2020

Universities and Carbon Neutrality: Motivation to Act and How to Create a Domino Effect

Jason Schwartz
University of Richmond

Universities and Carbon Neutrality:
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By

Jason Schwartz

Honors Thesis

Submitted to:

Jepson School of Leadership Studies
University of Richmond
Richmond, VA

May 1, 2020
Advisor: Dr. Javier Hidalgo

Abstract

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Jason Schwartz

Committee members: *Dr. Javier Hidalgo, Chair; Dr. Christopher von Rueden, and Dr. Jeppe von Platz*

This research seeks to understand why universities, or other small actors, have pledged carbon neutrality, if these reasons are valid, and if there is room to expand upon existing efforts. In answering these questions, I will investigate whether aggressive climate change mitigation passes a cost-benefit analysis, the nature of individual obligations, and how positive duties can spur social action. Finally, I recommend ways universities can create larger change, through trending social norms.

Signature Page for Leadership Studies Honors Thesis

Universities and Carbon Neutrality: Motivation to Act and How to Create a Domino Effect

Thesis presented

by

Jason Schwartz

This is to certify that the thesis prepared by Jason Schwartz has been approved by his/her committee as satisfactory completion of the thesis requirement to earn honors in leadership studies.

Approved as to style and content by:

Javier Hidalgo

Dr. Professor, *Chair*

Jeppe von Platz

Dr. Professor, *Member*

Chris von Rueden

Dr. Professor, *Member*

Dr. Crystal L. Hoyt, *Associate Dean for Academic Affairs*
Jepson School of Leadership Studies

Introduction

In 2006 twelve university presidents all signed pledges committing their campus to carbon neutrality. Some were motivated by the scientific urgency to take action. Many did so because they felt it was the right thing to do and it aligned with other core institutional values. Others felt it was an internal educational opportunity, using this initiative as a powerful tool to motivate student awareness and action. Finally, a few college presidents recognized the potential to pressure similar organizations to follow in their example, creating new normative expectations for such behavior and guiding followers along the way.

Few will disagree that carbon neutrality pledges have good intentions, yet they still face several criticisms regarding underlying premises. First, opponents like Bjorn Lomborg push back on the focus of mitigating climate change, arguing that the high costs of abating emissions today are not worth the expected return. If actors, like universities, were interested in maximizing the impact of each dollar, such funds could be better allocated towards poverty alleviation, education, or vaccine research. His argument pushes back both against the gravity of scientific models and the urgency of expensive solutions. Next, former university administrators, like president Stanley Fish, reject political movements at universities, arguing there are institutions in society better suited for such aims, even when facing a global injustice. Finally, philosophers like Walter-Sinnott Armstrong claim "it's not my fault" and argue that small actors are incapable of inflicting any discernable harm on others. Instead, he believes it is up to government to take action which will limit actors on a large scale, rather than focusing on individual behavioral change. Furthermore, he goes on to argue that we aren't as influential as we think we are,

negating the potential impact of any domino effect or norm change. I hold that all three of these arguments are incorrect.

In my thesis, I seek to answer questions about climate change, individual obligations, and social norm research, particularly for universities as first movers. First, I investigate the consensus on climate change science and controversies surrounding economic models. This invokes questions on how to monetize damages, setting a just discount rate, and the opportunity cost of funds. I argue that action to mitigate climate change passes a cost-benefit analysis, pushing back against Lomborg's science and narrow utilitarian framework, which lacks key ethical considerations.

Pushing back against Fish, I hold that universities, like all actors in society, are not excused of negative duty not to harm others and a positive duty to assist in time of moral emergencies, as seen with climate change. This then extends into my argument that all small actors, from the individual to a rural liberal arts college up to a state university, have a duty to mitigate their emissions as part of an obligation not to contribute to climate change as a collective action problem. Ignoring these risks given such devastating effects is a flaw in moral calculus and patently ignores concerns for scarcity and equity. Aside from undervaluing the impact of a small actor, Armstrong also treats such behavioral change in isolation, failing to account for any spillover effect of mitigating action.

This argument extends to universities, as specially motivated actors who can be among the first to achieve carbon neutrality, creating a new social norm in the process and modeling efficient solutions. I use social norm research to understand how universities can build upon their own efforts to convince followers, from students to large corporations or states, to strive for GHG reductions, using examples to highlight best practices and opportunities for improvement.

To conclude, I will rely heavily on a case study from the University of California, using their campuses as test labs for sustainability and creating a guide on scalable solutions for others to follow. Stacked together, this thesis stands to argue there is real value in campus led carbon neutrality efforts, for students, for society at large, and for the environment.

Chapter One

The planet is warming, it is human caused, and if action is not taken to properly mitigate and adapt to the effects of climate change, there will be drastic consequences. This chapter examines this imperative, arguing that a volatile climate violates human rights. Such a climate has the potential to severely harm the interests of current and future generations, specifically those most vulnerable. The urgency to act is expedited by current failures to take meaningful action, as well as increased scientific evidence regarding the risk of catastrophic tipping points. Given the well-founded risk of severe human rights violations there are strong moral and prudential reasons to take sufficient action now that will align global action with the scientific consensus. This view, however, has met resistance from climate skeptics, such as Bjorn Lomborg, who pushes back against scientific evidence that climate change will be detrimental and argues that the benefits of mitigation do not justify the immense costs. Lomborg also argues that one dollar towards climate change can be better spent on causes that will produce more social good. Although I agree with some of Lomborg's ideas, such as rebutting emotionally charged rhetoric and highlighting inefficient solutions, I will provide empirical evidence and ethical arguments which push back against Lomborg, maintaining that strong action against climate change is morally required.

The Science

Before diving into the ethical arguments surrounding climate change, it is important to present a basic overview on what the scientific consensus views as the biggest risks associated with climate change and how severe these impacts could be. It is one thing to say climate change

will be catastrophic for humanity; however, it is necessary to define exactly how climate change will affect present and future generations.

The Intergovernmental Panel on Climate Change (IPCC) is often regarded as the leading source of scientific reports surrounding climate change and is made up of more than 1,300 scientists from around the world. The IPCC's special report released in 2018 highlights the largest and most severe impacts of 1.5-2 degrees C of warming.[1] The report finds that this 1.5-degree limit will likely be surpassed anywhere from 2030 to 2052 if current emission levels continue. Preventing warming of 1.5 degrees would require carbon neutrality by 2050, a target that even the most ambitious countries will likely struggle to meet. To avoid 2 degrees of warming, emissions would need to be cut 25% by 2030 with carbon neutrality reached by 2075. While both are not impossible goals, neither seems realistic given current emissions and mitigation efforts. According to the Climate Action Tracker, current Paris pledges would result in 3 degrees C of warming if met, and only 7 countries, most of which are not major emitters, are on track to meet their goal.[2]

Although the report acknowledges that there may be some positive externalities for countries that normally experience extreme cold conditions, on the whole this is not a positive outlook for the planet. The most commonly associated effects of increasing the global temperature of the earth are an increase in extreme heat events, droughts, and irregular rainfall patterns and a rise in the intensity and frequency of extreme weather events.

