on corporations for climate change and environmental harm; implementing tort liability laws that make private actors pay for damage to climate and environment. Indirect interventions include: market based incentives aimed at promoting private climate friendly behaviour; embracing a voluntary corporate social responsibility (CSR) approach that shifts the burden of public interest onto corporations, which are deemed to possess other-regarding preferences and moral values. In this paper it is claimed that only direct intervention can be effective because, in the case of market-based instruments, it may apply the same sources of market failure that the intervention seeks to correct. The voluntary CSR approach is not viable because it hinges on the false premise that corporations have the same moral status as natural persons. The moral status of corporations endorsed by scholars like French (French, 1984) is to be rejected when the three necessary conditions for moral agency are examined: the ability to intend an action; the ability to perform an action; the ability to autonomously choose an intentional action. In the case of conglomerate collectives, such as corporations, these conditions are not fulfilled (Ronnegard, 2006: 82) and therefore they do not qualify as moral agents conceived as distinct from their members. Consequently, corporate moral responsibility attributions to collectives as distinct from their corporate members are illegitimate. Competition policy and climate change: the perspective of the Chicago school Given that only direct intervention by the state can assure adequate levels of global warming mitigation, the issue to be addressed is what role competition policy, among other forms of public intervention, can have in promoting corporate climate friendly behaviour. Competition policy originated in the US in 1890 with the Sherman Act. In the European Union the first antitrust regulation was set by the treaty of Rome in 1957. There are commonly described three historical phases of US antitrust law implementation, the first dating from 1890 to 1940, the second from 1945 to 1975 and the third from 1970 to the present (Viscusi et al., 2005). These three phases have been characterized by different economic and political theories incorporating two different ideologies of the market and the state: the evolutionary vision and the intentional vision (Page, 2008). The evolutionary vision views the market, framed solely by laws on property and contracts, as a mechanism for facilitating free exchanges among countless individuals in the pursuit of their best interests. In this vision, the market without state intervention naturally tends to a perfect competition ideal form destroying monopoly. On the contrary, the intentional vision views the market as a mechanism within which powerful interests can coerce consumers, labour and small businesses. In this vision markets tend toward monopoly unless government intervenes. The political economic theories corresponding to these two visions are the laissez-faire and the welfare state theories. The more the intentional vision is preferred to the evolutionary vision, the greater is the scope and the enforcement of antitrust law, and vice versa. The Sherman Act and the first period of antitrust law implementation embodied a compromise between the two visions. Notwithstanding the faith in the market, coherent with a strong liberal theory of the state, it was recognized as a matter of fact that monopolies and extreme economic power concentrations actually occur in the real world, producing social inequalities and injustice. At that time, state intervention was intended as a way to promote social justice and mediate among class conflicts in society. In the second period, the intentional view prevailed. Stemming from the disillusionment with markets during the Great Depression, the New Deal initiated the era of the welfare state based on the idea, supported by the growing economic literature on market failure, that economic state intervention should be legitimated by efficiency more than by equity concerns. The years between 1950 and 1970 are the golden era of antitrust legislation. The view of the markets taken up by the Court was that of recognition that coercion is the reality of market relationships. That is to say that in contrast with the previous ideological faith in the freedom of contracts, it was acknowledged that in a market transaction each party may be forced by the bargaining power of the other to accept unfair payments and obligations. Along with these views, the then prevailing theory of industrial organization, the structure-conduct-performance paradigm, facilitated a strong enforcement of antitrust legislation, holding that the mere measure of market share was sufficient to witness the presence of market power and monopoly inefficiencies. By the mid-1970s the evolutionary view completely dismissed the intentional view with the uprising of the so called Chicago school of antitrust. Chicago scholars applying neoclassical economics maintained that unfettered markets always lead to the best social outcomes. They pointed out that many of the practices that the courts had been viewing as harmful to competition and economic welfare, such as vertical restraints, may instead improve economic efficiency. Moreover they contested the structuralist view by claiming that a firm’s large market share may signal superior efficiency and that, consistently with the contestability theory (Baumol et al., 1982), freedom of entry is the only parameter to be scrutinized by antitrust laws. The general wisdom of the Chicago school was that state intervention and regulation is always harmful to the general interest. The Chicago ‘revolution’ has made competition policy a useless instrument for reaching goals of general interest such as providing public goods and promoting social justice. **In order to make competition policy a useful instrument against global warming,** it is necessary to reject some assumptions of the **Chicago antitrust school** and revive instead the conventional wisdom of the previous approaches in the wake of the intentional view. Among the assumptions to be scrutinized are those related to the three following issues: the theory of the firm; the nature of corporation; the goals of antitrust policy. The Chicago approach endorses a neoclassical theory of the firm where the firm is defined by a technical production function. The neoclassical theory of the firm, even in its modern neo-institutional version that accounts for transaction costs, explains a firm’s behaviour exclusively through the efficiency argument (exploitation of scale and scope economies). According to Chicago scholars, large size and above-normal returns must be due to efficiency differentials between firms. In their world made of equilibria and complete contracts, power-seeking behaviours are not conceivable (Raghuram and Zingales, 1998). Organizational, institutional and cognitive problems addressed by alternative theories (such as managerial, evolutionary, property rights, and behavioural theories) are dismissed as trivial. With regards to the legal debate on the nature of corporations (the latter defined as economic organizations whose members are granted limited liability by incorporation statutes), the Chicago view is consistent with the Nexus-of-Contracts theory, which contrasts the two alternative theories, namely the Legal Fiction and the Real Entity theories (Ronnegard, 2006). The Nexus-of-Contracts theory depicts the corporation as a web of contracts among all the members, which implies that it should not be regarded as a separate legal entity from the shareholders and that rights and duties can be defined only with regards to its members. Because the corporation is the result of a free contract, it is not dependent upon state grants and the same act of incorporation (granted by the state) is only a shorthand way of obtaining a contractual situation equivalent to that which could materialize through the private contracting of individuals. This conception of corporation is based on a libertarian ideology that says that corporations ought to merely be a commercial instrument for furthering the ends of the incorporating parties. Because corporations are not autonomous entities, any moral status (and therefore social responsibility) is ruled out, and because they are not a ‘creature’ of the state but the result of free contracts, they cannot be given rules and duties by the state. Therefore, one cannot expect them to provide public goods, such as climate stabilization, either voluntarily or compulsorily. Finally, as regards the goals of antitrust, the Chicago school states that antitrust policy ought to deal only with consumer losses due to high prices and/or output restrictions (Burns, 2006). Any equity concern about wealth distribution or unfair business practices is dismissed. For instance, in the Chicago view low final prices generally signal efficiency and practices like predatory pricing, reciprocal selling and cross-subsidization by conglomerates, unfair procurement contracts, and so on, are given little attention. All these three sets of assumptions entail that corporations pertain to the private more than to the public sphere and that antitrust pertains to the economic more than to the political sphere. In consequence, corporations should not be required to seek public goals (like providing public goods such as climate stabilization) and antitrust should not be required to seek goals like equity and justice (among which climate justice) but should only pursue economic efficiency in terms of low consumer prices. Competition policy and climate change: reversing the false premises of the Chicago school Stemming from the intentional vision, and in opposition to the evolutionary vision of the Chicago school, **the previous assumptions can be reversed in such a way as to justify a wider scope of antitrust policy** able to encompass the goal of climate stabilization. **The first** hypotheses to be reversed **are those** **concerning** the theory of **the firm** and the nature of the corporation. Firms cannot be described purely as technical production functions but as institutions (as economic theory had to acknowledge after the seminal work of Coase of 1937) that in some way substitute the market with power as means of resource allocation. Like states, firms exercise power in various forms, either inside their organizational boundaries or outside, over their competitors, their suppliers, their customers and the same state, through lobbying and bribing. Modern corporations are firms which, through the limited liability and other rights granted by the state (such as unlimited life span, unlimited asset acquisition, complete flexibility and mobility in business conduct, constitutional rights equal to those of natural persons), possess even superpowers (Nace, 2003; Korten, 2001), i.e. powers that cannot be enjoyed by a single individual and even less (because of territorial limits) by a single state. Because corporations are legal persons, with specific rights granted by the state, their nature cannot be described through the Nexus-of-Contract theory endorsed by the Chicago School. Their nature is better described by the Legal Fiction theory. The Legal Fiction theory essentially says that the corporation is merely an abstract creation of law which is granted to an association of individuals. The corporation is an artificial legal entity with an existence distinct from the incorporating members and exists entirely at the discretion of the state. The Legal Fiction theory differs from the Nexus-of-Contract theory which does not recognize the corporation distinct from its members and does affirm that it is independent from the power of the state because it is the result of free contracts by individuals. The Legal Fiction theory also differs from the Real Entity theory that considers corporations to be real, social organisms that possess a will and life of their own, with characteristics that are distinct from their individual members. Similar to the Nexus-of-Contracts theory, the Real Entity theory rejects the notion that corporation is a creation or grant from the state. However, differently from the Nexus-of-Contracts theory, the Real Entity theory claims that corporations ought to be granted legal rights as natural persons, rights which are owed to the corporation itself as a separate organism and are not derived from the rights of the individual members. The Legal Fiction theory is the only theory on the nature of corporations that is consistent with the advocacy of an antitrust regulation aimed at directly controlling and limiting the scope of activity of corporations. Because corporations are legal persons they can be given rights and duties. Nevertheless, because they are not natural persons, as instead envisaged by the Real Entity theory, they do not automatically enjoy basic rights (like the rights to free speech and due process of law) and do not possess moral responsibility. Because they are creatures of the state, they do not have their own life and in the divide between the private and public sphere they can be put somehow on the public side. Shifting from the idea of corporations as private efficiency-seeking organizations to the idea of corporations as social bodies enjoying large powers by virtue of state grants allows us to recognize that corporations may have an important role in addressing general social problems like global warming. Two arguments must be considered. First, because the power of corporations, including the power to affect global warming, depends on state grants, state regulations and obligations imposed on corporations in order to contribute to climate stabilization cannot be considered as illegitimate limitation to private freedom (as envisioned by Chicago scholars and neo-liberalists). Such regulations and obligations should instead be considered a due act of governance involving subjects (state regulators and corporations) that both pertain to the public sphere. Secondly, obligations imposed on corporations may be of the kind of human rights duties in case of environmental harm (Mabaquiao, 2002). It is worth noticing that rights are, after all, a response to the problem of power; in particular human rights are asserted in order to protect individuals from abuse of power by states. When one recognizes that many TNCs are really as powerful as or more powerful than many states, it does make sense to treat them as duty-holders, with the same obligations as the states to uphold human rights (Sinden, 2007). It is also important to notice that, because according to the Legal Fiction theory corporations do not possess moral responsibility, we cannot rely on CSR or voluntary codes of conducts as ways to protect the public from environmental harm and any power abuse made by corporations. The second set of hypotheses to be reversed is that concerning the definition of the scope of antitrust policy. It is general wisdom that antitrust policy should prevent excesses in exercise of power by large firms. The difference between the Chicago School and alternative approaches based on the intentional view is with the kind of power at stake. The Chicago school only considers market power in the form of high consumer prices. Alternative approaches instead look at different kinds of power: the bargaining power towards suppliers and employees; the power to choose technologies and products with different environmental impacts; the power to influence the political arena; the power to ‘capture’ regulators; the power to influence cultural and social values; and even more. If antitrust policy has to deal with all these kinds of power then it must widen its scope, adding to the economic goal efficiency, social and political goals, such as business fairness, distributive equity, environment protection, enforcement of human rights and so on. In this perspective, **antitrust policy should provide incentives** (either positive or negative) **for business firms to pursue public goals**, **such as global warming mitigation.** Conclusion The global food system is populated by many large TNCs (Etc.Group, 2008). These corporations have de facto become a key part of the fabric of global environmental governance. In their role as investors, polluters, experts, manufacturers, lobbyists and employers, corporations are central players in environmental issues. While necessary, voluntary action on the part of corporations and consumers is not alone sufficient to mitigate the worst effects of global warming. However, in the food sector, voluntary actions have been weak and sparse so far (Cogan, 2006). For instance in the Ceres report (CERES, 2008), which rates firms by their achievements in climate-related corporate governance, there are no companies from the food sector among the top ten firms. Among the bottom twelve there are instead three food giants: ConAgra, Bunge, and PepsiCo. Climate stabilization, as in general environmental protection, is a public good and as such is not provided by the private sector but needs public intervention. Among the many kinds of public intervention, the paper has focused on antitrust legislation. At its origin, antitrust legislation was conceived as a means to mitigate power wielded by large corporations in society. With the spread of neo-liberalism from the mid-1970s, the Chicago School radically changed the meaning and the scope of antitrust laws, with drastic changes in its enforcement (Mueller, 2009). The general claim of this paper is that it is necessary to go back to the original spirit of antitrust legislation which endorses an idea of corporation as an artificial powerful legal entity created by the state in order to serve the public interest. Only in this way can large firms, in particular TNCs in the food sector, **be expected to comply with environmental regulations and guarantee human rights.**

#### It is not enough to come up with answers to the issue of climate change without a possible path towards achieving sustainable development through economic and political means. Strength of integration of economics into climate policy is key.

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The environmental sciences have documented large and worrisome changes in earth systems, from climate change and loss of biodiversity, to changes in hydrological and nutrient cycles and depletion of natural resources (1⇓⇓⇓⇓⇓⇓⇓⇓⇓⇓–12). These global environmental changes have potentially large negative consequences for future human well-being, and raise questions about whether global civilization is on a sustainable path or is “consuming too much” by depleting vital natural capital (13). The increased scale of economic activity and the consequent increasing impacts on a finite Earth arises from both major demographic changes—including population growth, shifts in age structure, urbanization, and spatial redistributions through migration (14⇓⇓⇓–18)—and rising per capita income and shifts in consumption patterns, such as increases in meat consumption with rising income (19, 20).

At the same time, many people are consuming too little. In 2015, ∼10% of the world’s population (736 million) lived in extreme poverty with incomes of less than $1.90 per day (21). In 2017, 821 million people were malnourished, an increase in the number reported malnourished compared with 2016 (22). There is an urgent need for further economic development to lift people out of poverty. In addition, rising inequality resulting in increasing polarization of society is itself a threat to achieving sustainable development. Eliminating poverty (goal 1) and hunger (goal 2), achieving gender equality (goal 6), and reducing inequality (goal 10) feature prominently in the United Nation’s Sustainable Development Goals (23). A recent special issue in PNAS on natural capital framed the challenge of sustainable development as one of developing “economic, social, and governance systems capable of ending poverty and achieving sustainable levels of population and consumption while securing the life-support systems underpinning current and future human well-being” (24).

The discipline of economics arguably should play a central role in meeting the sustainable development challenge. The core question at the heart of sustainable development is how to allocate the finite resources of the planet to meet “the needs of the present, without compromising the ability of future generations to meet their own needs” (25). A central focus of economics is how to allocate scarce resources to meet desired goals; indeed, a standard definition of economics is the study of allocation under scarcity. More specifically, economics studies the production, distribution, and consumption of goods and services, which are both a key driver of development (increasing standards of living through providing food, housing, and other basic human requirements) and a main cause of current changes in earth systems. Economics, combined with earth system sciences, is crucial for understanding both positive and negative impacts of alternatives and the trade-offs involved. Economics, combined with other social and behavioral sciences, is crucial for understanding how it might be possible to shift human behavior toward achieving sustainable development. Economics has well-developed fields in development economics, ecological economics, environmental economics, and natural resource economics, with large bodies of research relevant to the sustainable development challenge. The application of economic principles and empirical findings should be a central component in the quest to meet the aspirations of humanity for a good life given the finite resources of the earth.