Dealing with these main categories first, a study in Nature found that for every degree Celsius of warming the number of heat waves will increase by 4 to 34 days per season.[3]

[1] Intergovernmental Panel on Climate Change, *Global Warming of 1.5°C*, 2018, http://www.ipcc.ch/report/sr15/.
[2] "Home | Climate Action Tracker", https://climateactiontracker.org/.
[3] "Yes, Climate Change Is Making Heat Waves More Common," *Yale Climate Connections*, June 25, 2019, https://www.yaleclimateconnections.org/2019/06/heat-waves-and-climate-change-is-there-a-connection/.

Specifically, in the United States days above 105 degrees Fahrenheit will triple.[4] Some consequences of such extreme heat include increased wild fires, reduced crop yield, increased crime rates, higher risk of vector-borne diseases, and increases in heat related deaths. The increase in temperature will also affect precipitation and storm patterns, causing either heavy rain or extreme drought in specific regions. Finally, climate change will increase the frequency and intensity of hurricanes and other extreme weather events. One of these extreme weather events alone can cause billions in damage, and several of the past years have broken records for the most and worst extreme weather events.[5]

Another climate change phenomenon is sea level rise. The IPCC finds that 1.5 degrees of warming will cause approximately 0.26-0.77 m of mean sea level rise by 2100.[6] This range increases by 0.1 m with 2 degrees of warming, which would put an additional 10 million people at risk. Beyond this threshold, there is an additional risk that if warming is not curtailed sufficiently, irreversible melting in Antarctica and the Greenland ice sheet will result in sea level rise of several meters.[7]

Finally, the IPCC report highlights the increased risk of species and ecosystem loss at 2 degrees of warming compared to 1.5. The ocean ecosystem is particularly vulnerable due to ocean acidification, which threatens the survival of the whole food chain with no visable solution in sight. When the ocean absorbs CO2, the pH becomes more acidic, reducing carbonate ions which form the building blocks for sea shells and corals.[8] Ultimately, if ocean acidification is not

[4] *Ibid*
[5] "Extreme Weather and Climate Change | Center for Climate and Energy Solutions,"https://www.c2es.org/content/extreme-weather-and-climate-change/.
[6] Intergovernmental Panel on Climate Change, *Global Warming of 1.5°C*, 5.
[7] *Ibid*
[8] "Ocean Acidification | National Oceanic and Atmospheric Administration,", https://www.noaa.gov/education/resource-collections/ocean-coasts-education-resources/ocean-acidification.

reversed a large percentage of marine life at the bottom of the food chain will be wiped up, which then has the potential to move up throughout the food chain.

Overall, the IPCC report and the studies it cites give the best starting point for turning the scientific consensus into ethical duties and the obligation to act. The IPCC report is regarded as the most authoritative scientific stance on the current state of climate change, yet many prominent atmospheric scientists criticize these reports for being too conservative. One study in particular found that the language used by the IPCC overstated uncertainty, highlighting the double-edged sword of scientific rigor which can be abused when turning statistical confidence into biased policy recommendations, even when overwhelming scientific evidence proves otherwise.[9] Another book on this issue found that climate scientists tend to overwhelmingly dull down their report due to a fear of being an "alarmist" and have a tendency to stay towards the mean of climate science, although their data suggested that damages will be higher.[10]

The Controversy

The science in favor of climate change has never been more absolute or compelling. We must act *now* to avoid the most detrimental and catastrophic events. Yet, there are claims that a rational approach to climate change does not entail aggressive mitigation today. Many leading economists will agree that climate change is one of many threats to humanity, however, the mitigation tactics currently available are expensive, too expensive to justify the benefits. Furthermore, the worst harms of climate change will not come until much later. Simply put, under a cost-benefit analysis, the benefits of mitigating climate change, while significant, are not

[9] "Statistical Language Backs Conservatism in Climate-Change Assessments | BioScience | Oxford Academic, https://academic.oup.com/bioscience/article-abstract/69/3/209/5382637.
[10] Michael Oppenheimer et al., *Discerning Experts: The Practices of Scientific Assessment for Environmental Policy* (Chicago ; London: University of Chicago Press, 2019).

sufficient to justify the high costs of limiting warming today. Given a variety of social issues and our world's limited budget, many economists argue a rational approach seeks to maximize the social impact of each dollar. Thus, every dollar that is inefficiently spent on climate change has an opportunity cost, and what is given up is not insignificant.

This argument is most notably advocated by Lomborg who uses scientific reports and economic analysis to cut through emotionally charged rhetoric, seeking a rational and utility maximizing approach. First, Lomborg argues that the solutions we propose for climate change are highly ineffective. For example, Lomborg estimates that the pledges agreed upon at the Paris Climate Accord would cut global warming by just 0.17º C if met and cost the global economy approximately $730 billion a year for just the EU, Mexico, U.S. and China.[11] This is incredibly expensive and will do very little social good. Every dollar that is inefficiently spent trying to combat climate change could be better allocated to more deserving causes in society. Lomborg highlights several important social issues such as poverty reduction, education, malaria nets, and research to cure diseases among several others. In each of these categories, one dollar can do more social good, in many cases saving lives.[12]

This is not merely a hypothetical argument. Lomborg worked with several Nobel Laurates in Economics to answer the question, what is the best way to spend $75 billion.[13] The committee considered several opportunities and ranked communicable diseases such as HIV and malaria, malnutrition, and trade liberalization among the top categories. Notably, climate change was at the bottom of this list.

[11] Bjorn Lomborg, "What's The Price Tag Of Paris' Climate Summit? Don't Ask The Politicians," Forbes, https://www.forbes.com/sites/bjornlomborg/2015/12/07/whats-the-price-tag-of-paris-dont-ask-the-politicians/.
[12] Bjørn Lomborg, *How to Spend 75 Billion to Make the World a Better Place* (Washington, D.C.: Copenhagen Consensus Center, 2013).
[13] *ibid*

Thus, Lomborg argues as follows. First, the world should seek to invest in solutions which will actually produce results for less money. Some of these solutions include investing in R&D for technologies such as renewable energy, carbon sequestration, and geoengineering testing. When these solutions become cost-effective they should be deployed. In the meantime, actors should focus on adaptation, which many wealthy countries have had great success with during past changes in sea level rise and variable weather events. I agree with part of Lomborg's analysis and as I will discuss later, efficient and cost-effective solutions must be prioritized. Still, many technologies are far from development, such as carbon sequestration, or carry high risks, like solar radiation management. While some very wealthy countries, like the Netherlands, have adapted to changes in climate, these shifts were gradual and of a smaller scale.[14]

Using an economic lens, Lomborg argues that the efficient level of emissions is actually above the 1.5 or 2-degree threshold, since a global effort to meet these goals would fail a cost-benefit analysis. That is to say, Lomborg acknowledges the benefits of mitigating climate change in the long term, however, he argues it is too expensive to commence aggressive mitigation today and this does relatively little social good. Furthermore, since the cost of accomplishing this goal is likely in the order of trillions of dollars, this inefficient spending deprives other causes which can produce more social good today. Lomborg relies on IPCC reports and leading economists to derive this argument, yet there are several reasons to be skeptical of its conclusion.

Throughout this chapter I will chip away at Lomborg's thesis, providing evidence based and ethical arguments that will defend a global obligation to do more than Lomborg's recommendation. Although this obligation is vague, it pushes back against Lomborg's models

[14] Frans Klijn et al., "Assessment of the Netherlands' Flood Risk Management Policy Under Global Change," *AMBIO* 41, no. 2 (March 1, 2012): 180–92, https://doi.org/10.1007/s13280-011-0193-x.

and ethical framework, in favor of more urgent and impactful action to mitigate climate change today.

First, I will evaluate the scientific evidence used, and, more importantly, neglected by Lomborg's models, focusing specifically on positive feedback cycles and extreme tipping points. I will argue that undervaluing this scientific evidence, which informs the economic models, leads to an incomplete conclusion. I will also argue that the solutions Lomborg proposes, while important in the long-term, are insufficient in the short term to sufficiently guard against the risk of extreme warming, thus stronger action is required.

Next, I will argue against the economic models themselves. This section is informed by the scientific evidence mentioned before, however, also brings in an ethical component for discussing the morality of a discount rate and incomplete cost-benefit analysis. Putting aside scientific inaccuracies, there are still compelling reasons to reject these models, due to the strong influence of the discount rate, which I argue is flawed. I also argue these models are inherently subjective when putting a price on human life and the environment, and thus should not be interpreted as absolute guides.

Finally, I maintain a strong moral duty to mitigate climate change, even if it is not the most efficient allocation of resources. This duty is informed by a humanitarian argument which takes into account equity and holds that human caused harms are worse than allowing harm. I also argue that compensation for harm is not morally sufficient. Overall, this argument does not set a cap at a specific amount of warming or argue for a minimum global response. Instead, I simply argue that extreme warming is unacceptable and action must be taken now to ensure this does not take place.

Pushing Back Against Lomborg's Science

Given vast uncertainties in our planet's climate, it can be extremely difficult to predict how human activity can change the equilibrium and to what extent. As a result, leading reports from NASA and the IPCC tend to favor vague language when discussing future damages, as there is a large range of uncertainty.[15] Still, the scientific consensus has agreed upon several major risks, alluded to earlier, and although there is a wide range of damage, depending on the degree of warming, most studies tend to the middle ground. Even the IPCC admits these figures are more likely to be underestimates.[16] There is a legitimate concern, however, that Lomborg selects climate change studies which are overwhelmingly optimistic, or chooses the lower bound of studies, softening their conclusions. Although this argument does not apply for every application surrounding climate change, it is important to assess the validity of the data Lomborg uses to defend his thesis, as it often differs from the scientific consensus.

Sea level rise is one of the most commonly associated threats with climate change and Lomborg's treatment of this contentious issue reveals a flaw in his analysis. Approximately 40% of the world's population lives within 100 kilometers of the coast, and thus any significant increase in sea level has a high probability of putting their home and safety at risk.[17] Increasing the concentration of carbon in the atmosphere will cause sea levels to rise in two different ways. First, as Lomborg acknowledges, heating the temperature of the ocean melts land-based ice such as glaciers and ice sheets, which hold about 68.7% of all freshwater on the planet.[18] Secondly, and of greater consequence, thermal expansion occurs when oceans absorb around 90% of the

[15] "Statistical Language Backs Conservatism in Climate-Change Assessments | BioScience | Oxford Academic."
[16] Intergovernmental Panel on Climate Change, *Global Warming of 1.5°C*, 5.
[17] "Ocean-Fact-Sheet-Package.Pdf,", https://www.un.org/sustainabledevelopment/wp-content/uploads/2017/05/Ocean-fact-sheet-package.pdf.
[18] *Ibid*

atmospheres heat, causing water molecules to expand.[19] Together, these effects will continue to cause sea level rise at exponential rates. Yet, this conclusion, founded in numerous academic papers from the IPCC, National Ocean Service, and NASA, is not how Lomborg presents the issue.

Instead, he relies on one U.N. report from 2007 which finds that sea levels may rise by one foot over the next century.[20] However, Stefan Rahmstofr, lead author of the study Lomborg's claims rest on, has come out to publicly criticize Lomborg's treatment of this outdated report, arguing that the 12-20 inch range of sea level rise was a base scenario, not an upper range, that does not include many of the "uncertainties in climate-carbon cycle feedbacks, nor the full effects of changes in ice sheet flow," thus making this report not only incomplete, but obsolete.[21] Although Lomborg has acknowledged these caveats, he still presents the one foot of sea level rise as the official stance of the IPCC. The IPCC has since come out with numerous reports which find, with high confidence, that as global temperatures increase, the rate of sea level rise will also increase exponentially.[22] The lower bound in the report, based on a scenario of extreme mitigation is around 1 foot, however under more realistic scenarios, given the lack of global efforts to mitigate emissions and positive feedback loops, this number goes up to around 3 feet by the end of the century, and significantly higher in the future.[23] Another important caveat

[19] "NASA Sea Level Change Portal: Thermal Expansion," NASA Sea Level Change Portal, https://sealevel.nasa.gov/understanding-sea-level/global-sea-level/thermal-expansion.
[20] S. Rahmstorf et al., "Recent Climate Observations Compared to Projections," *Science* 316, no. 5825 (May 4, 2007): 709–709, https://doi.org/10.1126/science.1136843.
[21] Stefan Rahmstorf, "Stefan Rahmstorf: We Need to Face the Risk of Rapidly Rising Seas," *The Guardian*, March 3, 2009, sec. Environment, https://www.theguardian.com/environment/cif-green/2009/mar/03/sea-levels-rising.
[22] , https://www.ipcc.ch/srocc/.
[23] "Special Report on the Ocean and Cryosphere in a Changing Climate."

is that this is the global mean of sea level rise, meaning that many regions will face disproportionate impacts several times larger than the earth as a whole.[24]

These qualifications should be recognized, and many have accused Lomborg of cherry-picking or softening data to fit his thesis, with full books dedicated to debunking his sources and methods.[25] As Lomborg has updated his work, he has aligned his scientific evidence with the official IPCC reports, however, there is still a concern about underestimation and presenting conservative or optimistic estimates, which contain several caveats, as absolute fact.[26] This practice seeks to present absolute facts in a world of scientific uncertainty, and brings in value-judgements, such as risk aversion. This is not to say that the studies Lomborg cites are objectively better or worse than other reports, but rather to interject that all climate science must be balanced and interpreted with full context.