Indeed, an extensive body of work by economists provides key insights into aspects of sustainable development. At its best, this work integrates work by other natural and social sciences into a policy-relevant framework and demonstrates the rich potential for collaborations among economists, natural scientists, and other social scientists on sustainable development challenges. For example, economists have developed integrated economic and climate models to address important climate change policy questions, such as how much and how fast greenhouse gas emissions should be reduced (26⇓⇓⇓⇓–31). In 2018, William Nordhaus shared the Nobel Prize in economics, in large part for his seminal work on such models. These models have sparked large debates within economics over fundamental issues such as the proper discount rate (32⇓⇓–35), and with the natural sciences over the likely scale of damages from climate change (36, 37). Another Nobel Prize winner in economics, Elinor Ostrom, used economic models to highlight the importance of governance and institutions for sustainable use of common property resources (38⇓–40). Another important area of work by economists directly relevant to sustainable development defines and measures inclusive wealth (13, 41⇓⇓⇓⇓⇓⇓⇓–49). Ken Arrow, yet another Nobel Prize winner in economics, was a leader in this field. It is also notable that the intellectual roots of inclusive wealth trace to work in the 1970s of two Nobel Prize winners in economics, William Nordhaus and James Tobin (50). Inclusive wealth is a measure of the aggregate wealth of society, including the value of natural capital along with the values of human capital, manufactured capital, and social capital. Inclusive wealth is a sufficient statistic for showing whether or not global society is on a sustainable trajectory. For the past two decades, the Beijer Institute of Ecological Economics, part of the Royal Swedish Academy of Sciences, has held annual meetings bringing together leading economists and ecologists to discuss issues at the intersection of ecology and economics, which have resulted in a number of high-impact papers (51). The idea for a forum to highlight work in economics on environment and sustainable development originated at one of these meetings.

Despite these examples and many others, the center of gravity in the analysis of sustainable development remains in the natural sciences, and the center of gravity in economics remains far removed from the challenge of sustainable development. The natural sciences that form the core of earth systems science, including ecology, geology, climatology, hydrology, and oceanography, are a logical place to start to build understanding of the current state and the evolution of earth systems. Natural scientists have taken the lead in prominent analyses of pathways to achieve sustainable development. For example, Pacala and Socolow (52) outline feasible methods using existing technology to reduce greenhouse gas emissions to secure a livable climate. Foley et al. (53) analyze how to meet growing food demand without expanding the footprint of agriculture. Costello et al. (54) suggest how extensive fishery reform could result in improved productivity and ecosystem health. Tallis et al. (55) analyze how to improve material standard of living for a growing population in ways that simultaneously sustain biodiversity, reduce greenhouse gas emissions, and reduce water use and air pollution. These works show that it is feasible to achieve multiple sustainable development goals with existing technology. The harder challenge is combining what is feasible in a biophysical sense with the difficult economic, political, and social hurdles that prevent society from getting to sustainable outcomes (55). In other words, natural science understanding is necessary but not sufficient to achieve sustainable development.

While natural science understanding is insufficient on its own to achieve sustainable development, the same is true of economics. Economists alone do not have the knowledge base supplied by the natural sciences necessary to understand the complex ecological systems within which the economic system operates and on which economic activity causes impacts. Progress in sustainable development requires collaboration between social scientists, including economists and natural scientists. Of course, achieving sustainable development requires institutions and political alignment that go well beyond assembling the science knowledge arising from integrated scientific knowledge.

Numerous examples show the incomplete nature of collaboration between economists and other disciplines engaged in the analysis of sustainable development. To take one recent example, there were no economists involved in a special section on “Ecosystem Earth” published in Science in April 2017 that contained discussions of population, consumption, agricultural production, land use, human behavior, collective action, and policy (56). The lack of involvement by economists in ongoing discussions of sustainable development leads to gaps in understanding production and consumption decisions, the resulting market outcomes that drive global environmental change, and how to regulate or reduce negative environmental impacts from economic activities.

The incomplete engagement of economists mirrors the structure of the economics discipline. The fields of ecological, environmental, and resource economics are not core fields within economics. There are few ecological, environmental, or resource economics publications in flagship journals within economics. For example, in 2018 only two papers published in the American Economic Review listed classification codes for renewable resources and conservation, nonrenewable resources and conservation, energy economics, or environmental economics (57, 58). Only a small minority of the top economics departments have fields in ecological, environmental, or resource economics. In contrast, virtually every top economics program offers fields in labor economics, industrial organization, and international trade. Ecological, environmental, and resource economics programs often are in schools of the environment or natural resources, schools of public policy, or in departments of agricultural economics. In addition, economics is notable among academic disciplines for its relative isolation: “Though all disciplines are in some way insular…this trait peculiarly characterizes economics” (59). Compared with other social scientists, economists have far lower citation rates for work in other disciplines. Jacobs (60) found that the percentage of within-field citations in economics was 81%, versus 59% for political science, 53% for anthropology, and 52% for sociology. In addition, the core of the economics discipline is relatively isolated from the natural sciences that have played a large role in sustainability science to date, ecology, geology, climatology, hydrology, and marine biology. Network maps of disciplines using citations patterns often show economics and fields, such as ecology and geosciences, at opposite ends of the spectrum (figure 3 in ref. 61).

Given the large role of economic activity in causing rapid change in earth systems, and the scale of the sustainable development challenge, there is an urgent need for more rapid integration of economics into the core of sustainable development, and for more rapid integration of sustainable development into the core of economics.

#### The plan is necessary—corporations are driven by profit incentives and allowing mergers and monopolies make solving the climate change impossible—they maintain perverse incentives that need to be reigned in. Any alternative leads to collusion!

Schinkel and Treuren 21. Maarten Pieter Schinkel and Leonard Treuren. “Green Antitrust: Friendly Fire In The Fight Against Climate Change” <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3749147>

4 Not less but more competition leads to greater sustainability The central question of whether it should be expected that firms will produce more sustainably in an anticompetitive agreement than in competition squarely falls on economics to answer. It is reasonable to base the analysis on two standard premises. The first is that (potential) consumers care about sustainability. Eichholtz et al. (2010) document a higher willingness to pay for office buildings with sustainability labels. Casadesus-Masanell et al. (2009) report a higher willingness to pay for T-shirts made with organic cotton. In a survey of the literature Kitzmueller and Shimshack (2012) conclude that willingness to pay depends in general positively on the degree of corporate social responsibility a firm engages in.23 More recently, Aghion et al. (2020) find that green innovation is positively correlated with consumers’ stated sustainability preferences.

A second premise is that, no matter how noble the initiatives may appear, firms are ultimately driven by profit motives. Rate of return incentives can certainly lead to intricate and forward-looking firm behavior, for instance investing in a good public image in order to attract more consumers. Running up short term losses with a CEO passionate about corporate social responsibility can therefore still be consistent with long term profit maximization. Yet under pressure of shareholders and investors, firms are interested in sustainability initiatives first and foremost to increase their profitability, in particular through buyers’ higher willingness to pay.24 The latter are the revenue returns to sustainability investments, which are costs. Therefore, companies will strive for profit-maximizing price increases and sustainability advances, for which cost-minimization is a necessary condition. That these incentives lead to little green is reflected in the literature on greenwashing. Firms certainly like to have a “green” public image, but when consumers cannot assess the true extent of their sustainability investments, they only undertake the minimum.25 In general, we should expect no less, and no more, from for-profit enterprises, both in competition and in coordination.

The relationship between competition and sustainability is studied in a limited but recently growing literature. The current consensus is that competition increases investments in sustainability, with firms investing in sustainability because it lowers their costs or allows them to stand out to consumers. Green, in other words, is a dimension of product differentiation. Bansal and Roth (2000), Porter and Kramer (2006), and Roulet and Bothello (2020) point out that corporate social responsibility (CSR) can be a strong competitive advantage. Graafland (2016) finds in survey data that price competition does not influence companies’ environmental performance ratings. Simon and Prince (2016) show that a reduction in industrial concentration in the United States is associated with a reduction in toxic releases at the factory level. Fernández-Kranz and Santaló (2010) and Flammer (2015) find that competition has a positive effect on CSR at the firm level, in studies of variation in import duties and concentration. Aghion et al. (2020) show that the positive relation between consumers’ stated sustainability preferences and the probability that a firm engages in green innovation increases with the degree of product market competition. This suggests that as pro-environment attitudes become more common over time, the role of competition in fostering green innovation will only increase. Ding et al. (2020) link antitrust policy to sustainability by showing that stricter competition law regimes are positively associated with CSR, and that this link is stronger in countries where consumers indicate stronger pro-environment attitudes.

Few papers study the relationship between horizontal agreements and sustainability directly. They relate to the literature on exempting research joint-ventures, which can increase R&D investments above competitive levels if spillovers of innovations are so large that unilateral investments are discouraged.26 For this reason, there is a broad exemption clause available for R&D joint-ventures, including for research into more sustainable production methods. However, with limited spill-overs, competition is the stronger driver of R&D. There is concern, therefore, that mergers reduce innovation.27 Importantly, sustainability initiatives of the kind considered for exemption, such as investments in cleaner technology or better quality of live for farm animals, have little or no spillover from one company to another. These cases, and the current green antitrust debate about advancing a transition to more sustainable ways of manufacturing, are primarily about the implementation of existing cleaner technologies, rather than about innovation.

Schinkel and Spiegel (2017) analyze the link between anticompetitive agreements and sustainability in a two-stage duopoly model where firms first select investments in sustainability and subsequently compete on the product market. They find that allowing the firms to coordinate their sustainability efforts leads to the lowest sustainability levels. Sustainability is a product attribute that consumers care about, and hence is used by firms to compete and attract each other’s customers. Treuren and Schinkel (2018) generalize these findings to more firms and remaining competition. Note that when firms coordinate prices and sustainability investments, sustainability levels are still lower than in competition. This means that if coordinating their sustainability investments allows the companies to collude on prices as well, a risk we noted above, sustainability does not benefit from coordination.

#### Even a total shift in individual attitudes about climate change would benefit from a more competitive economic environment.

Schinkel and Treuren 21. Maarten Pieter Schinkel and Leonard Treuren. “Green Antitrust: Friendly Fire In The Fight Against Climate Change” <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3749147>

Proponents of green antitrust policy point out that today’s corporate leadership increasingly pledges allegiance to take responsibility for stakeholders more widely, including for their environment.28 They view profit-driven firm analysis as outdated, and Friedman’s appeal to it as an ancient belief.29 Green CEO’s may not even be controllable by shareholders anymore if they wanted to. Importantly, however, if firms operate with an intrinsic motivation to produce more sustainably too, investments typically remain higher in competition than with sustainability agreements, and the difference may even become larger. In Schinkel and Treuren (2021), the level of sustainability investments features directly in each firm’s objective function, besides in the profits part. Since intrinsically motivated investments are independent of the competitive regime, they are higher in absolute value in both competition and coordination. Moreover, coordination reduces the additional intrinsically motivated green investments, since the loss of profit due to increasing sustainability beyond the normal profit maximizing level is larger for firms who jointly decide on sustainability. That an intrinsic motivation to do green makes anticompetitive agreements not more, but rather even less suitable to promote sustainability investments underlines our warning not to lean too far in sympathies for initiatives to take corporate social responsibility jointly.

#### AND it’s sufficient – Establishing a basis for “green anit-trust” creates government leverage for large-scale climate action

Schinkel and Treuren 21. Maarten Pieter Schinkel and Leonard Treuren. “Green Antitrust: Friendly Fire In The Fight Against Climate Change” <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3749147>

7 Green antitrust excuses government failure to regulate In the classical economic approach, damaging side-effects of market interactions are seen as externalities. **The solution is to force market participants to internalize these externalities.** The social costs of pollution, for example, then become part of the production costs to be expressed in the product prices. Higher prices decrease demand and thereby environmental damage, while higher costs incentivize firms to look for more sustainable production methods. This way, market forces are harnessed to benefit the environment. Through competition, an optimal allocation of production and consumption will result, based on a society’s preferences for the climate relative to consumption goods. The efficient allocation of scarce resources over alternative means then remains firmly based on consumer sovereignty, i.e. the preferences of the people.36 Care for the future has a prominent place in this framework. Welfare of future generations is taken into account, for instance through the intergenerational altruism and bequest motives of the current population.37 **This is** also **how the future can** consistently enterinto **competition authorities’ assessments** of green efficiencies. It is first and foremost a government task to ensure that the social costs of production are reflected in the private costs of manufacturers. This can be done through taxation, or by ensuring that private property rights for climate-related issues are well defined, such that private parties will ensure that the costs of their use will be priced in. **Where this is hard to achieve,** for instance because the source of pollution remains disputed, **governments** can use direct regulation **to force firms to produce in a more sustainable way**. Unsustainable production, like under-provision of public goods, is a well-understood market failure, but it is a government failure that well-known solutions have only been sparingly used in the last several decades. Trying to remedy this government failure by creating a market failure – market power – seems a response that is itself doomed to fail. To begin with, trying to have private market power advance public interests is orthogonal to key lessons of classical public economic theory. **One way of seeing this green antitrust policy is as mandating private companies to increase their prices by an overcharge, i.e. “tax” a private good**, **and to use that money to finance a compensating public good**; sustainability. Samuelson’s rule prescribes that public good provision should be increasing with the utility that people derive from the public good. But for an anticompetitive sustainability agreement, the higher the willingness to pay for sustainable products, the less sustainability the corporate cooperative needs to deliver to compensate consumers for a given product price increase. After all, consumers with a high appreciation for green can be made indifferent with less of it, compared with consumers that appreciate green little. There is no reason for a green corporate cooperative to invest more of its extra revenue in sustainability than it is minimally required to do: the rest it can pocket as profit. Government, though certainly imperfect, at least strives for optimal taxation and break-even public good provision. Companies with market power instead have an incentive to maximize their margin. In addition, green antitrust policy runs the risk of exacerbating government failure. That governments keep failing to live up to their **mandate to guarantee the public interest** has many reasons, including public choice incentives ranging from regulatory laziness to outright corruption. Being able to point to industry self-regulation, in the form of sustainability agreements in restriction of competition, is another perfect excuse for governments not to take up their regulatory responsibility. Why the effort to regulate, after all, if government officials can simply rely on private initiatives to help meet sustainability goals? This is exactly how Chicken (2015) entered the stage: the Dutch cabinet did not want to improve by regulation the abysmal circumstances in which poultry is reared, because it would apply to all chicken, including the vast majority bred for export purposes. Yet there was strong public pressure to act. The problem was conveniently redirected towards the ACM, which was subsequently reproached for refusing to exempt the meagre initiative. The green antitrust movement therefore insists on a turn that, once taken, risks leading us down a path where competition authorities are accused of standing in the way of sustainability initiatives, behind which accusations firms can hide as an excuse for not becoming more sustainable. That is barking up the wrong tree: where there is a need for coordinated implementation of more sustainable production, government should regulate it, and firms with such green initiatives should lobby the designated public authority for effective regulation, rather than the competition authorities for protection from competition.

#### Emissions mitigation policy as an early mover is key to future abatement and preventing lock-in – solves leakage and green paradox.

Arroyo-Currás et al 15 (Tabaré Arroyo-Currás, Potsdam Institute for Climate Impact Research, Nico Bauer, Elmar Kriegler, Valeria Jana Schwanitz, Gunnar Luderer, Tino Aboumahboub, Anastasis Giannousakis, Jérôme Hilaire, “Carbon leakage in a fragmented climate regime: The dynamic response of global energy markets’, Technological Forecasting and Social Change Volume 90, Part A, January 2015, Pages 192–203)

5. Conclusions

Given the challenges to international cooperation on mitigating climate change, a number of climate policies have been implemented by various countries and regions, while others remain on the sideline. The heterogeneity of climate policy approaches has given rise to an internationally fragmented climate policy regime. Subsequently, global emission externalities such as carbon leakage have emerged as an important topic within the climate change mitigation debate.

This study illustrates the incidence and consequences of carbon leakage as an effect of early action in a fragmented climate policy regime. For this analysis, the REMIND integrated assessment model of the global economy, energy sector and the climate system is used to evaluate the environmental effectiveness and economic implications of unilateral and joint mitigation efforts. Overall, the main scope of this paper is to examine the role of carbon leakage via the energy channel, i.e. the increase in fossil fuel use in regions with weaker or non-existent climate policies due to more stringent mitigation action in other regions. The study also includes the capital market channel of carbon leakage.

We derive four main findings from our study. First, a reference policy scenario extrapolating fragmented action at current levels of ambition into the future will reduce emissions only modestly compared to the idealized case of immediate cooperative action on reaching a 450 ppm CO2e stabilization target (compare Blanford et al. [35]). Therefore, a pioneering region adopting more stringent emission reductions may be needed to strengthen climate mitigation. We show that the main impact on additional emission reductions does not come from the early mover action itself, but from the rest of the world following up with strengthening their abatement effort post 2030. Thus, a pioneer in adopting more stringent mitigation action needs to be particularly concerned with its ability to induce others to follow.

Second, the carbon leakage rate via the energy channel is limited to below 16% of the additional emission reductions from more stringent abatement action by pioneering regions. This result holds for different sizes and compositions of the early mover coalition. The carbon leakage mechanisms include the reduction of coal use in pioneering regions, or indirectly in other regions via knock-on substitution effects from reduced gas use in abating regions, leading to increased coal consumption in the rest of the world. While the type of mechanism and the regions that increase their fossil fuel consumption vary with the early mover coalition, the general result of limited leakage stands. This implies that carbon leakage, at least via the energy channel investigated here, is not strongly impacting the emission reduction gains from early mover action, and does not permanently increase the lock-in into fossil fuel infrastructure in other regions. It therefore does not provide a strong counter-argument against adoption of more stringent mitigation efforts by pioneering regions.

Compared with the scientific literature that mainly focused on the competitiveness channel the upper limit of 16% carbon leakage rate due to the energy market channel is small (Babiker [36]; Babiker [37]; Bernstein et al. [38]; Bollen et al. [39]; Burniaux and Oliveira-Martins [40]; Burniaux and Truong [41]; Gerlagh and Kuik [42]; Kuik and Gerlagh [43]; Light et al. [44]; Manne and Richels [45]; McKibbin et al. [19]). In the REMIND model the representation of international fossil fuel markets is highly flexible and fossil based energy conversion technologies can easily replace alternatives. Hence, fossil fuel suppliers can, in principle, find new demands easily, if demand is reduced due to unilateral climate policies. Carbon leakage via the energy market channel is mainly limited due to trade costs of fossil fuels and demand for final energies in non-abating countries. In the present study also the carbon prices of the moderate climate policies dampen the carbon leakage. Studies focusing on the competitiveness channel usually depend on the choice of trade elasticities with higher elasticities implying larger carbon leakage rates. In this study fossil energy trade is not limited in a similar way, and therefore limitations should imply even smaller carbon leakage rates.

Third, we observe that the re-allocation of emissions due to carbon leakage depends mostly on the energy system structure of the region that takes abatement action i.e. whether the region is a fossil resource importer (e.g. Europe), exporter (e.g. the United States) or de facto carbon intensive economy (e.g. China). We conclude that carbon leakage is a dynamic effect that mostly depends on (i) demand response of fuel importers to price changes, (ii) inter-fuel substitution possibilities and (iii) transportation cost barriers in the fossil fuel market.

Regarding the economic implications of fragmented climate action we confirm the assertion that early mitigation action leads to short-run GDP losses for the first movers, but delayed implementation of the carbon tax can lead to larger losses after the introduction of the tax. The larger tax shock can act as a significant barrier to take more stringent action and therefore delaying action might further impede the adoption of more ambitious carbon tax levels in the long run. We also find reallocation of GDP between early mover and late-comer regions triggered by the international capital market, but this is not a major driver of carbon leakage. This result is, however, different to the result of McKibbin et al. [19] who identified the converse effect on carbon leakage for the US.

Several caveats apply to the analysis here. First, the REMIND version used for this study does not take into account bilateral fossil fuel trade, but assumes a global pool trading scheme. Considering bilateral (or multilateral) trading reduces the flexibility of fossil fuel owners to redirect their supplies as some regions reduce their demand. Hence, this improvement might lead to lower leakage rates. Second, the study focused only on the energy channel of carbon leakage, although macro-economic substitution effects between energy, capital and labor were accounted for. Expanding the analysis of dynamic leakage in staged accession scenarios to a larger set of leakage channels, particularly including the re-allocation of energy intensive industries, would help to better constrain the full carbon leakage effect. It is worth mentioning that technology spillovers related to technology learning are not observed in this study.

We conclude from the results that the value of individual regions or coalitions adopting more stringent climate action rises or falls with their ability to induce others to follow suit. Thus, while global cooperation on climate mitigation may prove illusory in the short run, credible and strong mitigation action by major countries can help to keep the door open for future global action to stabilize climate change as carbon leakage effects are limited.

#### Even small carbon price increases impact behavior—changes consumption patterns

Hsu 11 (Shi-Ling Hsu, Professor of Law at University of British Columbia – previously Associate Prof at George Washington School of Law, Senior Attorney & Economist for the Environmental Law Institute The Case for a Carbon Tax: Getting Past our Hang-ups to Effective Climate Policy, Island Press Page 139-142)

While curmudgeons may grudgingly concede that a high carbon tax like that in Sweden would reduce emissions, a smaller one like the British Columbia carbon tax is a different matter. When the British Columbia government introduced its carbon tax in 2008, it admitted that its modest price effects would not have a substantial effect on car- bon dioxide emissions in the province. 41 More action was needed, and was in fact contemplated as the British Columbia government also en- acted a companion program laving the foundation for a cap-and-trade program as part of British Columbia's participation in the California- led Western Climate Initiative. But the carbon tax is indeed so small that one wonders if it really was meant to accomplish anything. The BC carbon tax was designed to ramp up from about $9 per ton of C02 in 2008 to about $30 in 2012. This translates into about 2.4 cents per little of gasoline, up to about 7.2 cents per liter in 2012. Gasoline prices fluctuate a great deal more than that, spiking in 2005 in the aftermath of Hurricane Katrina to more than $1.12 per liter, only to see a higher spike in the summer of 2008 to nearly $1.50, fol- lowed by a dip just a few months later to below 80 cents. 42 In Vancou- ver, gas stations even commonly lower the price by three and a half cents at nighttime. Does an extra 2.4 cents—or even 7 cents—per liter really change behavior very much?

It is a fair question. The standard economic answer is that a price increase will lead to a decline in consumption. It could take a while, but higher prices always lead to lower consumption, all other things being equal. So for the household wondering if it will drive less be- cause of a small increase in the price of gasoline, the answer could well be no, but there are many, many other consumers that could be right at the margins of making a consumption decision. Price elasticity is the term that economists use to denote how much of an adjustment con- sumers, in the aggregate, can be expected to make in response to a price change. Consumption of commodities respond not only to changes in the price of the commodity itself—measured by the own- price elasticity—but also changes in the prices of other goods that may be substitutes or affect the economic environment some other wav— measured by the cross-price elasticities. Finally, consumption of com- modities can change to varying degrees as income changes— measured by the income elasticity. Bread and milk have low income elasticities. Sports cars and cosmetic surgery have high income elasticities.

Most energy analysis is conducted on own-price elasticities, al- though income also figures very prominently in energy consumption. There are short-term and long-term elasticities—adjustments that are made in the relatively short term—on the order of a few months—and those that are made for the longer term. Long-term elasticities are in- variably greater, since at any given time, the timing may or many not be right for any individual household to make an adjustment. Over a longer period of time, there arise more and more times during which an adjustment—some decision that might be affected by a price— seems appropriate. For example, a family that has just purchased a new sport-utility vehicle would not contemplate replacing it even if gaso- line prices rose sharply. One would expect very few adjustments of that sort. However, over a five- or ten-year period, as the sport-utility vehi- cle starts to age and incur more maintenance costs, and as it nears the end of its useful life, a replacement decision is more likely to take into account gasoline prices. As the same family contemplates what they will buy to replace that sport-utility vehicle, the family has a wider ar- ray of options available than it does when it has a brand-new shiny SUV. And in the aggregate, over a longer period, more and more households are likely to arrive at that decision point at which they con- template replacing an aging vehicle, and more adjustments are likely to be made. As long-term elasticity takes into account this greater number of adjustments, it would naturally be larger than short-term elasticities.

Among commodities, fossil fuel usage is one of the more studied phenomena, and the likelihood that people adjust to even small price changes in fossil fuel price is so well-established that it almost rises to the level of an economic maxim. While one might ask oneself whether a family might change their mind about anything if the carbon price is as small as $9 per ton of C02 (translating into 2.4 cents per liter at the gas pump), there are a myriad of other decision makers that could well change their behavior. As argued above, the University of British Columbia is just such an entity. Facing a tax liability that would be consid- ered small by industrial standards, but significant to an academic institution or a medium-sized business or industry, it set about finding ways to reduce its reliance on fossil fuels for powering the campus.

For decades, economists have been studying the aggregate responses to change in energy prices. The range of estimates can be quite large, as some studies are limited to certain regions or countries, and some ate limited in time, so the economic environment in which price changes are studied can be quite varied. As an empirical matter, it is safe to say that long-term elasticities are indeed greater than short- term elasticities. It is also likely that industrial and commercial consumers have larger long-term elasticities than residential consumers. 43 So it might be misleading for individuals to examine their own personal situation and ask themselves, "would I turn down my thermo- stat if the price of natural gas went up by 5 percent?" The point is how much, in the aggregate, all consumers of energy change their behavior, and on this score, industrial and commercial consumers, which ac- counted for half of all energy consumption in the United States in 2008 (with residential accounting for 22 percent), 44 would provide a different answer.

#### Proposing and rejoining specific climate policies in debate provides students the climate literacy, problem-solving, and critical thinking competencies to differentiate effective and ineffective policy remedies as well as mobilizing broader activism.

Dr. Susan Powers et al. 21, Ph.D. in environmental engineering from the University of Michigan, professor of sustainable environmental systems and the director of the Institute for a Sustainable Environment at Clarkson University; Jan DeWaters, associate professor of engineering at Clarkson University; and Dr. Suresh Dhaniyala, Ph.D. from the University of Minnesota and distinguished professor of mechanical and aeronautical engineering at Clarkson University; 8/28/2021, “Climate Literacy—Imperative Competencies for Tomorrow’s Engineers,” *Sustainability*, 13(17), <https://doi.org/10.3390/su13179684>, pacc

4.1. Climate Literacy

Before taking the climate change class, students had low scores on all three climate literacy sub-scales (Figure 2), with a mean of 62.4% correct on the knowledge scale and only 20% of the students achieving a knowledge “passing” rate of 70%. This is consistent with the generally low climate literacy among college students found by others (e.g., [31]). Mean scores on the affect and behavior scores were also below the target 3.8 score (equivalent to 70%). Our students share the common misconceptions about the role of the ozone depletion and toxic chemicals contributing to climate change (Table 3). Huxster et al. [31] attribute these common misconceptions as a general “pollution conceptual model”, where students lump all environmental impacts into one category and believe that any “good environmental practice” will help to mitigate climate changes. This confusion and aggregation can lead to misplaced priorities and efforts when trying to tackle the specific causes and impacts associated with climate changes. Gautier et al. [32], who studied misconceptions about 21 key principles related to the greenhouse effect, suggest that instructional strategies that require students to explicitly address and evaluate their ideas, through role play, discussion/debate, or even presentation of information, will help them correct their misconceptions and allow for learning more scientific conceptions.

As a whole, the post-results show that students demonstrated significant gains in climate-related literacy (Figure 3). Of the 89 students who fully participated in the pre/post questionnaire, there were statistically significant gains in content knowledge (p << 0.001), affect (p << 0.001), and behavior (p = 0.002). Mean post scores were at or above a ‘passing’ cutoff (≥70% of the maximum knowledge score; >3.8 for affect and behavior), with 68.5% of the students achieving the knowledge target of ≥70% correct. This showed substantial improvement over the pre-scores, for which none of the three subscale means met the targeted passing score.

As expected (e.g., [33]), there was a significant correlation between students’ knowledge, affect, and behavior pre-scores (p < 0.01). Also as expected (e.g., [34]), the correlation between affect and behavior (ρ = 0.539) was stronger than the correlation between either of these two subscales and knowledge scores (ρ = 0.460 and 0.0336, respectively).

Table 3 and Table 4 illustrate the types of overall gains made by students on the Climate Literacy Questionnaire. Students demonstrated significant pre/post improvement on 35 of the 42 cognitive items (examples in Table 3) and felt much more confident in their knowledge of climate change following the course (Table 4), with 86% responding that they know “a lot or quite a bit” about climate change on the post-test, compared to the pre-test response of 26%. The most remarkable gains were in the topic of climate science (Table 3). After taking the climate change course, students better understood the abundance and importance of various greenhouse gases and the various mechanisms involved in the greenhouse effect that contribute to global warming. Most items that did not show a significant gain in this topic were already understood by students before taking the course—for example, 89% of the students already recognized the difference between weather and climate and 92% understood the relationship between the greenhouse effect and global warming.

Differences between student responses on the pre- and post-questionnaire indicate that students were generally much more cognizant and concerned with the magnitude, causes, and effects of climate change following their participation in the course. When asked to identify the most important environmental problem facing the United States today, 61% of the students identified climate change on the post-test compared to only 21% on the pre-test (Table 3). They also displayed increased recognition of the link between climate change and fossil fuel combustion, as well as other anthropogenic causes such as livestock production and agricultural use of chemical fertilizers, and increased understanding that nuclear power and disposal of radioactive waste do not cause climate change. The number of students who were confused by the misconception that climate change is caused by the ozone hole in the upper atmosphere decreased after participating in the climate change course, although even on the post-test, 47% incorrectly identified this as a cause of global climate change. In terms of climate change mitigation, there was significant improvement in students’ ability to correctly categorize three of nine strategies that would or would not help reduce global climate change.

Responses to affective and behavior questions indicate that course participation strengthened students’ concern about climate change and its impacts and their willingness to participate in solutions (Table 4). At the end of the course, 100% of students responded that they were completely or mostly convinced that global warming is happening and 81% agreed that it is caused mostly by human activities. Most students felt global warming is a threat to people in other countries (80%), although far fewer were concerned about a threat to people closer to home, such as their local community or their family (30%). Our students generally favored increasing the price of commodities such as cars or household energy in order to support the implementation of energy efficiency and renewable energy technologies, while increasing taxes to accomplish similar goals was far less popular.

The course also had some benefit in improving 4 of 13 items within the behavior subscale. For example, after taking the climate change course, 96% of the students reported that they almost always or quite frequently recycle, 71% use previously-used or reusable shopping bags, 55% walk or ride a bike instead of driving short distances, and 92% turn off lights when they leave a room.

These indirect measures such as students’ self-reported attributes on a questionnaire are subject to a range of limitations, including potential inconsistencies between what people ‘say’ and what they ‘do’ as well as the inability to collect in-depth explanations regarding the reasoning behind responses to the simplified Likert-type scale. While the latter problem is a clear limitation of this questionnaire-based study, the use of overall pre-post differences helped to minimize the moderating effects of self-reported answers, as these effects were likely to persist on both pre- and post-questionnaires.

4.2. Student Feelings of Competency Related to Climate Change and Engineering Goals

The self-efficacy items on the climate literacy questionnaire provided a means of assessing research question 3: At the end of the semester, do the students have the self-efficacy to effectively integrate climate change perspectives into their profession?

The climate literacy self-efficacy results show that students had a relatively high climate self-efficacy at the beginning of the class (4.01 ± 0.62 out of 5), with statistically insignificant gains up to 4.07 ± 0.65 (post). The highest post scores were for questions related to the impact of actions by the US on global warming (91% agreed or strongly agreed) and believing that the students as individuals can take action to have a positive impact in both their personal (85%) and professional (87%) lives. The only significant change was an increase to 69% in the students’ sense of urgency to take immediate and drastic action to reduce global warming and its associated major disruptions (p = 0.0006).