More important than which scientific studies Lomborg includes, is what he omits. The scope of Lomborg's consideration is limited to a world of 2 degrees. There are serious concerns that warming will surpass this 2-degree threshold. The IPCC warns of a positive non-linear relationship moving forward as warming increases exponentially. This is due to positive feedback loops and tipping points, both of which are incredibly important yet often overlooked aspects of climate change. Tipping points occur "when Earth's climate abruptly moves between relatively stable states" and are often seen as points of no return.[27] Climate feedback loops refer to "process that can either amplify or diminish the effects of climate forcings," however with

[24] Nazrul Islam and John Winkel, "Climate Change and Social Inequality," *UN Department of Economic & Social Affairs*, October 2017, https://www.un.org/esa/desa/papers/2017/wp152_2017.pdf.
[25] Howard Friel, *The Lomborg Deception: Setting the Record Straight about Global Warming* (New Haven: Yale University Press, 2010).

[27] "The Study of Earth as an Integrated System," Climate Change: Vital Signs of the Planet, 2019, https://climate.nasa.gov/nasa_science/science.

climate change these processes are predominately positive, meaning they will exacerbate warming.[28]

One example of both a negative and positive feedback is seen with clouds. As the earth warms, there will be more precipitation, which means more latent heat transfer, as the transformation of water vapor is a greenhouse gas. As this precipitation increases, there will be more clouds. These clouds increase the albedo effect, which reflects sunlight and cool the earth. However, high clouds also trap more heat, thus offsetting some of this cooling. Clouds are just one of several feedback loops identified by scientists at NASA. Researchers also pointed to a lack of tree growth, which removes approximately 50% of human CO2 from the atmosphere each year, shrinking ice, which also contributes to the albedo effect, and rapid release of frozen methane from the permafrost.[29] Methane is roughly 30 times more potent than CO2 as a greenhouse gas and these large reserves of methane and other powerful greenhouses gases have great potential to accelerate warming at unpredictable and dangerous rates. [30]

While estimating the damages of 2 degrees of warming are difficult, trying to put an estimate on the effects of these feedback loops is an even more challenging task. Some studies, using mid-range IPCC figures, estimate these feedback loops can increase warming anywhere from 15% up to 78%, and these numbers were self-reported as conservative estimates.[31] Likely, these loops will not be significant until later in the century, therefore a world of 4-6 degrees of warming becomes a much more realistic future, even if warming is limited to 2 degrees today. In Lomborg's writing, he makes little mention of positive feedback loops and tipping points

[28] *ibid*
[29] *ibid*
[30] OAR US EPA, "Overview of Greenhouse Gases," Overviews and Factsheets, US EPA, December 23, 2015, https://www.epa.gov/ghgemissions/overview-greenhouse-gases.
[31] "Positive Feedback between Global Warming and Atmospheric CO2 Concentration Inferred from Past Climate Change - Scheffer - 2006 - Geophysical Research Letters - Wiley Online Library,, https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2005GL025044.

associated with climate change. More notably, as I will address later, the economic models Lomborg uses as the foundation of his argument completely omit these feedback loops. This is a grave mistake which dramatically shifts the outcome of Lomborg's analysis, making it inconclusive.

The Solutions: No Easy Fix

Given Lomborg's perspective about the effects of climate change, he argues that the solutions for climate change should be scaled accordingly. One report found staying below the 2-degree threshold global mitigation would cost approximately $221-388 billion per year by 2030, with upfront investment costs in 2030 as high as $897 billion per year.[32] Nobel Prize winning Economist William Nordhaus estimated that limiting warming to 2.5 degrees would cost $134.6 trillion.[33] In comparison, Lomborg's own "solution" would cost $100 billion per year for research and development, $1 billion on climate engineering, and $50 billion on adaptation efforts all from a modest carbon tax.[34] This sounds highly appealing, and would remove many of the larger ethical obligations to reduce emissions.[35] If complete solutions to climate change were relatively cheap, the urgency and necessity to go carbon neutral is dramatically reduced, especially for small actors. In this section I will argue there are no easy fixes to climate change and the illusion that we can pay a small fee while avoiding behavioral change is a moral hazard.

[32] "Pathways to a Low-Carbon Economy: Version 2 of the Global Greenhouse Gas Abatement Cost Curve | McKinsey,", https://www.mckinsey.com/business-functions/sustainability/our-insights/pathways-to-a-low-carbon-economy.
[33] "A Nobel Prize for the Creator of an Economic Model That Underestimates the Risks of Climate Change," *Grantham Research Institute on Climate Change and the Environment*, http://www.lse.ac.uk/GranthamInstitute/news/a-nobel-prize-for-the-creator-of-an-economic-model-that-underestimates-the-risks-of-climate-change/.
[34] Bjørn Lomborg, *Cool It: The Skeptical Environmentalist's Guide to Global Warming*, 1st Vintage Books ed (New York: Vintage Books, 2008).
[35] Ironically, while deep carbon reductions are expensive, Lomborg admits in his book, *The Skeptical Environmentalist",* that there is "no way" the costs, predicted to be about 2% of GNP, would "send us to the poorhouse", thus any illusion of climate change mitigation dramatically halting economic progress is misguided.

While I support Lomborg's argument to prioritize cost-effective solutions, this does not mean that deeper change, while more expensive, does not pass a cost-benefit analysis.

While technological innovation has enabled renewable energy to become the cheapest form of electricity, this took several decades, and only covers one sector of global greenhouse emissions.[36] Electricity and heat production make up approximately 31% of such emissions, however the global transition to clean energy will still take decades.[37] Other major sectors such as industry, transportation, buildings, concrete, agriculture, forestry, and land use do not have the same carbon free substitutes as the energy industry. Given that the clean energy transformation will take decades, and other industries still have no alternatives in sight, Lomborg's vision of research and development is overly optimistic for cheap alternatives on a reasonable time horizon. With the short time scale calculated by IPCC to remain below 1.5 degrees of warming, and subsequently prevent further warming through positive feedback loops, it is highly unlikely new clean innovations to replace pollutant heavy industries can play a major role in immediate efforts.

In response, Lomborg points to geoengineering as another option to buy more time and allow green alternatives to become economically competitive. Geoengineering comes in several different forms, including emitting sulfur particles in the atmosphere to block sunlight, marine cloud brightening, and large reflectors in space. While compelling, none of these technologies have undergone sufficient testing to declare safe, and none are guaranteed to work, and may even produce outcomes worse than business as usual with climate change.[38] Although continued

[36] "Levelized Cost of Energy and Levelized Cost of Storage 2019," Lazard.com, http://www.lazard.com/perspective/levelized-cost-of-energy-and-levelized-cost-of-storage-2019/.
[37] "Sources of Greenhouse Gas Emissions | Greenhouse Gas (GHG) Emissions | US EPA," https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions.
[38] Alan Robock et al., "Benefits, Risks, and Costs of Stratospheric Geoengineering," *Geophysical Research Letters* 36, no. 19 (2009), https://doi.org/10.1029/2009GL039209.

funding of such efforts may eventually yield a different conclusion, the IPCC does not consider any solar radiation modification measures currently feasible to reach the 1.5-degree target, saying "SRM face large uncertainties and knowledge gaps as well as substantial risks, institutional and social constraints to deployment related to governance, ethics, and impacts on sustainable development." The report went on to point out such efforts will not reduce ocean acidification.[39] While testing geoengineering is a rational approach, even proponents of geoengineering see it as a fallback option to stop tipping points and feedback loops, not a replacement for mitigation today. Lomborg may be correct to criticize the Paris Agreement and other international efforts to mitigate climate change through voluntary pledges and inefficient solutions, however his plan is also incomplete. Real solutions will require moral urgency and sacrifice. Proposing cheap Band-Aid fixes give the impression of a moral high ground, while emissions continue to rise and the climate crisis worsens for future generations.

Economic Models

Given Lomborg's analysis of the high costs to successfully mitigate climate change and relatively minimal benefits, Lomborg's economic models conclude that aggressive mitigation of climate change does not pass a cost-benefit analysis. This claim builds off the work of Professor William Nordhaus who won the Noble Prize in Economics for his analysis of climate change using a macroeconomic lens. One of Nordhaus's key findings was that a gradual and modest carbon tax, starting at around $27 per ton back in 2005, would be sufficient to limit global warming so that the costs of mitigating do not exceed the potential impact. Lomborg has run

[39] Intergovernmental Panel on Climate Change, *Global Warming of 1.5°C*.

with this idea, using Nordhaus's findings to argue that abating climate change will leave us "50 trillion worse off."[40][41]

Although Nordhaus's position still calls for action to prevent the worst effects of climate change, there are strong reasons to remain skeptical that his moderate tax is too low, and more aggressive initiatives will be needed. There are three main flaws with the economics models used by Nordhaus and Lomborg, aside from additional ethical concerns I will later address. First Nordhaus and Lomborg omit strong scientific evidence regarding extreme scenarios I referenced earlier and as a result their studies are highly disputed among scientific and economic experts. Furthermore, the economic models themselves are inherently flawed by trying to both a price on human life and the environment and subsequently using this cost-benefit analysis as a definitive guide on how to best approach climate change policy. Finally, I will examine the discount rate used and discuss practical and moral flaws with too high a rate.

Lack of Extreme Warming Events and Inherent Flaws with Economic Models

The first problem with Nordhaus and Lomborg's analysis is how they quantify the damage based on the leading science. Nordhaus's model fails to account for extreme warming events, positive feedback loops, and tipping points. I argue that putting a monetary value on climate change damages, especially effects such as war or migrants, is likely to be an underestimate and brings up contentious ethical issues. Thus, Nordhaus's model is incomplete

[40] Bjørn Lomborg, "Truth Is the First Casualty of Global Warming | by Bjørn Lomborg," Project Syndicate, December 18, 2018, https://www.project-syndicate.org/commentary/climate-change-self-defeating-alarmism-by-bjorn-lomborg-2018-12.

[41] Nordhaus himself has come out against such claims, arguing that the science behind climate change is resounding, and has shifted dramatically since his original economic analysis in 1992. To set the record straight, in an op-ed titled "Why the Global Warming Skeptics Are Wrong" Nordhaus pushes back against the work of climate skeptics who favor postponing action. Nordhaus argued the science has increased in urgency that action now will have much greater implications for future generations, and that carefully guided mitigation efforts are not more harmful than inaction, especially given inherent flaws in the models surrounding uncertainty and extreme warming.

and the flaws of economic models in general reveal that economic models, while helpful, are not perfect for guiding decision making.

The IPCC report on 1.5 degrees of warming shies away from officially turning its findings into monetary values, further evidence of a commitment to conservative, yet accurate reports. There is strong evidence, however, that Nordhaus's damage functions do not align with the conclusions of this leading report, specifically regarding the risks catastrophic events. Using an expected rise in average income and a relatively high discount rate, Nordhaus concluded that climate change will only cost the world 2-4% of global GDP by the end of the century.[42] This number is by itself contentious among scientists and political leaders due to disproportionate impacts, nevertheless the larger concern is that the model does not include the risk that warming will exponentially increase, even if human behavior dramatically shifts. In contrast, Sir Nicholas Stern, former Chief Economist of the World Bank, found that inaction would result in an annual loss of 5% of GDP, but that more extreme scenarios could jump as high as 20%.[43] He later corrected his stance, claiming that his model likely underestimated these extreme risks by at least 50% or more.

Nordhaus admits that "our economic models have great difficulties incorporating these major geophysical changes and their impacts in a reliable manner," yet his model is still presented by Lomborg as a complete guide, used to reject claims of runaway warming.[44] One scientific paper used Nordhaus's DICE model to show that 19º C of warming would only reduce

[42] "Integrated Assessment Models of Climate Change,", https://www.nber.org/reporter/2017number3/nordhaus.html.
[43] N. H. Stern, ed., *The Economics of Climate Change: The Stern Review* (Cambridge, UK ; New York: Cambridge University Press, 2007).
[44] William D. Nordhaus, "Why the Global Warming Skeptics Are Wrong," March 22, 2012, https://www.nybooks.com/articles/2012/03/22/why-global-warming-skeptics-are-wrong/.

global GDP by 50 percent which highlights this disconnect.[45] To Nordhaus's credit, many scientists and economists avoid putting an explicit number on damage functions given unknown variables out of fear of being wrong, and thus omit such possibilities completely. A paper on the philosophy of modeling unknown risks confirms that top academics avoid validating assertion out of fear of "making it up."[46] Thus few economic models include these risks which are difficult to quantify, and those that do are prone to underestimate how these effects interact.[47]

These judgmental adjustments are presented by Lomborg as sound predictions, yet, do not have solid backing and directly conflict with the scientific data. A recent study in Nature found that there is a 93% chance that warming surpasses 4 degrees by the end of the century, and that if it does so, damages for the global economy will be $23 trillion per year, a much larger percentage of GDP than Nordhaus estimates.[48] This difference is significant, and although Nordhaus attempts to include "worse case scenarios," his undervaluation results in an incomplete analysis of climate change. Instead, Lomborg paints an optimistic view of these studies, highlighting lower bounds of damage as realistic projections and claiming in the future we will be better suited to adapt to these changes. Lomborg may be correct, but is this a possibility worth gambling? Stephen Gardner argues that present generations would be acting recklessly if they only took into account best-case scenarios and ignored severe projections, even if the former