4.3. Variability in Climate Literacy and Self-Efficacy among Student Groups

Additional statistical analyses provided insight into the nature of climate literacy among students in this class. Potential differences in student outcomes were initially investigated using a series of Kruskal–Wallis one-way analyses of variance.

Three variables had an impact on student outcomes: gender, previous exposure to climate change topics in an earlier class, and student major. These three variables, further analyzed with stepwise multivariate regression analyses, were not independent. There was a strong correlation between gender and major (ρ = 0.338, p < 0.01) (Figure 2). Students in Group 2 majors and female students were also more likely to have had a prior course that included climate change (females, ρ = 0.257, p < 0.05; Group 2 majors, ρ = 0.332, p < 0.05).

Multivariate regression analyses revealed that previous exposure to climate change topics was the greatest predictor of student pre-scores on the affect and behavior subscales, followed closely by student gender (p ≤ 0.05). Specifically, students with prior classes indicated that they were more strongly convinced that climate change is happening and responded more positively to questions about their level of concern about climate change and the degree to which they are adopting behaviors such as walking/biking, turning off appliances, and recycling/reusing materials (all differences significant at p ≤ 0.05). This correlation with prior exposure to climate change in another class could be biased by fundamental and pre-existing environmental values that contributed to these students choosing classes that include climate change concepts, or it could be a function of the value of education in changing attitudes and behaviors through increased understanding and awareness of problems and an increased personal motivation.

While both male and female students had significant gains on the knowledge scale (Figure 4), the female students did not show significant gains on the affect or behavior scales because their pre scores were already high. The post scores for all subscales exceed the target (70% right or score >3.8 on affective and behavioral subscales) except for the self-reported behavior of male students. Identical conclusions were drawn for analysis of Group 1 (MAE, EE, and ChE) versus Group 2 majors (EnvE, CE, E&M), where accreditation requirements differ in terms of expectations for social and sustainability learning outcomes. With the strong correlation between gender and major (Figure 1), we were unable to identify which variable contributed more greatly to climate literacy.

There is some literature evidence to corroborate the differences we observed among majors. Meyers and Mertz [35] found that civil engineering students are more motivated to make the world a better place than mechanical engineering students (CE: 44.4% vs. ME: 40.7%, not statistically significant), whereas ME students are more interested in innovation and creativity (44.4%) compared with civil engineering students (5.6%). Goodwin et al. [36] found that engineering students generally do not identify with “global agency”, which includes concepts such as “science and technologies will provide greater opportunities for future generations”. In contrast, students in our study responded very positively to a similar question, “A career in science or engineering will help me contribute to solving the global climate problems”, with high initial scores (4.23/5) and non-significant increases in the post-survey (4.30/5). Scores for women on this question were statistically higher than men for the pre (p = 0.026) survey and marginally higher on the post (p = 0.087) survey. Although women seem to be more pre-disposed to an attitude that engineering is a means to help solve global social and environmental problems, the men in this class were more strongly impacted in terms of improved climate self-efficacy and affect scores. By the end of the class, differences between men and women and among majors were reduced compared to the start of the class. Thus, providing a class like this appears to bring students to a similarly high level of attitude and self-efficacy required to contribute to solutions.

Student outcomes were not impacted by their grade level or year in which they took the class, although there were a few notable variations in student responses on the pre-questionnaire. For example, seniors began the course with higher average knowledge scores than juniors, as would be expected. Looking at changes over time, there were no variations in students’ initial affect and behavior responses, and the only noteworthy trend in knowledge is that students who took the course in the later years had a greater understanding of climate change impacts and the disconnect between nuclear power and climate change compared to students in earlier years (data not shown). This general lack of change in students’ climate knowledge over time may seem surprising given the recent surge in climate-related news from a variety of media sources. It is likely that, were we to repeat the study, we would find different results.

4.4. Competencies Required to Address Climate Change

While self-efficacy survey questions allow students to self-report what they believe they can do or accomplish, the review of their semester reports provides a direct assessment of their capabilities as an engineer to address climate change challenges. Review of the 30 reports completed over four years showed that 80% demonstrated at least proficient (≥4.0) problem-solving and critical-thinking competencies (Figure 5). As a whole, the average among reports met the target “proficient” score in two of four attributes, with the greatest strength in formulating and identifying a climate-change-related problem and weakest in appropriately using data and evidence.

#### Analyzing climate scenarios galvanizes motivation to support climate-friendly policies AND generates individual and collective responsibility to combat climate change and reorganize the societal structures that trap individual efforts into ineffective climate solutions.

Dr. Perri Druen 21, Ph.D. and associate professor of psychology at York College; and Stephanie Zawadzki, environmental psychology, University of Groningen; 8/23/2021, “Escaping the Climate Trap: Participation in a Climate-Specific Social Dilemma Simulation Boosts Climate-Protective Motivation and Actions,” *Sustainability*, 13(16), <https://doi.org/10.3390/su13169438>, pacc

4. Discussion

In this paper, we evaluated a novel social dilemma simulation that was specifically designed to help people experience and understand the decision-making processes which contribute to the human dimensions of climate change. In addition to evaluating the simulation as an educational tool, we offer a novel extension of the previous research on social dilemma simulations by shifting the focus of these simulations from how people act during the simulation to how they think, feel, and act after the simulation has been completed. Specifically, we predicted and found, comparing the simulation participants to the non-participants, as well as the participants to themselves before and after the simulation, that the people who participated in our simulation were more confident in their knowledge of climate change and its relationship to social dilemmas, reported more self-determined motivation to help, and performed more climate-mitigating behaviors. When changes within the other groups who did not complete the simulation were present, our analyses suggested that our simulation participants may have experienced stronger climate-friendly changes on each measure than the other groups. Moreover, the effects remained largely consistent when controlling for social desirability bias, suggesting that our results are unlikely to be attributable to self-presentation concerns related to pleasing the teacher in a classroom setting.

Our results suggest that our new climate-change social dilemma simulation may be a potentially useful educational tool. It was rated as highly engaging by the participants, and is unique in that it links climate change to decisions about the production of goods, and incorporates social and temporal traps, allowing a variety of strategies to be used. The students who participated in our simulation expressed greater confidence in their knowledge about climate change, social dilemmas, social traps, temporal traps, decision-making strategies in social dilemmas, the effects on the climate of overconsumption, the effects on the environment of overpopulation, the reasons for environmental problems, and sustainability strategies. This is important because it suggests that the simulation creates an engaging educational experience while also boosting the students’ confidence in their knowledge about social dilemmas and environmental challenges. We did not assess the accuracy of the student learning directly, as knowledge about climate change has not been found to motivate climate action [10,69], but we found that the participants’ beliefs about their understanding were affected by their experience.

As predicted, environmental concern was higher for the simulation group, but the within-subjects tests indicated that the simulation group—as well as the environmental studies with no simulation group—did not change from pre- to post-test, whereas the control condition dropped in concern. It is not possible to determine if this decrease was statistically spurious or caused by some outside factor related to the content of the non-environmental course material, and so we recommend that future researchers explore the conditions under which participating in a climate-specific social dilemma simulation may influence people’s concern for the environment. Additionally, we have initial evidence that the students who participated in the simulation may also have reported stronger belief in global warming than those who did not participate in the simulation, but more research is needed to replicate this effect, as it was inconsistent across the analyses. These results highlight a potentially important avenue for future research, because people’s climate-related beliefs and feelings are consistent predictors of their willingness to act in a climate-protective manner and support climate-friendly policies [86]. In the United States, where this study was conducted, climate beliefs are deeply politically ingrained and largely influenced by the social groups people belong to and the political landscape they inhabit [86,87,88]. Consequently, it can be difficult to positively influence these beliefs without activating political identities. When people are resistant to climate-protective initiatives because of political identities, otherwise-constructive climate-protective policies and projects can be derailed or cancelled [89]. If participating in a social dilemma simulation could activate climate beliefs while also side-stepping political concerns, then it could be an important teaching tool with the ability to positively impact how a person thinks and feels about climate change.

Importantly, and as predicted, we also found that the motivation to act in a climate-friendly manner was higher for the participants who completed the simulation compared to those who did not, as well as being higher among the simulation participants post-simulation compared to their pre-simulation levels. This was consistent for three of the four types of motivation we examined: identified, integrated and intrinsic motivation. No significant effects were found for introjected motivation. These findings are important because they suggest that our simulation may be effective as a potential behavioral intervention, which could have lasting effects on the participants’ willingness to engage with climate-protective actions. Identified, integrated and intrinsic motivation are closely linked to the performance of pro-environmental behaviors [90]. By activating these types of motivation via the simulation, the participants came away feeling that pro-climate behavior is consistent with their personal goals (identified motivation), part of their personal identities (integrated motivation), and that it feels good to do (intrinsic motivation) [78,79]. People who express stronger identified, integrated and intrinsic motivation are more likely to perform pro-environmental actions than people with relatively weak motivations. Moreover, compared to more extrinsic forms of motivation (like introjected motivation), intrinsic forms of motivation may be more likely to boost pro-environmental behaviors for a longer duration and across a variety of situations [91].

Critically, in addition to influencing strong behavioral antecedents, we also found evidence that our simulation may increase the likelihood of performing actual climate-protective behaviors. Specifically, and as predicted, the participants who completed the simulation were more likely to perform both personal and social behaviors, like donating money or time and signing petitions to support climate-friendly initiatives. The satisfactory reliability of our behavior index, in addition to observing a consistent pattern of results for volunteering behaviors, suggests that the influence of our simulation may be generalizable across multiple pro-climate behaviors. This is important both theoretically and practically, as it suggests that the underlying psychological mechanisms through which our simulation influences behavior are unlikely to change depending on what behavior is being targeted. Although we cannot be certain how environmentally significant these behaviors would be from an impact perspective, Stern [80] argues that these types of public-sphere behaviors can be powerful through their influence on policies. The examination of these types of behaviors is important because they offer people ways to bridge the individual and the collective in a way that can also be personally rewarding (e.g., volunteering) [92]. In order to adequately mitigate and adapt to global warming, changes at all levels of the system will be required, and so it is vital that behavioral scientists study both actions at the individual level and at those that help individuals connect to the larger collective effort.

Altogether, these findings are both theoretically and practically important. From a theoretical perspective, we explored a critical gap in the literature which had not been previously addressed. Specifically, we expanded the scope of social dilemma simulations beyond what occurs during the game to explore how participating in these types of simulations may impact the participants’ thoughts, feelings and actions after the simulation has ended. From a practical perspective, our findings suggest that climate change-specific social dilemma simulations might offer an engaging, educational and potentially psychologically powerful tool for the promotion of both the understanding of climate-relevant behaviors and the motivation to act in a climate-friendly manner. The participants may recognize both their own personal responsibilities and the need to collectively change the social structures that constrain decisions and create climate traps. When it comes to teaching, our results support the notion that including a learning module consisting of the Climate Trap simulation, along with the discussion of social dilemmas in the context of climate change and human solutions, may be an effective teaching intervention in many different kinds of sustainability studies courses. Our simulation may help strengthen learning, reinforcing links to many important issues in trying to understand why people, even those who are aware of the threat of climate change, still may not act in a climate-protective manner. In addition, many courses or other environmental education activities have a goal to motivate the participants to act on their knowledge, and the simulation was able to do so.

In addition to those discussed above, our results shed light on many potentially fruitful avenues for future research related to the underlying psychological drivers of the observed effects. Specifically, while we do have initial evidence that participating in a climate-specific social dilemma simulation can be both educational and motivating to act in a climate-friendly manner, the precise psychological process through which these types of simulations influence actions is yet unknown. We did not explicitly test a particular theory of change; however, ours is essentially a motivational model, grounded primarily in Protection Motivation Theory [51,52,53]. That said, what pushed the motivation into the more self-directed forms is not clear. The simulation may have been effective for any number of reasons, and the extant literature gives some hints as to what may be underlying the changes we observed. For example, Krasny [8] reviewed 10 intermediate outcomes in environmental education that mediate between an activity and a behavioral outcome: (1) knowledge and thinking; (2) values, beliefs, and attitudes; (3) nature connectedness; (4) a sense of place; (5) efficacy; (6) identity; (7) norms; (8) social capital; (9) positive youth development; and (10) health and wellbeing. We suggest that our participants likely acted pro-environmentally in response to our simulation as a result of more internal factors, rather than any structural or social ones that were inherent in the activity. We suspect that the simulation woke the participants up to the understanding that the necessary change to address global warming is constrained by social dilemma pressures, which is potentially a form of systems knowledge [93]. This realization may have helped them see that the threat is serious, not just because of the physical changes to the environment, but because the current structures in society—such as economic systems and regulations—do not readily reward climate-protective decisions in many domains, especially in the corporate production of consumer goods. When they observed themselves being vulnerable to the same pressures in the simulation, the participants may have been motivated to overcome the trap, as is consistent with Capstick’s finding that “…among the participants’ perspectives, strong arguments can also be found for action in spite of—even because of—the social dilemma nature of climate change” (35, p. 3495). In Protection Motivation Theory terminology, we speculate that the simulation activated people’s perceptions of climate change as a severe threat (severity), with negative potential impacts for them (vulnerability), that is also influenced by their behaviors (response efficacy), and so they are efficacious enough to help prevent it (self-efficacy). By creating a situation in which the participants view the situational influence of social dilemmas and climate change through these lenses, we may have created an experience powerful enough to motivate action. Future studies need to test whether the underlying psychological processes align with Protection Motivation Theory, or if alternative influences are at play, [8].

#### Weighing the costs and benefits of the plan creates the anticipatory capacity and shared responsibility to navigate climate policy

Laura Pereira et al 20, Carina Wyborn, Federico Davila, Laura Pereira, Michelle Lim, Isis Alvarez, Gretchen Henderson, Amy Luers, Maria Jose Martinez Harms, Kristal Maze, Jasper Montana, Melanie Ryan, Chris Sandbrook, Rebecca Shaw & Emma Woods; 8/3/2020, “Imagining transformative biodiversity futures,” *Nature Sustainability*, pp 670-672, https://doi.org/10.1038/s41893-020-0587-5, pacc

Imagination in the Anthropocene

Imagination is critical to sustainable and just futures for life on Earth8,13. Writing after the West African Ebola outbreak, Professor Michael Osterholm and colleagues called for more “creative imagination” to consider future pandemic scenarios14. This feels particularly salient five years on. Purely technocratic approaches fail to engage with the emotions that motivate action towards alternative futures: fear, hope, grief and agency8,15. By building new ways of thinking about longstanding problems, inclusive and creative processes can generate positive stories about the future in ways that are empowering8,10. Imagining the future can drive societies towards change by shaping common practices, aspirations and institutions16.

Methods for imagining, such as scenarios analysis, strategic foresight and speculative fiction are commonplace in research, investment and planning8,13,17. They can help the biodiversity community address the bleak futures that are projected for biodiversity. Research can play an important role in embracing imagination by fostering novel participatory methods that enable society to explore what is possible, plausible and desirable13. All models and scenarios are wrong, some are helpful: they contain assumptions about what matters, what is known and what is unknown. Embracing and communicating these assumptions and uncertainties builds trust in science, opening up spaces for deliberation about values, trade-offs and desirable futures18.

Imagination can build the anticipatory capacity to get ahead of the curve, rather than react to crisis17. Decision makers must learn to provide anticipatory leadership that fosters shared responsibility for actions that may have greater costs now, to avert harm in the future. Enabling transformations also requires those who benefit from the status quo to acknowledge the need for change. Policy frameworks need to consider the distribution of costs and benefits over longer timescales when setting current priorities. Ultimately, society needs to accept that the future is unknowable and uncertain, but that action is needed now.

These anticipatory capacities start with asking: what are the short- and long-term drivers of change? What values should be maintained into the future? What can be done differently over the next five years? Over the next 30 years? What do we need to know and what will we never know? How can options be created and traps avoided? What are the ethical implications of action and inaction? Considering these types of questions can provide a foundation for decision making despite uncertainty.