[45] Frank Ackerman, Elizabeth A. Stanton, and Ramón Bueno, "Fat Tails, Exponents, Extreme Uncertainty: Simulating Catastrophe in DICE," *Ecological Economics* 69, no. 8 (June 15, 2010): 1657–65, https://doi.org/10.1016/j.ecolecon.2010.03.013.
[46] "PhilIssuesModelAssessOreskes.Pdf," , http://history.ucsd.edu/_files/faculty/oreskes-naomi/PhilIssuesModelAssessOreskes.pdf.
[47] "The Missing Economic Risks in Assessments of Climate Change Impacts," *Grantham Research Institute on Climate Change and the Environment* (blog), accessed December 3, 2019, http://www.lse.ac.uk/GranthamInstitute/publication/the-missing-economic-risks-in-assessments-of-climate-change-impacts/.
[48] Patrick T. Brown and Ken Caldeira, "Greater Future Global Warming Inferred from Earth's Recent Energy Budget," *Nature* 552, no. 7683 (December 2017): 45–50, https://doi.org/10.1038/nature24672.

comes true.[49] Using an analogy of retirement savings, one would not regret these savings if they suddenly win the lottery. Given statistical probabilities, it was the prudential thing to do.

Furthermore, understanding how these damages are felt is more complicated. In addition to positive feedback loops in the climate, corresponding effects of climate change can cascade. For instance, drought and extreme weather events limit food production, which in turn make populations more vulnerable to disease and high heat. High heat and food scarcity can lead to a decrease in productivity hurting the economy, and potentially starting a refugee crisis or armed conflict, which further limits countries from managing climate damage.[50] Given the high risk of extreme warming and the potential for this warming to snowball into catastrophic events, the cost of unabated climate change are much higher than Nordhaus or Lomborg present.

Moral Reasons to be Skeptical of Cost-Benefit Analysis

However, there is a deeper concern aside from pulling levers on models, changing the discount rate, or debating the cost of solutions. There are important flaws inherent to the cost-benefit framework that Lomborg applies. Putting a monetary price on human lives or the environment is often incomplete, and can underestimate these revered aspects of life. In the face of uncertainty regarding ocean acidification, biodiversity loss, sea level rise, and long term warming, Nordhaus simply added 25% of monetized damages to reflect these non-monetized impacts, in what he admitted to be a "judgmental adjustment."[51] Such subjectivity has a high potential for empirical failure, yet a moral assessment reveals further flaws.

[49] Stephen Mark Gardiner, *A Perfect Moral Storm: The Ethical Tragedy of Climate Change*, Environmental Ethics and Science Policy Series (New York: Oxford University Press, 2011).
[50] Naomi Oreskes and Nicholas Stern, "Opinion | Climate Change Will Cost Us Even More Than We Think," *The New York Times*, October 23, 2019, sec. Opinion, https://www.nytimes.com/2019/10/23/opinion/climate-change-costs.html.
[51] "A Nobel Prize for the Creator of an Economic Model That Underestimates the Risks of Climate Change."

Various countries have set different values on one human life, ranging around 6 to 9 million.[52] Many companies and policy makers use this number to inform decisions in their cost-benefit analysis. Ford infamously valued a human life at around $200,000 and this resulted in their decision to not improve gas tank integrity which ultimately resulted in easily preventable deaths.[53] Although some value is needed since the environment or a human life cannot be worth infinite utility, the results that can come from an undervaluation are morally troubling.

This ethical framework can be applied to the cost-benefit analysis (CBA) of climate change in several ways. First, Lomborg places a value on everything from species diversity to maintaining ecosystems and preserving national parks. The subjective value for these goods will differ for each person. Furthermore, the effects of climate change are felt disproportionately across the globe. The average citizen in America is unlikely to feel the effects of climate change the same as a vulnerable population in a developing country. It is extremely difficult for CBA to calculate the effects of climate change on poor farmers in third world countries, when small ripple effects can have devastating consequences for their livelihood.

Additionally, there is strong evidence that the effects of climate change will lead to scarcity of resources in areas already vulnerable to refugee crisis and war, exacerbating these global problems. Calculating potential refugees is vulnerable to many of the same flaws of all climate change predictions, and the IPCC statistic of 200 million climate migrants by 2050 is offered as a conservative average, between upper and lower bounds of 25 million to 1 billion.[54] The IPCC also acknowledges that climate change has a high probability of "threatening human

[52] "Value of Life," in *Wikipedia*, October 13, 2019, https://en.wikipedia.org/w/index.php?title=Value_of_life&oldid=921057121.
[53] "THE FORD PINTO CASE:," https://users.wfu.edu/palmitar/Law&Valuation/Papers/1999/Leggett-pinto.html.
[54] Etienne Piguet, Antoine Pécoud, and P. F. A. de Guchteneire, eds., *Migration and Climate Change* (Paris : Cambridge, UK ; New York: UNESCO Pub. ; Cambridge University Press, 2011).

security through undermining livelihoods, compromising culture and identity, increasing migration that people would rather have avoided, and challenging the ability of states to provide the conditions necessary for human security."[55] The UN went on to call climate change a "threat multiplier" that can disrupt world peace in both concrete and less tangible ways.[56]

These are two of numerous examples where assigning a monetary value to the effects of climate change is difficult, if not impossible to capture in an economic analysis. A price on a refugee crisis, war, or crop failure in an agrarian society may be roughly estimated, but that does not speak to its accuracy or morality. Philosopher John Broome pushes back against the application of CBA and expected-utility in such cases due to this high degree of uncertainty.[57] While he normally supports both tools, he argues that climate change poses a moral disaster for future generations and the variance in long-term estimates renders these economic methods of evaluation useless. To illustrate this, he points to examples where the future has changed in ways that are "utterly unpredictable" to past generations.

Is Broome right, is there absolutely no room for CBA in predicting climate change damages? I think such an extreme approach is misguided. Even though CBA may be fundamentally flawed for long-term estimates, it can be a powerful motivator for action when done transparently and with ethical considerations. Lomborg points out that lines must be drawn, however, without debate about these lines, the results of CBA can lead to contentious speculation. Scientists and economists should continue to work together to inform relevant actors

[55] Adger,W.N., J.M. Pulhin, J. Barnett, G.D. Dabelko, G.K. Hovelsrud, M. Levy, Ú. Oswald Spring, and C.H. Vogel, "Human Security," *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* Cambridge University Press (n.d.).
[56] "Climate Change Recognized as 'Threat Multiplier', UN Security Council Debates Its Impact on Peace," UN News, January 25, 2019, https://news.un.org/en/story/2019/01/1031322.
[57] John Broome, "Counting the Cost of Global Warming," *Environmental Values* 1, no. 4 (1992): 363–364.

on best estimates for damages while working to educate the public on how to best contextualize these results as inherently imperfect guidelines for steering policy.

Discount Rate

While the underlying science in Nordhaus's model may be flawed and monetary damages are likely underestimated, the discount rate used has the greatest impact on his model. As a result of this weight, setting a social discount rate in economic analysis is highly controversial. A discount rate roughly accounts for two factors, first that societies in the future will be better off, thus a dollar today is worth more than in the future, and secondly what economists call our "revealed time preference" or our impatience. If given the choice between $100 in a few years or $50 today, there are a variety of factors that would impact this decision, such as immediate need and potential ROI. However, when deciding whether we should invest billions of dollars into climate change mitigation, which will mainly support future generations, or use the money to fight food insecurity, cancer, or insect-borne diseases today, such debates grow more difficult.[58] To give an illustration of how extreme the implications of a discount rate can be, economist Graciela Chichilnisky calculated that with a discount rate of 5%, the present value of the entire earth's aggregate output would be a few hundred thousand dollars in 200 years.[59] Chichilnisky went on to find that given this evaluation, we would be willing to pay "no more than one is willing to invest in an apartment" to prevent the destruction of the earth.

[58] Although most mitigation efforts are concerned with minimizing the risk of the worst effects of climate change, there are significant effects that will be felt today, specifically regarding extreme weather events. Such impacts must not be ignored when debating where to set the discount rate.
[59] Graciela Chichilnisky, "An Axiomatic Approach to Sustainable Development," *Social Choice and Welfare* 13, no. 2 (April 1996): 231–57, https://doi.org/10.1007/BF00183353.

There are no easy answers when deciding what is owed to the future while weighing harms to present generations, especially given the high degree of unknown risk. Proponents of no discount rate, such as F.P. Ramsey, take a full utilitarian approach, arguing that the outcome of any decision should be weighed based on its total utility to all persons, regardless of whether they are currently living or in the future. Ramsey argues that total utility is most important, and recipients are merely "vessels."[60] Under this view, all generations deserve equal moral weight since valuing one individual over another would be fundamentally wrong.

Practically, such a low discount rate, given the potential for infinite generations would require sacrifice on an unreasonable scale, in many ways paralyzing the present generation. Furthermore, given vast uncertainty about the needs of future generations it would be impossible to try and account for such preferences. In addition to practical considerations of protecting against such extreme ripple effects, I believe there are compelling ethical reasons to allow some discounting of the future while still staying in line with common sense morality.

This expands on philosopher David Hume's idea of human morality based on our behavior and interactions with others. This agent-relative relationship reflects the values that allow us to build and develop human connections. Consider an elder woman drafting a will. She might give a large portion to her children and other immediate relatives, and maybe a smaller portion to her grandchildren, and possibly, for the sake of argument, a small amount to start a college fund for her great grandchildren, but it would be out of the ordinary and unexpected for her to think any further down her lineage. Furthermore, someone who was her great-great grandchild would not, by any normal account, be justified in arguing they have been wronged out of their share of inheritance if they receive nothing.

[60] Wilfred Beckerman and Cameron Hepburn, "Ethics of the Discount Rate in the Stern Review on the Economics of Climate Change" 8, no. 1 (2007): 25.

This is because one way we build and maintain relationships is through exclusivity. One of the highest expressions of affection is putting one individual or group over the needs or desires of others. We do this with relatives, friends, members of the same religious group, and neighbors. Thus, the preference for reciprocal altruism between individuals may be essential for forming relationships and bonds, something to weigh over the utilitarian calculus of maximizing overall utility. Furthermore, it would be unreasonable to demand the individual must sacrifice all present well-being and desires for future generations. Requiring this not only harms relationships, but individual value and meaning.

Of course, this view is not perfect either. There is a legitimate concern that weighing preferences over utility can lead to exploitation, harming minority and underrepresented groups, in this case future generations who have no voice at the table when it comes to these debates. In defending a lower discount rate in his economic model of climate change, Sir Nicholas Stern argues that with pure time discounting of a mere 2%, one would be giving half the weight of someone born today as opposed to someone born 35 years ago.[61]

To illustrate Stern's point, imagine one builds a bomb. It seems irrelevant whether that bomb goes off today, in 35 years, or in 500 years, as long as this bomb presents a potential threat to harm others, it should be prosecuted today as such a harm. A high discount rate greatly discredits the harm we cause today which will drastically affect future generations. Stern argues there is no moral justification for this. Although he acknowledges that in our own lives it may be morally permissible to want a dollar today versus a dollar in an unknown future, Stern rejects a high social discount rate, favoring only a modest one that takes into account increases in global income.

[61] David Biello, "Clash: Sir Nicholas Stern," Scientific American, https://www.scientificamerican.com/article/clash-sir-nicholas-stern/.

In respect to climate change, a relatively small change in discount rate can completely change the results. Famously, the Stern review favored aggressive mitigation of climate change while using a discount rate of 1.6% as compared to Nordhaus's discount rate of 5.5% or Lomborg's range of 4-6%.[62] Putting monetary values on this debate, helps make the argument more concrete. Using Nordhaus's discount rate, 5 trillion in damages in 100 years would only be worth $72 billion today.[63]

There is no perfect discount rate, but discount rates, such as the one used by Nordhaus are stripped of moral considerations and justified by a descriptive approach, which only considers revealed preferences. This ignores ethical judgement regarding the treatment of future generations. While a discount rate of zero would be too limiting, adding moral considerations regarding future generations, especially given a high risk, would dramatically alter the moral urgency to act today.

Thus, I propose a moral balance to weigh both present relationships and long-term utilitarian ethics, without paralyzing society today. For positive duties to help others, it would be unreasonable to hold that individuals must give *great* weight to countless iterations of future generations. Aside from the impossibility of knowing what the future needs, it is not immoral to prioritize immediate relationships, such as buying gifts or traveling to spend time with family. However, this argument does not apply to negative duties to refrain from harming others. Just as I highlighted with the bomb example, the timeline of harm is irrelevant to the moral validity of the act. A bomb has many similarities to the devastating effects of climate change. Both acts have a high certainty of inflicting harm and the harm is unequivocally detrimental to future

62 "The Ethics of Climate Change," *SCIENTIFIC AMERICAN*, 2008, 6.
63 "Discount Rates: A Boring Thing You Should Know about (with Otters!)," *Grist* (blog), September 24, 2012, https://grist.org/article/discount-rates-a-boring-thing-you-should-know-about-with-otters/.

interests. These two factors separate climate change from other considerations, avoiding the "paralyzed objection" while imposing a strict negative duty to avoid severe harms, regardless of the time horizon.

There is no precise number that satisfies these conflicting desires, but the lack of ethical consideration in the discount rate used by Nordhaus and Lomborg reveals an unwarranted omission in their methods. Thus, the economic models they run are inherently flawed and should not be considered precise tools for guiding our decision making.