Our stories show that choices have consequences. Some close down options. Some open up multiple pathways. Either way, choices create winners and losers. The critical challenges of the Anthropocene require humility19 and the ability to respond20. Imagination can help the biodiversity community grapple with these challenges by embracing diverse ways of thinking, listening, being and knowing. And such diversity can be the foundation of more just and sustainable futures for life on Earth.

#### Pragmatism is necessary in climate politics

Frederic C. RICH, J.D., University of Virginia School of Law, practiced at Sullivan & Cromwell LLP (1981-2014), Vice Chair of the Land Trust Alliance, head of the Environmental Leaders Group in New York State, 16 [*Getting to Green*, 2016, p. 196-198]

Bill Clinton recently said of the U.S. Constitution, "[I]t ought to be subtitled: 'Let's make a deal.'"10 He's right. But the Green movement has for decades been led by policy experts who are confident that their policies present the best solutions to environmental issues and who often are unwilling to consider alternatives, or accept incremental progress when a comprehensive solution is not possible. Green advocates have appeared to many to prefer confrontation to compromise, and Green colleagues are often harsh in criticizing others [END PAGE 196] who accept partial solutions or show willingness to deviate from the movement's ask in order to show some progress.11

Even after the fact, Green orthodoxy often paints landmark compromises as failures. David Brower, longtime head of the Sierra Club, came to regret the deal that saved Dinosaur National Monument because it involved a compromise that permitted a single dam at the spectacular Glen Canyon.12 Rejection of compromise is deeply embedded in the DNA of the more radical part of the movement. Earth First!, for example, has as its slogan "No compromise in the defense of Mother Earth." And although the rest of the movement does not share the approach of these more radical groups, their rhetoric echoes in the consciences of mainstream Greens. As a result, among Greens purity too often is prized above pragmatism. The former president of the Izaak Walton League complains bitterly about some of his colleagues in the Green movement, where, he says, "people often want to be viewed as the most holy defender of the faith, rather than the most effective at making progress."13

The Green movement has had a particular problem accepting incrementalism, although recent history is filled with examples, such as the gradual tightening of fuel efficiency and auto emissions standards, that are successful models of exactly this approach. In some cases opposition to incremental gain is strategically sound, or is simply a tactic designed to improve and broaden the scope of a law or rule. But when it results in positive legislation or regulation being stalled or killed, with no realistic hope of anything better replacing it, then it is a mistake. When motivated by pure politics, such as the desire to deny the Republicans an environmental victory, then it is a betrayal of our environmental mission for partisan gain.

Greens also sometimes seem to take pride in spewing out "big thinking" without regard to its political feasibility. Gus Speth, for example, wrote, "If someone says these proposals are impractical, [END PAGE 197] or politically naïve, then I would respond that we need impractical answers."14 These habits—reluctance to compromise, distrust of incrementalism, and insufficient attention to pragmatism—have contributed to the movement's failures and resulted in missed opportunities to make at least some progress on climate change. Any well-managed organization should insist that results define success. If the perfect policy is dead on arrival as a political matter, then compromise. The environmental movement is funded by its supporters to make a difference in the environment. So figure out what is achievable and go for that, even if it means you are negotiating with yourself, compromising before you sit down at the table with the other side, or "thinking small," all of which have been cardinal sins in many NGO cultures. Incremental progress is progress, and progress is what is urgently needed.

#### Working within the system is necessary to solve particular instances of climate change—there’s no guarantee revolution will solve

-It’s too late to solve the whole environmental crisis, but can work to mitigate the damage

-No guarantee the alternative’s regression to socialism won’t have same environmental problems

Christian PARENTI, professor of sustainable development at the School for International Training, Graduate Institute, 13 [“A Radical Approach to the Climate Crisis,” *Dissent*, Summer 2013, http://www.dissentmagazine.org/article/a-radical-approach-to-the-climate-crisis]

Several strands of green thinking maintain that capitalism is incapable of a sustainable relationship with non-human nature because, as an economic system, capitalism has a growth imperative while the earth is finite. One finds versions of this argument in the literature of eco-socialism, deep ecology, eco-anarchism, and even among many mainstream greens who, though typically declining to actually name the economic system, are fixated on the dangers of “growth.”

All this may be true. Capitalism, a system in which privately owned firms must continuously out-produce and out-sell their competitors, may be incapable of accommodating itself to the limits of the natural world. However, that is not the same question as whether capitalism can solve the more immediate climate crisis.

Because of its magnitude, the climate crisis can appear as the sum total of all environmental problems—deforestation, over-fishing, freshwater depletion, soil erosion, loss of biodiversity, chemical contamination. But halting greenhouse gas emissions is a much more specific problem, the most pressing subset of the larger apocalyptic panorama.

And the very bad news is, time has run out. As I write this, news arrives of an ice-free arctic summer by 2050. Scientists once assumed that would not happen for hundreds of years.

Dealing with climate change by first achieving radical social transformation—be it a socialist or anarchist or deep-ecological/neo-primitive revolution, or a nostalgia-based localista conversion back to a mythical small-town capitalism—would be a very long and drawn-out, maybe even multigenerational, struggle. It would be marked by years of mass education and organizing of a scale and intensity not seen in most core capitalist states since the 1960s or even the 1930s.

Nor is there any guarantee that the new system would not also degrade the soil, lay waste to the forests, despoil bodies of water, and find itself still addicted to coal and oil. Look at the history of “actually existing socialism” before its collapse in 1991. To put it mildly, the economy was not at peace with nature. Or consider the vexing complexities facing the left social democracies of Latin America. Bolivia, and Ecuador, states run by socialists who are beholden to very powerful, autonomous grassroots movements, are still very dependent on petroleum revenue.

A more radical approach to the crisis of climate change begins not with a long-term vision of an alternate society but with an honest engagement with the very compressed timeframe that current climate science implies. In the age of climate change, these are the real parameters of politics.

#### Strategic use of market mechanisms to politicize the inequalities of the status quo is possible – radical system change alone is a demand for a clean slate we don’t have

Hoffman 16 (Andrew, Professor and director of the Erb Institute for Global Sustainable Enterprise at the University of Michigan, 2/15/2016, The Invisible Hand Won’t Solve the Climate Crisis. Capitalism Must Evolve., Evonomics, http://evonomics.com/the-invisible-hand-wont-solve-the-climate-crisis-capitalism-must-evolve/)

This binary framing masks the real questions we face, both what we need to do and how we are going to get there. Yet there are serious conversations within management education, research and practice about the next steps in the evolution of capitalism. The goal is to develop a more sophisticated notion of the role of the corporation within society. These discussions are being driven not only by climate change, but concerns raised by the financial crisis, growing income inequality and other serious social issues.¶ The market’s rough edges¶ Capitalism is a set of institutions for structuring our commerce and interaction. It is not, as some think, some sort of natural state that exists free from government intrusion. It is designed by human beings in the service of human beings and it can evolve to the needs of human beings. As Yuval Levin points out in National Affairs, even Adam Smith argued that “the rules of the market are not self-legislating or naturally obvious. On the contrary, Smith argued, the market is a public institution that requires rules imposed upon it by legislators who understand its workings and its benefits.”¶ And, it is worth noting, capitalism has been quite successful. Over the past century, the world’s population increased by a factor of four, the world economy increased by a factor of 14 and global per capita income tripled. In that time, average life expectancy increased by almost two-thirds due in large part to advances in medicine, shelter, food production and other amenities provided by the market economy.¶ Capitalism is, in fact, quite malleable to meet the needs of society as they emerge. Over time, regulation has evolved to address emergent issues such as monopoly power, collusion, price-fixing and a host of other impediments to the needs of society. Today, one of those needs is responding to climate change.¶ The question is not whether capitalism works or doesn’t work. The question is how it can and will evolve to address the new challenges we face as a society. Or, as Anand Giridharadas pointed out at the Aspen Action Forum, “Capitalism’s rough edges must be sanded and its surplus fruit shared, but the underlying system must never be questioned.”¶ These rough edges need be considered with the theories we use to understand and teach the market. In addition, we need to reconsider the metrics we use to measure its outcomes, and the ways in which the market has deviated from its intended form.¶ Homo economicus?¶ To begin, there are growing questions around the underlying theories and models used to understand, explain and set policies for the market. Two that have received significant attention are neoclassical economics and principal-agent theory. Both theories form the foundation of management education and practice and are built on extreme and rather dismal simplifications of human beings as largely untrustworthy and driven by avarice, greed and selfishness.¶ As regards neoclassical economics, Eric Beinhocker and Nick Hanauer explain:¶ Behavioral economists have accumulated a mountain of evidence showing that real humans don’t behave as a rational homo economicus would. Experimental economists have raised awkward questions about the very existence of utility; and that is problematic because it has long been the device economists use to show that markets maximize social welfare. Empirical economists have identified anomalies suggesting that financial markets aren’t always efficient.¶ As regards principal-agent theory, Lynn Stout goes so far to say that the model is quite simply “wrong.” The Cornell professor of business and law argues that its central premise – that those running the company (agents) will shirk or even steal from the owner (principal) since they do the work and the owner gets the profits – does not capture “the reality of modern public corporations with thousands of shareholders, scores of executives and a dozen or more directors.”¶ The most pernicious outcome of these models is the idea that the purpose of the corporation is to “make money for its shareholders.” This is a rather recent idea that began to take hold within business only in the 1970s and 1980s and has now become a taken-for-granted assumption.¶ If I asked any business school student (and perhaps any American) to complete the sentence, “the purpose of the corporation is to…” they would parrot “make money for the shareholder.” But that is not what a company does, and most executives would tell you so. Companies transform ideas and innovation into products and services that serve the needs of some segment of the market. In the words of Paul Pollman, CEO of Unilever, “business is here to serve society.” Profit is the metric for how well they do that.¶ The problem with the pernicious notion that a corporation’s sole purpose is to serve shareholders is that it leads to many other undesirable outcomes. For example, it leads to an increased focus on quarterly earnings and short-term share price swings; it limits the latitude of strategic thinking by decreasing focus on long-term investment and strategic planning; and it rewards only the type of shareholder who, in the words of Lynn Stout, is “shortsighted, opportunistic, willing to impose external costs, and indifferent to ethics and others’ welfare.”¶ A better way to gauge the economy¶ Going beyond our understanding of what motivates people and organizations within the market, there is growing attention to the metrics that guide the outcomes of that action. One of those metrics is the discount rate. Economist Nicholas Stern stirred a healthy controversy when he used an unusually low discount rate when calculating the future costs and benefits of climate change mitigation and adaptation, arguing that there is a ethical component to this metric’s use. For example, a common discount rate of 5% leads to a conclusion that everything 20 years out and beyond is worthless. When gauging the response to climate change, is that an outcome that anyone – particularly anyone with children or grandchildren – would consider ethical?¶ Another metric is gross domestic product (GDP), the foremost economic indicator of national economic progress. It is a measure of all financial transactions for products and services. But one problem is that it does not acknowledge (nor value) a distinction between those transactions that add to the well-being of a country and those that diminish it. Any activity in which money changes hands will register as GDP growth. GDP treats the recovery from natural disasters as economic gain; GDP increases with polluting activities and then again with pollution cleanup; and it treats all depletion of natural capital as income, even when the depreciation of that capital asset can limit future growth.¶ A second problem with GDP is that it is not a metric dealing with true human well-being at all. Instead, it is based on the tacit assumption that the more money and wealth we have, the better off we are. But that’s been challenged by numerous studies. ¶As a result, French ex-president Nicolas Sarkozy created a commission, headed by Joseph Stieglitz and Amartya Sen (both Nobel laureates), to examine alternatives to GDP. Their report recommended a shift in economic emphasis from simply the production of goods to a broader measure of overall well-being that would include measures for categories like health, education and security. It also called for greater focus on the societal effects of income inequality, new ways to measure the economic impact of sustainability and ways to include the value of wealth to be passed on to the next generation. Similarly, the king of Bhutan has developed a GDP alternative called gross national happiness, which is a composite of indicators that are much more directly related to human well-being than monetary measures. ¶ The form of capitalism we have today has evolved over centuries to reflect growing needs, but also has been warped by private interests. Yuval Levin points out that some key moral features of Adam Smith’s political economy have been corrupted in more recent times, most notably by “a growing collusion between government and large corporations.” This issue has become most vivid after the financial crisis and the failed policies that both preceded and succeeded that watershed event. The answers, as Auden Schendler and Mark Trexler point out, are both “policy solutions” and “corporations to advocate for those solutions.”¶ We can never have a clean slate¶ How will we get to the solutions for climate change? Let’s face it. Installing efficient LED light bulbs, driving the latest Tesla electric car and recycling our waste are admirable and desirable activities. But they are not going to solve the climate problem by reducing our collective emissions to a necessary level. To achieve that goal requires systemic change. To that end, some argue for creating a new system to replace capitalism. For example, Naomi Klein calls for “shredding the free-market ideology that has dominated the global economy for more than three decades.”¶ Klein is performing a valuable service with her call for extreme action. She, like Bill McKibben and his 350.org movement, is helping to make it possible for a conversation to take place over the magnitude of the challenge before us through what is called the “radical flank effect.”¶ All members and ideas of a social movement are viewed in contrast to others, and extreme positions can make other ideas and organizations seem more reasonable to movement opponents. For example, when Martin Luther King Jr first began speaking his message, it was perceived as too radical for the majority of white America. But when Malcolm X entered the debate, he pulled the radical flank further out and made King’s message look more moderate by comparison. Capturing this sentiment, Russell Train, second administrator of the EPA, once quipped, “Thank God for [environmentalist] Dave Brower; he makes it so easy for the rest of us to be reasonable.”¶ But the nature of social change never allows us the clean slate that makes sweeping statements for radical change attractive. Every set of institutions by which society is structured evolved from some set of structures that preceded it. Stephen Jay Gould made this point quite powerfully in his essay “The Creation Myths of Cooperstown,” where he pointed out that baseball was not invented by Abner Doubleday in Cooperstown New York in 1839. In fact, he points out, “no one invented baseball at any moment or in any spot.” It evolved from games that came before it. In a similar way, Adam Smith did not invent capitalism in 1776 with his book The Wealth of Nations. He was writing about changes that he was observing and had been taking place for centuries in European economies; most notably the division of labor and the improvements in efficiency and quality of production that were the result. ¶ In the same way, we cannot simply invent a new system to replace capitalism. Whatever form of commerce and interchange we adopt must evolve out of the form we have at the present. There is simply no other way. ¶ But one particularly difficult challenge of climate change is that, unlike Adam Smith’s proverbial butcher, brewer or baker who provide our dinner out of the clear alignment of their self-interest and our needs, climate change breaks the link between action and outcome in profound ways. A person or corporation cannot learn about climate change through direct experience. We cannot feel an increase in global mean temperature; we cannot see, smell or taste greenhouse gases; and we cannot link an individual weather anomaly with global climate shifts. ¶ A real appreciation of the issue requires an understanding of large-scale systems through “big data” models. Moreover, both the knowledge of these models and an appreciation for how they work require deep scientific knowledge about complex dynamic systems and the ways in which feedback loops in the climate system, time delays, accumulations and nonlinearities operate within them. Therefore, the evolution of capitalism to address climate change must, in many ways, be based on trust, belief and faith in stakeholders outside the normal exchange of commerce. To get to the next iteration of this centuries-old institution, we must envision the market through all components that help to establish the rules; corporations, government, civil society, scientists and others. ¶ The evolving role of the corporation in society¶ At the end of the day, the solutions to climate change must come from the market and more specifically, from business. The market is the most powerful institution on earth, and business is the most powerful entity within it. Business makes the goods and services we rely upon: the clothes we wear, the food we eat, the forms of mobility we use and the buildings we live and work in. ¶ Businesses can transcend national boundaries and possess resources that exceed that of many countries. You can lament that fact, but it is a fact. If business does not lead the way toward solutions for a carbon-neutral world, there will be no solutions.

#### Economic valuation is key to the environment

Polasky 12 (Stephen, Professor of Ecological/Environmental Economics, University of Minnesota, Seth Binder, Summer 2012, Valuing the Environment for Decisionmaking, http://issues.org/28-4/polasky/)

Virtually all important environmental management and policy decisions have a wide range of effects. For example, zoning or development decisions about land use can have a variety of environmental impacts (for example, on local water and air quality, the potential for flooding downstream, carbon sequestration, and habitat for wildlife) as well as economic and social effects (on economic development, jobs, and income). Similarly, decisions on limits on emissions of air pollutants or greenhouse gases can affect a range of environmental, economic, and social concerns. These results affect multiple groups who often have very different views about desired outcomes (for example, developers versus environmentalists). Effects differ across geography (upstream versus downstream) and time (current versus future impacts). Choosing among management or policy options that differ in terms of environmental, economic, and social outcomes with spatial and temporal components may at first glance seem overwhelmingly complex, with dimensions that seem incomparable. Good environmental management and policy decisionmaking, however, necessitates systematic evaluation and consideration of the effects of management and policy on the affected public. Even though the quantitative valuation of these effects will never be perfect, the outcome of attempts to assess value provides important information to help guide decisionmaking.¶ ¶ Decisions, decisions¶ ¶ Management and policy decisions typically involve difficult tradeoffs that bring improvements in some dimensions and declines in others. Ultimately, deciding whether to choose management or policy alternative A or B requires an evaluation of whether A or B is “better,” where better is determined by the objectives of the decisionmaker. It is easy to conclude that one alternative is better than another if it is better in all dimensions. But making comparisons in which one alternative is better in some dimensions but worse in others requires making difficult value judgments. For example, clearing land for housing development may result in higher incomes and more jobs but reduce habitat for species and worsen local water quality. Whether land clearing is the right decision will depend on whether an increase in incomes and jobs is valued more highly than maintaining habitat and water quality. But how can one really compare income versus habitat for species or jobs versus water quality? Comparing across these different dimensions seems like comparing the proverbial apples and oranges. Reaching an environmental management or policy decision, though, requires the decisionmaker to compare apples and oranges, either explicitly or implicitly.¶ ¶ For an individual, deciding which college to attend, where to live, or what job to take is often a hard choice to make, in large part because it involves changes in multiple dimensions simultaneously. Moving to a new job in a new city may be a better professional opportunity and offer a new set of cultural amenities, but is it worth disrupting family life, moving away from friends, and making adjustments to a new community? Though it is difficult to compare such alternatives, people do make these decisions all the time. In choosing an option, taking account of all the factors, people make a determination that one option is better than the other available options.¶ ¶ As difficult as such choices can be for an individual, making environmental management and policy decisions adds yet another level of complexity. Such decisions affect many people simultaneously and thus require finding a way to aggregate values across different people to reach a decision. Management and policy decisions can make some groups better off while making others worse off, requiring a different sort of apples-and-oranges comparison.¶ ¶ Two methods used in such multidimensional, multiperson decisionmaking contexts are economic benefit/cost calculations and multicriteria decision analysis (MCDA). Each of these methods transforms a complex multidimensional problem involving multiple people into a single dimension that can be used to rank alternatives. These methods act like a blender that mixes apples and oranges to produce a fruit smoothie. Decisionmakers can then decide which fruit smoothie they like the best.¶ ¶ Economics reduces multidimensional problems to a single dimension by measuring the value of changes in each dimension with a common metric, which is typically, but not necessarily, a monetary metric. Economist8s tend to prefer a monetary metric because it is a pervasive, intuitive, and easily observable measure of the values that people attribute to an array of everyday goods and services. In wellfunctioning markets, the price of a good or service reflects its marginal value to the buyer measured in terms of the common monetary metric: what the buyer is willing to pay to have the good or service. This fact makes the marginal values of many very different goods and services commensurable. The concept extends even to environmental attributes that do not have a market value, such as clean air, as long as people are willing to make tradeoffs in their consumption of some market goods in order to obtain other nonmarket attributes.¶ ¶ The ability to measure values with a common monetary metric rests on two key premises. First, individual willingness to pay for an item is assumed to accurately represent the value of that item to the individual: that is, how much better off the individual is with the item than without the item, measured in monetary terms. Second, the aggregation of values to the societal level requires that the correspondence between willingness to pay and well-being be comparable across individuals, so that a measure of societal value is equal to the (appropriately weighted) sum of values across all individuals in society. This comparability is necessary in order to do benefit/cost analysis resulting in a single number that summarizes social net benefits.¶ ¶ With the ability to produce an aggregate social net benefit calculation for any policy option, the economic benefit/cost decision rule is simple: Choose the option that maximizes social net benefits. This simple rule can be extended to account for uncertainty by maximizing expected social net benefits, where net benefits for individuals can include risk aversion (that is, a willingness to pay to avoid being subjected to uncertain outcomes). The decision rule can also incorporate constraints that restrict outcomes, so that they do not violate minimum environmental standards or basic human rights. As noted, however, the social net benefit calculation requires that individuals evaluate multiple dimensions with a single monetary metric of value and that these values be comparable across individuals. Without such interpersonal comparability, management or policy changes resulting in both winners and losers cannot be evaluated. In this case, only alternatives in which everyone is better off are clearly superior, and such alternatives are extremely unlikely to emerge.¶ ¶ Benefit/cost calculations have been applied to a wide variety of environmental policies. All recent presidents, both Democratic and Republican, have required agencies to evaluate the benefits and costs of regulations, including environmental regulations. Executive Order 12866 signed by President Clinton in 1993 states that agencies “shall assess both the costs and the benefits of the intended regulation” and “in choosing among alternative regulatory approaches, agencies should select those approaches that maximize net benefits” The Environmental Protection Agency (EPA) has done extensive benefit/cost calculations of regulations, particularly regulations under the Clean Air Act. The EPA estimated that the 1990 Clean Air Act would provide benefits of $2 trillion between 1990 and 2020 while imposing costs of $65 billion, a benefit-to-cost ratio of approximately 30-to-1. A prior study of the benefits and costs of the Clean Air Act from 1970 to 1990 found a similarly large benefitto-cost ratio.¶ ¶ The economic benefit/cost approach to maximizing social net benefits may be thought of as belonging to the broader class of MCDA methods, all of which require explicit or implicit weighting of various attributes of expected outcomes of management or policy decisions. Although some MCDA methods accommodate only quantitative attributes, others also permit qualitative attributes. Given attributes and weights, different MCDA methods take different approaches to evaluating alternatives. Some methods seek to identify the best alternative, similar to the economic approach of maximizing social net benefits, while others, such as goal programming, seek to identify alternatives that meet certain thresholds of performance. In goal programming, aspirational or minimally acceptable thresholds are set for each criterion, and alternatives are evaluated according to the priority-weighted distances by which criteria fall short of these thresholds. In general, MCDA methods seek to maximize a social welfare function of a particular, often implicit, form.¶ ¶ Setting relative values¶ ¶ To be operational, benefit/cost and MCDA methods require information on relative values (weights) for different dimensions of value affected by environmental management or policy. Economics and decision sciences tend to take different approaches to assembling information about values. In economics, the values of different management or policy options are derived from aggregating the net benefits to individuals in society for that option. In decision sciences, a variety of methods are used to assemble information on weights to assign to different dimensions.¶ ¶ The task of the economist in understanding relative values for an individual is far easier for marketed goods and services than for nonmarketed environmental attributes. For marketed goods and services, economists use observations on how much is purchased at a given price over a range of different prices to construct a demand function. The demand function summarizes information on the willingness to pay of the individual for the good or service. In competitive markets, the supply function reflects the marginal cost of producing the good or service. Demand and supply can be used to define economic surplus, which is the difference between the (marginal) willingness to pay given by demand and the marginal cost of production given by supply. Summing up this difference over the entire quantity traded is equal to economic surplus; that is, the value generated from the production and consumption of the good or service.¶ ¶ Some environmental changes directly affect marketed goods and services, and the value of these effects can be evaluated by assessing the net change in economic surplus in the affected markets. Take, for example, the potential effects of excess nutrients in a body of water that cause dead zones (areas of low oxygen), resulting in lowered fish and shellfish populations and reduced commercial harvests. With basic information about consumer demand and the costs of supply, economists can estimate the expected loss in economic surplus from the reduction in harvests. Adjustments to economic surplus calculations are necessary when market imperfections, such as monopoly pricing, taxes, or subsidies, result in price distortions so that prices are not a true reflection of the value of marketed goods and services.¶ ¶ The concept of economic surplus (value) also applies to environmental attributes, such as clean air or access to natural areas, for which there is no market. Valuing nonmarket goods and services is more difficult, because there is no readily observable signal of value that is comparable to a marke8t price. Economists have devised a suite of nonmarket valuation tools that can be applied to value nonmarketed environmental attributes. Some nonmarket valuation methods use observable expenditure on a different marketed good or service to draw an inference about the value of the nonmarketed environmental attribute of interest. For example, housing prices may reflect the increased willingness to pay for housing in locations with better environmental amenities, such as access to lakes and parks or better air quality. The choice of where to recreate can reveal information about the relative value of environmental amenities that vary across recreation sites. Other methods of estimating value record changes in expenditures, such as changes in the cost to treat drinking water with changes in water quality.¶ ¶ Economists cannot use observed expenditures to value all important changes to the environment. For example, if all of the lakes in a region are polluted and no one uses them for recreation, it will be difficult to assess the value of reducing pollution on recreational value, unless one is willing to make inferences from other regions. More fundamentally, there are limited or no directly observable expenditures or other behavioral clues for some environment attributes, particularly non-use benefits such as knowing that species exist. In Antonio Briceño, Overfishing, from the Millions of Pieces: Only One Puzzle Project, Digital c-print on Fuji Crystal Archival paper, 21 x 60 inches, 2010. the absence of observable behavior, economists use survey questions to ask people about values for changes in environmental attributes. Such “stated preference” methods include contingent valuation and conjoint analysis. The contingent valuation method presents survey respondents with a hypothetical change in the environment, such as a 10% increase in the size of humpback whale populations, and asks whether they would be willing to pay a specified amount for the change. Varying the specified amount and observing the proportion of people saying yes generates information analogous to a demand curve for marketed goods and services. In conjoint analysis, people are asked to rank a series of outcomes that differ in the quantities of various attributes. Conjoint analysis allows direct evaluation of how people trade off one attribute versus another, such as an improvement in air quality versus greater access to open space. If one of the attributes is income or expenditure, then the analyst can also estimate willingness to pay.¶ ¶ Some actions, such as emissions of greenhouse gases, cause changes in multiple dimensions that occur over extended periods. For example, a change in carbon storage in ecosystems that reduces atmospheric concentrations causes changes in climate forcing and ocean acidification, which in turn affect myriad other environmental attributes, including precipitation patterns, with effects on agricultural production, the probability and severity of flooding, and the health of marine resources, among others. Summarizing the value of all these changes into a single estimate of the social cost of carbon (SCC) requires complex integrated assessment models that predict both environmental and economic outcomes and attach estimates of the value of those outcomes. Further complicating matters, SCC estimates depend on levels of emissions that can be affected by the very policy choice that SCC is meant to inform. For this reason and others, such as the choice of social discount rate, the estimates of the SCC range from near zero to hundreds of dollars per ton of carbon.¶ ¶ Instead of the often-complex process of economic valuation, MCDA typically relies on a set of alternative methods for establishing relative values or weights on different criteria, to be chosen by the decisionmakers. The identification of weights may be done by introspection, deliberation, or negotiation—or some combination of the three—among stakeholders. Setting relative weights may also be done as part of an iterative process in which alternatives are evaluated, weights reassessed in light of the evaluation, and new criteria weights applied.¶ ¶ One example of how relative weights for different criteria are set in MCDA is through application of the analytical hierarchy process. In this process, decisionmakers are asked to determine a set of top-level criteria, and within each of these to determine the subcomponent criteria. They are then asked to rank the relative importance of criteria at each level of the hierarchy. For example, suppose a decisionmaker is evaluating policies aimed at controlling non–point-source pollution from agriculture with two overarching criteria of water quality and economic effects. If these criteria are assigned equal importance, then each receives a weight of 0.5. At the next level of hierarchy, suppose that the water quality criteria include water clarity, dissolved oxygen content, and temperature, and that the economic criteria include farm income and jobs. If the decisionmaker believes that water clarity is twice as important as dissolved oxygen, and dissolved oxygen is twice as important as temperature, their weights at this level of hierarchy are 4/7, 2/7, and 1/7, respectively. Suppose that jobs are ranked as twice as important as farm income, then the weights would be 2/3 and 1/3. The overall weights in the analysis would then be 0.5 times these values: 2/7 for water clarity, 1/7 for dissolved oxygen content, 1/14 for water temperature, 1/3 for jobs, and 1/6 for farm income.¶ ¶ A potentially important difference between economic and MCDA approaches to valuation is in whose values are incorporated. In principle, valuation in benefit/cost assessments includes the value of everyone affected by management or policy choices, though in practice there may be questions about whether economic valuation methods accurately reflect societal values. In MCDA, it is typically a smaller subset of people that is involved in setting relative weights. For local-scale problems, MCDA methods could include all affected parties in a deliberative process, but as the scale of the problem grows, this will not be possible. For larger-scale environmental problems, ranging up to global concerns such as climate change, there is the question of representation and whether those present adequately reflect the views of the wider public. In addition, relative weights in MCDA should not be treated as constant but should reflect changes in circumstances, something that is typically captured in economic valuation methods.¶ ¶ Weighty issues¶ ¶ Any environmental management or policy decision is likely to entail winners and losers. How should the distribution of benefits and costs across groups be treated in environmental management and policy decisions? Critics of benefit/cost analysis contend that reliance on economic valuation systematically disadvantages those with less money. Greater wealth means greater ability (and thus willingness) to pay, so benefit/cost analysis effectively gives more weight to those with more money (“voting with dollars”). One way to answer this criticism is to give a higher weight to the values of those with less wealth. Economists have found considerable evidence of diminishing marginal utility of income, meaning that the value of an additional dollar to a poor person is greater than to a rich person. This fact can be used to justify “equity weights” based on differences in wealth. For example, an equity weight argument would mean that otherwise equal damages from future climate change should be given greater weight in low-income countries than in high-income countries. In addition, if society is committed to protecting the interests of particular groups, it can constrain consideration of options to those that achieve specified distributional goals.¶ ¶ Since the effects of alternative environmental management and policy options will differ across generations, a fundamental challenge in valuing environmental management and policy decisions is how to aggregate benefits and costs that accrue to current and future generations (inter-generational distribution). For example, more aggressive climate change mitigation strategies impose costs on the current generation but generate benefits for future generations.Economists typically use discounting to aggregate benefits and costs over time. The standard economic rationale for discounting is that investments yield a positive expected real rate of return, so that having a dollar today is worth more than having a dollar in the future. Costs and benefits realized at different points in time are thus commensurable in present value terms after discounting.¶ ¶ The standard discounting approach works well for nearterm private investment decisions, but what about for longterm social decisions affecting the welfare of future generations? If one accepts the principle of equal moral standing of all generations, there would seem to be little ethical justification for discounting future welfare. Frank Ramsay, the father of economic approaches to discounting and growth theory, maintained that it was “ethically indefensible” to treat the welfare of current and future generations differently. However, to the extent that future generations are expected to be better off than the current generation, discounting can be justified as an intergenerational application of equity weights. By the same principle, if environmental conditions worsen significantly and future generations are expected to be less well off than the present generation, this would imply a negative discount rate; that is, discounting of present benefits relative to future benefits. As recent debates on climate change policy aptly illustrate, there is little agreement among economists, or between economists and others, on discounting.¶ ¶ Uncertainty is a central issue in environmental management and policy. Uncertainty enters at various steps in the link between management and policy choices and eventual effects on the value of outcomes. There can be uncertainty about how changes in management or policy affect choices made by individuals and businesses (behavioral uncertainty), how changes in human actions affect the environment (scientific uncertainty), and how consequent changes in the environment will affect human well-being (value uncertainty). Recent work on the value of ecosystems services illustrates each of these uncertainties. For example, the Conservation Reserve Program, which pays landowners for taking land out of production and restores perennial vegetation, can shift patterns of land use and, in turn, result in changes in carbon sequestration, water quality, and habitat provision. Program participation and the provision of services depend on the choices of individual landowners, which are uncertain. There are key gaps in the science linking land use to service provision, such as how changes in land use will affect changes in carbon storage in soil or populations of particular species, making provision uncertain even when behavioral uncertainty is ignored. There are also key gaps in information pertaining to the link between services and benefits, making value uncertain even if provision is known. The value of water quality improvement, for example, depends as much on who uses the water and for what purpose as on the water quality itself.¶ ¶ Economic approaches typically use an expected utility framework to deal with uncertainty, where the value of each potential outcome is weighted by its probability of occurrence. This approach summarizes expected social net benefits across dimensions, as discussed above, but also across all possible outcomes that could occur given a management or policy choice. Using the expected utility framework, however, requires information about probabilities as well as values under all potential outcomes. For environmental issues involving complex system dynamics, such as climate change or the provision of ecosystem services, the list of possible outcomes in the future may be unknown, much less how to specify probabilities or likely values for each of these outcomes. Beyond the challenge of scientific uncertainty, there may also be uncertainty about the preferences of future generation and how they will value various outcomes. Inability to objectively quantify probabilities or values requires modifying expected utility, such as by using subjective judgments to establish probabilities or values, or setting bounds on decisions thought to pose unacceptable risks (for example, safe minimum standards). A particular challenge to making decisions under uncertainty arises from consideration of catastrophic outcomes. It is difficult to set probabilities on such events because they are rare, but small changes in assumptions about these probabilities can lead to large changes in policy advice.¶ ¶ People make mistakes, often in systematic and predictable ways. They tend to be overly optimistic, biased toward the present, and averse to losses. They have trouble thinking through complex problems, especially those with uncertainty. Given these facts, some analysts question the validity of using valuation studies that rely on observed choices, survey responses, or even deliberative processes among affected parties as an important input for setting environmental policy. The alternative, however, would be to delegate judgments about the relative value of outcomes to political leaders or scientific experts. Elected leaders, at least in theory, should reflect public values. Environmental scientists, however, have no special claim to understanding public values. In either case, there is no guarantee that top-down decisions will reflect the underlying values of the public at large any better than an imperfect reflection of values gathered through valuation exercises.¶ ¶ In principle, economic valuation methods can estimate value for all environmental attributes, either through inferences from observable behavior or responses in stated preference surveys. In practice, however, it is generally not possible to get a complete economic assessment of all environmental values. Some values connected with the environment are notoriously difficult to assess in monetary terms. For example, what is the monetary value of conserving species with important spiritual or cultural value? Some critics contend that individuals are cognitively incapable of evaluating tradeoffs between utilitarian goods (such as commodities and ecosystem services) and moral goods (such as the existence of a species). There are sharp disagreements between psychologists and economists—and among economists themselves—on this point. Even when it is possible in principle to estimate monetary values, there may be insufficient data to do so. Nevertheless, economic methods can provide evidence about the value of many important environmental attributes.¶ ¶ The value of valuation¶ ¶ Though difficult, collecting information about the relative values of alternative potential outcomes, in all of their multiple dimensions, is vital to good environmental management and policy decisionmaking. Setting environmental policy is not simply a matter of applying the best science, as important as that is. Environmental management and policy typically involve making decisions about tradeoffs among multiple objectives about which society cares. Making decisions about such tradeoffs involves making value judgments. If these judgments are to improve human wellbeing, they should reflect the underlying values of individuals affected by the policy.¶ ¶ Economic valuation methods applied in the context of environmental management and policy seek to inform decisionmaking by collecting information about the value of alternatives to affected individuals and then aggregating these values to determine an estimate of social net benefits. In simple benefit/cost analysis, the management or policy option with the highest social net benefits should then be the preferred option. The great advantage of the simple benefit/cost approach is that it incorporates economic valuation methods to represent values of the affected public, summarizes this information into a single ranking, and uses this ranking to help guide policy. Valuation information can also be combined with other decisions rules, such as those that minimize the risk of bad outcomes occurring.

#### Radical alternatives pave the way for authoritarian environmentalism.

Simon HAILWOOD, Philosophy @ Liverpool, ‘4 [*How to be a Green Liberal*, 2004, p. 155-156]

For me, the main worry emerging from such considerations is not that liberal societies are incapable of embracing meaningful change towards "eco-sanity", such that anarchism is the only hope. That hope seems more unrealistic - more utopian in that sense - than that of liberal reform. The main worry is that those from the authoritarian end of the spectrum will convince people that the liberal mainstream is inherently incapable of reform, and so must be replaced by more coercive forms of green politics, and people from the radical left will help with the critique, provide no realistic, non-utopian alternative themselves, thus leaving the door open for the "Leviathan or oblivion" school: nakedly authoritarian, radically hierarchical programmes regarding substantive political equality as an obstacle to progress. 10) Sometimes the point about the practical need to oppose the state is made with impatience about philosophy and abstract theorizing. This does not apply to Carter. But it does to Sale, for example, who denounces abstract philosophical discussion of ethical responses to the "environmental crisis", mainly because dithering over abstruse conceptual matters is to ignore the simple practical issue of scale. '°4 It would be better if those with such powerful rhetorical skills used them to further the green cause as continuous with furthering the liberal cause against more reactionary elements. Perhaps this is particularly true in the USA, clearly the main player in the scientific-industrial-capitalist global order and, in terms of environmental policy agenda, in various ways a beacon of unreconstructed unreason. That would probably be of greater practical benefit than giving fellow citizens of the modern world a collection of quasi-religiose blueprinting ideas coloured with the dismal tinge of an anxious instrumentalism. That is, it seems more practically feasible to seek to work with the flow of modernity in order to help channel it on to a course more respectful of nature. That it is, in principle, possible to do this within the terms of what is often taken to be the main political philosophy of modernity, has been the point of this book.

#### Command and control and regulations don’t set a price signal – invites litigation not innovation

Hsu 11 (Shi-Ling Hsu, Professor of Law at University of British Columbia – previously Associate Prof at George Washington School of Law, Senior Attorney & Economist for the Environmental Law Institute The Case for a Carbon Tax: Getting Past our Hang-ups to Effective Climate Policy, Island Press] Page 33-34)

In the United States, command-and-control regulation of green- house gas emissions would fall under the ambit of the Clean Air Act. The EPA, having issued the finding that greenhouse gas emissions,"18 "endanger" the "public health and welfare, is empowered to issue regulations, industry by industry, pertaining to greenhouse gas reduction measures that will be requited as a condition of a permit under the Clean Air Act. The Canadian counterpart to EPA, Environment Canada, issued an analogous finding far earlier (in 2005), that green- house gases fell within a statutory definition of "toxic substances," in that they, among other effects, "have or may have an immediate or long-term harmful effect on the environment or its biological diver- sitv."19 Environment Canada is thus also positioned to issue command- and-control-style greenhouse gas regulations, although other forms of regulation are possible under the Canadian statute.

One might think that command-and-control regulation, by potentially imposing the highest price on emitters, would be the most effective in re-ordering economies to be lower-carbon. The mistake is to equate an administrative price with a market price. Under command- and-control regulation, an administrative price is imposed by an agency. This price need not bear any relation to greenhouse gas emissions. Most often, the key consideration in setting standards is the state of technology of pollution abatement. If abatement technology seems "cheap" or "feasible," then it likely factors into the setting of an administrative standard. This is, in very rough measure, an agency's at- tempt to balance costs and benefits: if requiring abatement technology seems somehow "worth it," by an eyeball estimate of the compliance costs and environmental benefits, then it becomes law.

Over the past several decades, command-and-control regulation has been continuously and successfully attacked on efficiency grounds. The most common arguments ate that: (i) command-and-control regulation is clumsy, its uniformity of standards sometimes too stringent and sometimes too lenient, resulting in wasteful over-abatement m some cases and missed opportunities to abate more in other cases, (ii) fails to strike a correct balance between costs and benefits as administrative agencies make poor guesses about compliance costs, (iii) being a fixed administrative price, fails to offer incentives for emitters to find innovative ways of reducing emissions, and (iv) provides fodder for delay and litigation by well-funded and disgruntled industry groups.

These well-rehearsed criticisms are thoroughly treated elsewhere. I argue here that, in addition to these arguments, command-and- control regulation sends an uneven price signal to greenhouse gas emitters. While there is controversy over the amount of damages from greenhouse gas emissions, it is still worth making the price proportional to greenhouse gas emissions. Command-and-control regulation, be- cause it imposes a different requirement for each industry, imposes a different price for each industry. A price signal that is different from one industry to another is no price signal at all, if the goal is to sort industries by carbon emissions. If the price wanes from industry to industry, then the sorting is not accomplished by carbon emissions, but by an administrative agency. Moreover, command-and-control regulation has in the past generated so much litigation, the administrative "price" often does not emerge at all. Because the locus of so much decision making and adjudication is at the administrative agency, and be- cause these decisions and adjudications invariably invite comparisons with those that affect other industries, perceptions of unfairness (accurate or not) run rampant through command-and-control regulation. So not only does an uneven price signal frustrate greenhouse gas reduction objectives, but sometimes litigation or just the threat of litigation erases the price signal completely.

#### Social cost prevents green-paradox

Williams 16 (Roberton C. Williams, PhD in Economics from Harvard, Senior Fellow at the Tax Policy Center, June 2016, Environmental Taxation, <http://www.rff.org/files/document/file/RFF-DP-16-24.pdf>)

The intuition for these results is simple: although those adjustments are costly and affect the optimal quantity path for emissions (with higher adjustment costs implying a slower drop in emissions), the adjustment costs are not market failures, and thus they don’t influence the optimal corrective tax, which still equals marginal damage. Williams (2012) notes, however, that these adjustment costs can be important for the distribution of costs, and that although other approaches, such as direct transfers, would be more efficient, if such alternatives are not possible, a gradual phase-in could be useful for meeting distributional objectives.

In general, the efficient carbon tax will rise over time at the same rate as marginal damage. The IAWG estimates suggest that the SCC rises at roughly 1.5 to 2 percent per year (in real terms), which would imply a similar rate of increase for the efficient carbon tax rate. Moreover, Daniel et al. (2015) and Lontzek et al. (2015) each add uncertainty about climate change (including the risk of climate tipping points) to integrated assessment models and find that this implies a substantially different time profile for the SCC (and therefore for the optimal carbon tax), one that starts much higher and rises much more slowly than without any uncertainty. Indeed, Daniel et al. (2015) find this effect so strong that the SCC actually falls over time.

Sinn (2008) observes that a rapidly rising carbon tax could actually accelerate greenhouse gas emissions. Consider the problem than an owner of fossil-fuel reserves faces when a rising carbon tax is imposed., then it might make sense to leave the fuel in the ground forever. But if not, the sooner that fossil fuel is extracted and burned, the less tax will be charged on it—and if the tax is rising faster than the rate of interest, then even the present discounted value of the tax will be rising over time, thus providing an incentive to extract and burn the fuel sooner. This leads to a “green paradox”: a carbon tax that starts lower and rises rapidly can cause more emissions in the short run than if there were no tax at all. However, as noted earlier, estimates of the SCC rise substantially more slowly than the rate of interest, so a tax rising with the SCC won’t trigger the green paradox.15 Thus, the green paradox is a real worry only for taxes that rise much faster than the SCC.

Some carbon tax proposals set the carbon tax based on estimates of the SCC, 16 but most proposals include rates that rise more quickly than that. Many call for a tax that rises at 4 or 5 percent in real terms (e.g., Morris’s 2013 proposal for the Hamilton Project suggests a 4 percent real rise), and it is not uncommon to see proposals that rise far faster– than that (e.g., recent proposals from the Carbon Tax Center start at $10/ton and rise by $10/ton each year, an extremely fast rate of increase). There are three main reasons for this.

First, many of these proposals start at rates below the SCC and thus must rise more quickly to catch up. It would be more efficient to start at a higher rate and rise more slowly, but if distributional or political considerations prevent that, then starting low and rising quickly may be the next best alternative.

#### Social costs are key--starting low and increasing quickly CAUSES warming.

Jensen 15 (Svenn Jensen 15, assistant professor at the Norwegian University of Life Sciences; Kristina Mohlin, Economist at the Environmental Defense Fund; Karen Pittel, professor at the University of Munich and heads the Center for Energy, Climate and Exhaustible Resources at the Ifo Institute of Economic Research; Thomas Sterner is a professor at the University of Gothenburg and senior advisor to the Environmental Defense Fund; Summer 2015, “An Introduction to the Green Paradox: The Unintended Consequences of Climate Policies,” Review of Environmental Economics & Policy, Vol. 9, No. 2, p. 246-265) \*\*itallics in original

The green paradox refers to an outcome in which climate policies such as carbon taxes, which are aimed at reducing carbon emissions, instead have the opposite effect: emissions increase, at least for some period of time. The recent debate about the green paradox was initially triggered by Sinn (2008), who focused on one specific reason for this paradoxical outcome: the effect of climate policies on the long-run profits (more specifically, scarcity rents) that owners of fossil resources expect to earn from selling their resources *over time*. More recently, the term green paradox has been used to more broadly describe unintended consequences of climate policies.

For economists, the solution to environmental problems like climate change is a Pigovian tax (i.e., a tax that is equal to the social marginal damage from emissions) or an equivalent policy. However, for political reasons, it is likely that a carbon tax will not be set according to the Pigovian principle but rather will start low and then rise over time. A green paradox arises if this policy backfires and the environmental problem worsens. The culprit here is the reaction on the *supply side* of the fossil fuel market. Because fossil fuels are nonrenewable resources, their prices reflect not only the cost of production but also their scarcity. Thus, owners of fossil fuels enjoy scarcity rents and maximize their profits by deciding when to extract their coal, oil, or gas reserves. If a future tightening of climate policy threatens to decrease future scarcity rents, then to maximize profits, fossil fuel owners will decide to extract less in the future and extract more today instead. This forward shift in extraction is known as the weak green paradox. If, despite climate policy, resource owners can still extract almost all of their resources profitably, then the forward shift in extraction might actually increase cumulative damages—an outcome known as a strong green paradox.

# 2AC

**Case**

### Regressive

**Climate change is regressive, the plan’s tax and dividend policies allow rebates to provide adaptation--only the plan’s multi-prongong approach to remedying climate change regressivity**

**Durning 10** – Director at Sightline Institute, a sustainability center (Alan, “Climate and Race,” Grist.org, January 20, 2010, http://grist.org/article/climate-and-race/)

Penalizing People of Color

Climate change and the disruptions it brings [threaten everyone](http://daily.sightline.org/resolveuid/98693bb8cc69dfd243c1acc84e89cd14), but they especially [threaten those at the bottom of the economic pyramid](http://daily.sightline.org/resolveuid/4808f1d3d9c6051ba32444b42f829d03). And despite many decades of striving, people of color remain disproportionately represented among North America’s poor and disadvantaged.

As a result, if you are African American, Hispanic, Native American, or Asian American, you’re more likely to suffer as heat-trapping gases unleash a changing climate. A warming world could mean food insecurity, risks of heat waves and flooding, and other ills that will fall hardest on those with the least means and fewest financial resources. That’s doubly unfair, considering that people of color have done less to cause climate disruption than have whites. Typical [African-American households, for example, have carbon footprints just 80 percent the size of their white counterparts](http://www.rprogress.org/publications/2008/climateofchange.pdf). So African Americans have created less of the problem of a warming planet, but bear more of the burden.

**Fortunately, a well-designed climate policy can help to ameliorate that unfairness**. Indeed, fixing America’s climate problem is one of many areas where people of all races, ethnicities, and backgrounds can find common cause. By **ending our addiction to fossil fuels**, we can simultaneously create economic opportunities for workers of all races, create a more just society for all families, and protect the climate for all of our children.

For those of us living in the Pacific Northwest, data on the links between climate and racial inequity are difficult to assemble. Most relevant data cover the United States as a whole, rather than to our Northwest region, so the situation here is uncertain. In the Northwest states of Idaho, Oregon, and Washington, African Americans make up 2 percent of the population—one fifth their share in the United States overall. These states’ Hispanic population is much larger, at 9 percent of all residents, though that’s a smaller proportion than in the United States overall, where 14 percent of residents are Hispanic. Native American/First Nation and Asian Americans, conversely, are more numerous in the Northwest than in North America generally. [These data calculated from this U.S. Department of Labor data set](http://www.bls.gov/lau/ptable14full2008.pdf).)

How does climate change penalize people of color? Andrew Hoerner and Nia Robinson of Redefining Progress have completed the most comprehensive study of this question. I draw on their [A Climate for Change](http://www.rprogress.org/publications/2008/climateofchange.pdf) extensively.

Heat

Climate disruption is increasing the frequency and intensity of heat waves, which disproportionately hurt those with low incomes and little wealth. Poor people don’t own mountain hideaways and may lack air conditioning. Because of higher poverty rates and African Americans’ geographic concentrations in hot, inner-city areas, African Americans die from heat-related causes at two to three times the rate of non-Hispanic whites in the United States.

Moreover, because they are poorer, African Americans also tend to live in counties and neighborhoods with worse air pollution. They also suffer from lung conditions such as asthma and chronic obstructive pulmonary disease at substantially higher rates than non-Hispanic whites. And as temperatures rise, air pollution gets more harmful to health.

[The Northwest’s biggest cities are temperate and do not suffer as much extreme heat or air pollution as many other cities, but they are also little-prepared for heat](http://grist.files.wordpress.com/2010/01/021609_climateeconomicsimpactsreport.pdf). Already, the hottest days and weeks of summer in the Northwest elevate death rates among the most vulnerable. In greater Seattle between 1980 and 2006, for example, hot summer spells that lasted five days typically brought 25 more deaths among those over the age of 85 than did normal-temperature periods of the same duration. On hot days, death rates also step up among those above ages 45 and 65. The state of [Washington’s official climate change assessment forecasts more than 100 additional heat-related deaths each summer in the greater Seattle area alone by 2025](http://grist.files.wordpress.com/2010/01/wacciaexecsummary638.pdf).

Heat may be a larger threat in the inland Northwest, where summer temperatures are higher anyway. There, among the most vulnerable are those who labor outdoors on field crews: at least [67 percent of Washington’s farm laborers are Hispanic](http://grist.files.wordpress.com/2010/01/3118_eeo-t-1-c2.xls), along with [60 percent of Oregon’s](http://www.qualityinfo.org/olmisj/PubReader?itemid=00000035). (These figures likely dramatically understate the share of arduous hand labor done by Hispanic workers on Northwest farms. The data are drawn from a [2000 Census special data tabulation](http://www.census.gov/eeo2000/), and the census typically undercounts undocumented immigrants, especially migrant workers. Furthermore, they come from an occupational dataset that encompasses certain other, higher-paid and predominantly white agriculture workers, such as animal breeders. [Farm owners, meanwhile, are overwhelmingly non-Hispani  
c whites, as this study of Oregon notes.](http://www.oregonlive.com/environment/index.ssf/2010/01/oregons_greenest_occupation_-.html)) In California, with its hot inland climate and large population of Hispanic agricultural workers, recent research (summarized [here](http://grist.files.wordpress.com/2010/01/climategapreport_full_report_web.pdf)) has documented heat’s disproportionate harm to working-age Hispanic men and women.

Vulnerability

Climate disruption does not just mean warmer temperatures. It means more extreme weather: more floods and more droughts, more heat waves and more windstorms. Consequently, it means more “natural” disasters, such as hurricanes and forest fires ([projected to more than triple in area in the inland Northwest over the century](http://grist.files.wordpress.com/2010/01/021609_climateeconomicsimpactsreport.pdf)).

In the face of extreme events, what families need is resilience—the ability to bounce back. Unfortunately, resilience is exactly what disadvantaged families lack.

First, people with less money lose out in the market competition for safe housing: they may end up in flood plains, on steep slopes, or in fire-vulnerable trailer homes. They may live in poorly planned, un-shaded urban or suburban apartment blocks that line arterial streets. There, they are vulnerable to both the higher temperatures of metropolitan “heat islands” and the polluted tunnels of air that hover over major thoroughfares. What’s more, they may live in substandard housing that doesn’t meet current codes for fire safety or that grows mold and triggers allergies.

Just so, disadvantaged workers have little choice but to work in conditions that the more affluent simply would not accept: they may have to work outdoors through extremes of heat and cold, for example.

But the physical exposure to climate risks is just the beginning. Because African Americans are typically poorer, for example, they are twice as likely to lack health insurance as non-Hispanic whites in the United States. They are also less likely to have property insurance or savings, and other forms of wealth to tide them over. Nationwide in the United States, African Americans’ average incomes are 57 percent as high as non-Hispanic whites’ incomes, but their median household wealth is one tenth as great. In other words, typical US whites’ net worth is tenfold that of typical African Americans.

Consequently, an environmental illness or climate-related disaster can trigger a downward “poverty ratchet.” For example, the stress of heat and pollution can induce a severe asthma attack that requires hospitalization. Or a flood might fill a basement apartment. A more-fortunate family might file an insurance claim, tap its savings, and quickly recover. A poor family, on the other hand, might end up bankrupt or homeless.

Energy Prices

Climate change is one consequence of our fossil-fuel economy. Another consequence is energy price volatility. We ride a fossil fuel price rollercoaster, but for people of little means, the ride offers more spills than thrills.

For one thing, working-class families of every race and ethnicity pay a larger share of their income for energy, so when energy prices go up, working-class families get hit harder than the well off. Because people of color are more likely to have modest incomes, they suffer directly from higher energy prices. Furthermore, [according to Hoerner and Robinson in A Climate of Change](http://www.rprogress.org/publications/2008/climateofchange.pdf), if you divide households into ten income segments or “deciles,” African Americans in each decile spend a larger share of their income on energy than non-Hispanic white households. They spend less on gasoline but more on electricity, probably because they live in lower-quality housing stock that is much less efficient. This pattern could be a result of what I mentioned earlier: that African Americans have somewhat less income but radically less wealth than whites in the United States.

Furthermore, in the Northwest, climate change may [increase the demand for summer electricity (for air conditioning) while reducing supply (by shrinking snowpack)](http://cses.washington.edu/cig/outreach/waccia/index.html), with the consequence of raising power prices to consumers even for this climate-friendly energy source.

Unemployment

Recession-induced unemployment is among the direst tolls of the fossil-fuel economy for people of color. People of color are overrepresented at the bottom of the employment ladder, where too many of them are among the last hired in good times and the first fired in bad. Recessions dole out extra misfortune to those who have the least fortune to begin with. And [fossil energy price spikes were part of the cause for the Great Recession](http://daily.sightline.org/resolveuid/ccb6b760c061eed613a57c937f02efef), as for most recent recessions.

As Hoerner and Robinson note, nationwide in the United States, “the increase in unemployment of African Americans during energy-caused recessions is twice that of non-Hispanic whites, costing the [African American] community an average of one percent of income every year.” Unemployment rates for African American and other minority groups mirror at higher levels those of non-Hispanic whites. As shown in this chart, in 2008, for example, the US unemployment rate for whites was 5.2 percent; for African Americans, it was 10.1 percent, according the US[Bureau for Labor Statistics (BLS)](http://www.bls.gov/lau/ptable14full2008.pdf). As the national unemployment rate has hit double digits in 2009, the [unemployment rate for African Americans](http://www.bls.gov/news.release/empsit.t02.htm) has soared above 15 percent.

Such elevated unemployment rates cause enduring hardship for people of color, reducing not only near-term income but also long-term wages, wealth, and prospects for health and education.

In the Pacific Northwest, racial disparities in employment remain stark, although they are smaller than in some other parts of North America. The [unemployment rate for First Nations people in British Columbia](http://grist.files.wordpress.com/2010/01/abo_lfs_2008.pdf) in 2008 was almost 11 percent; for everyone else, it was 4 percent, according to BC Stats. Some 5.6 percent of the Northwest states’ white labor force was unemployed, as were 8 percent of Northwest African Americans and 8.3 percent of Hispanic northwesterners,[according to BLS](http://www.bls.gov/lau/ptable14full2008.pdf). Since then, [rates have skyrocketed overall](http://daily.sightline.org/resolveuid/c959314ad524cdf437d4fb289718dad7), but Northwest race-specific unemployment data are not yet available.

Solutions

**Because the vagaries of the fossil fuel economy and of climate change penalize people of color, the clean-energy economy is especially beneficial for people of color.** Getting off the fossil-fuel rollercoaster prevents price spikes that hurt them and reduces the frequency of recessions, which hurt them even more.

**Furthermore, well-designed climate pricing compensates for the regressive and racially disproportionate toll of climate disruption and of the fossil fuel economy.** In this chart, Hoerner and Robinson model the net financial effect of a [cap-and-dividend](http://daily.sightline.org/resolveuid/5b5960975c26f67f8fc9c86a7283d70e) climate policy, in which authorities auction all carbon permits and distribute the proceeds in equal payments to all residents. The chart shows the net effect of higher energy prices and carbon dividend payments to households, expressed as a percentage of household expenditur  
es.

(Well, actually, the chart is an even better illustration of a [tax-and-dividend policy](http://daily.sightline.org/resolveuid/16bcced07c0112ed54062665c355e615) with a charge of $50 per metric ton of carbon dioxide. But the difference between a $50 carbon tax and a carbon permit auction that happens to settle on a $50 carbon price is immaterial for this case.)

As the chart shows, the policy approach of cap and dividend, recently [proposed in an imperfect form by Senator Maria Cantwell](http://daily.sightline.org/resolveuid/81cd3d5870ec9c9787e0397ff0c7b248) and the [endpoint by 2030 of the Waxman-Markey ACES bill that passed the US House in June of 2008](http://daily.sightline.org/resolveuid/96b57ad6f4afb6f0575470858116190d), yields substantial net gains for all Americans below the 70th percentile and only small losses for those above that level. **African Americans gain more (or lose less) than whites,** according to Hoerner and Robinson’s estimates.

Unfortunately, no one has yet estimated the household budget impacts of climate policy on other racial and ethnic groups, especially Hispanics. My hunch is that the results would look similar to those for African Americans, but more research is needed.

Furthermore, these figures are for the entire United States. The specific distributional impacts in the Pacific Northwest—including in British Columbia—are likely to be somewhat different. Still, the general pattern would likely hold.

Hoerner and Robinson model the impacts of one more policy approach. They call it a “Climate Asset Plan.” Assuming the same $50/ton carbon dioxide price, they modeled the results for a combination of equal per-person dividends and substantial public investments in a clean-energy transition such as energy efficiency, building weatherization, and renewable energy programs. (The Climate Asset Plan, in fact, is full of the kinds of things we’ve been writing about in our[Green Jobs series](http://daily.sightline.org/resolveuid/088587ad86e672c01e9e5f647ef6cd23) and that are written into both [House](http://daily.sightline.org/resolveuid/96b57ad6f4afb6f0575470858116190d)and [Senate](http://daily.sightline.org/resolveuid/befb903183487bcf176721c9d3c145f2) [versions](http://daily.sightline.org/resolveuid/81cd3d5870ec9c9787e0397ff0c7b248) of federal climate legislation.)

The upshot: Hoerner and Robinson conclude that the best kind of climate policy for African Americans’ household budgets—as for those of non-Hispanic whites—is a combination of citizen rebates and public investments in the clean-energy transition. They believe that **such a plan would not only slow catastrophic climate change**, start getting us off the fossil fuel rollercoaster, **and cushion us from job-killing recessions but also boost spending power for households at every income level. And it would help most those who have done the least to cause—and stand to lose the most from—climate disruption: people of color.**

All of which I take as exceptionally good news: [efficient, fair, and effective climate policy](http://daily.sightline.org/resolveuid/2c504b2b4d71d6cc3eb592cda4532341) is not only an economic and environmental imperative. It would mark a singular victory for civil rights.

## K

**Epistemic deference to individuals based off of experience and identity is counter-productive and undermines the 1ac’s goals – it privileges bodies that happen to be in a particular room and makes marginalized people responsible for fixing everyone’s problems**

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A fuller and fairer assessment of what is going on with deference and standpoint epistemology would go beyond technical argument, and contend with the emotional appeals of this strategy of deference. Those in powerful rooms may be “elites” relative to the larger group they represent, but this guarantees nothing about how they are treated in the rooms they are in. After all, a person privileged in an absolute sense (a person belonging to, say, the half of the world that has secure access to “basic needs”) may nevertheless feel themselves to be consistently on the low end of the power dynamics they actually experience. Deference epistemology responds to real, morally weighty experiences of being put down, ignored, sidelined, or silenced. It thus has an important non-epistemic appeal to members of stigmatized or marginalized groups: it intervenes directly in morally consequential practices of giving attention and respect. The social dynamics we experience have an outsize role in developing and refining our political subjectivity, and our sense of ourselves. But this very strength of standpoint epistemology – its recognition of the importance of perspective – becomes its weakness when combined with **deferential practical norms**. Emphasis on the ways we are marginalized often matches the world as we have experienced it. But, from a structural perspective, the rooms we never needed to enter (and the explanations of why we can avoid these rooms) might have more to teach us about the world and our place in it. If so, the deferential approach to standpoint epistemology actually prevents “centring” or even hearing from the most marginalized; **it focuses us on the interaction of the rooms we occupy, rather than calling us to account for the interactions we don’t experience**. This fact about who is in the room, combined with the fact that speaking for others generates its own set of important problems (particularly when they are not there to advocate for themselves), eliminates pressures that might otherwise trouble the centrality of our own suffering – and of the suffering of the marginalized people that do happen to make it into rooms with us. The dangers with this feature of deference politics are grave, as are the risks for those outside of the most powerful rooms. **For those who are deferred to, it can supercharge group-undermining norms**. In Conflict is Not Abuse, Sarah Schulman makes a provocative observation about the psychological effects of both trauma and felt superiority: while these often come about for different reasons and have very different moral statuses, they result in similar behavioural patterns. Chief among these are misrepresenting the stakes of conflict (often by overstating harm) or representing others’ independence as a hostile threat (such as failures to “centre” the right topics or people). These behaviours, whatever their causal history, have corrosive effects on individuals who perform them as well as the groups around them, especially when a community’s norms magnify or multiply these behaviours rather than constraining or metabolizing them. **For those who defer, the habit can supercharge moral cowardice**. The norms provide social cover for the abdication of responsibility: it **displaces onto individual heroes**, a hero class, or a mythicized past the work that is ours to do now in the present. Their perspective may be clearer on this or that specific matter, but their overall point of view isn’t any less particular or constrained by history than ours. More importantly, **deference places the accountability that is all of ours to bear onto select people** – and, more often than not, a hyper-sanitized and thoroughly fictional caricature of them. The same tactics of deference that insulate us from criticism also insulate us from connection and transformation. They prevent us from engaging empathetically and authentically with the struggles of other people – prerequisites of coalitional politics. As identities become more and more fine-grained and disagreements sharper, we come to realize that “coalitional politics” (understood as struggle across difference) is, simply, politics. Thus, the deferential orientation, like that fragmentation of political collectivity it enables, is ultimately anti-political. Deference rather than interdependence may soothe short-term psychological wounds. But it does so at a steep cost: it can undermine the epistemic goals that motivate the project, and it entrenches a politics unbefitting of anyone fighting for freedom rather than for privilege, for collective liberation rather than mere parochial advantage.