Ethics of Average Utilitarianism

There will continue to be disagreement on how to turn scientific predictions into economic models, but the final piece to Lomborg's argument is that funds have an opportunity cost. In this section I will argue against Lomborg's average utilitarian ethical framework in favor of a humanitarian approach that seeks to limit harm, especially to the most vulnerable. I also argue that failing to take significant action against anthropogenic climate change is morally worse than allowing other harms, where human activity is less culpable. Finally, I hold that due to this negative duty, compensation for the harms of climate change is not morally defensible, and full mitigation and adaptation is required.

Lomborg uses an average utilitarian ethical framework, which, per its name, seeks to maximize the average utility. Lomborg persuasively argues that there is an efficient level of climate change, which takes into account expected harm and, most importantly, how much it would cost to mitigate or adapt. Given a limited budget for social causes and pressing issues like malaria, poverty, or low education rates, one dollar spent on any of these issues is likely to do

more social good in the present. However, there are compelling reasons why doing the most social good may not be the correct moral viewpoint.

First, using an average utilitarian approach, would favor an outcome where a group of 10 individuals with $10 each is better than 100 with $9. More importantly, such a framework would allow society to harm certain individuals as long as it increases the average utility. A community could torture one individual or take someone's organs without their consent as long as average utility goes up from those who take pleasure in watching or receive those organs. This fails to draw a line on unacceptable behaviors, regardless of potential payoffs.

This strikes many of us as fundamentally wrong, and the application to climate change is no different. As Lomborg points out, the world only spends a limited amount of resources to various social causes thus he argues this money should go to where it can help the most people. There are likely hundreds of billions of dollars inefficiently spent each year under Lomborg's view. It can be idealistic to say we should simply give more, however scarcity will always be relevant, and tradeoffs must be made. Lomborg may be correct, the $100 billion pledged by the Paris Accord for climate change could be allocated towards causes that may improve average utility, however I argue this is a false equivocation, money spent alleviating climate change also benefits poverty and health concerns, and this approach ignores responsibility for acts and the role of uncertainty.

Underlying this argument is a conception of human rights. There is a certain threshold that no individual should have to sink below. The Universal Declaration of Human Rights declares "all human beings are born free and equal in dignity and rights." Therefore, it is morally unacceptable to push some individual below this designated "line" in order to raise cumulative utility. Applying this to climate change, philosophers like Simon Caney argue that the effects of

climate change will deprive individuals of human rights in several ways.[64] Climate change will violate the right to life by death from extreme storms or heat waves. It will violate human health by increasing risks of disease. It will violate the right to substance by destroying one's home or source of food. These rights to life, health, and the ability to provide for oneself are not fundamentally controversial. As Caney argues, there are other rights that deserve merit, such as the right to not be forced out of one's home, however these rights are less absolute relative to other concerns. This also does not take into account damage to biodiversity and the environment.

Lomborg may contest that many of the social issues he is concerned with also involve human rights violations, however this connection may be more dubious. There is a notable moral difference between allowing suffering in the world and directly causing that suffering. When looking closely at the language used to define human rights, the clause "*other people* do not deprive them" is present.[65] This is morally relevant when looking at the causes Lomborg advocates allocating money towards.

When a deadly hurricane or flood hits a third world country, there is always an immediate global push to provide humanitarian aid, and many feel it is their duty to do so. Just as one would not walk by a drowning child without helping, many feel guilt sitting idly by knowing that others are facing extreme harm, regardless of whether or not they or anyone played a role in causing this harm. However, the nature of the obligation changes when one did play a role in causing a specific harm. If someone engages in actions which greatly increase the risk of such a harm, they have a corresponding duty to stop committing that harm and to alleviate the effect of this harm on any recipients. This positive duty obligates them to a higher standard to save the person *they*

[64] Simon Caney, "Climate Change, Human Rights and Moral Thresholds," in *Human Rights and Climate Change*, ed. Stephen Humphreys (Cambridge University Press, 2010), 69–90.
[65] *Ibid*

harmed over the negative duty to help the individual who is harmed as a result of bad luck or unfortunate circumstance. While education, healthcare, and poverty reduction are important aims, there are different duties when remediating these harms versus climate related harms that human action has and continues to directly contribute towards.

A simple response from Lomborg would be to argue that many of the harms in the world he is concerned with fixing are, in fact, human caused. Poverty, lack of education, trade barriers and global hunger cannot be directly compared to unmotivated natural disasters. While disease is not human caused, human activity can worsen certain diseases. Still, the harms that Lomborg ranks high on his list of efficient social spending are mainly natural phenomenon or only maintain a weak linkage to human behavior. This cannot be fairly compared to the extent of human blame for climate change. Furthermore, there is a false equivocation that the world cannot afford to balance both priorities. Even Lomborg admits society is rich enough to solve a combination of these challenges, and climate change may direct global attention towards these issues in new ways, as past efforts have continuously failed to motivate action.[66] Money spent on climate change can also help alleviate poverty, disease, and inequality, providing a spillover effect into almost all of the categories Lomborg identifies in his development goals.

Additionally, facing Lomborg on his terms, there is little reason to believe getting the most marginal good out of each dollar should be limited to just today. As I mentioned earlier, the ethical justification for a high discount rate rests on shaky moral principles, and the threat of climate change has the potential to severely exacerbate the harms Lomborg is concerned with along with detrimental new harms associated with extreme warming.

[66] Bjørn Lomborg, *The Skeptical Environmentalist: Measuring the Real State of the World* (Cambridge ; New York: Cambridge University Press, 2001).

Finally, Lomborg is comparing known harms to uncertain risks. Nordhaus himself compares failure to act on climate change to spinning a roulette wheel, with red spaces being relatively moderate scenarios, black spaces confirming the fears of the IPCC report, and the green 0 and 00 spots representing a worst case scenario of runaway warming.[67] Lomborg sees the wheel as mostly filled with red spaces, however, throughout this chapter I have argued that an overwhelming majority of scientists disagree with this assessment. As time goes on, the number of black and green spots will increase, and each "spin" will result in a higher probability of the ball landing on one of these spots, resulting in unacceptable global damage. A malaria net, medication, or micronutrients will save a set number of lives, but facing uncertainty does not mean funding for climate change is always sacrificing more lives, especially when the future of the entire planet is gambled.

There is no objective moral stance on how to judge acceptable levels of risk and potential damage functions, thus Lomborg's data-backed proposition is appealing. If, however, Lomborg underestimates this risk, as leading climate scientists argue he does, then in hindsight his proposal will be seen as counterintuitive towards his ultimate goal of doing the most good per dollar.[68] I argue then, that efficient spending on climate change today should be balanced, if not prioritized, over other social causes.

Reparations

Finally, any proposal for reparations is an incomplete anecdote to the extent and type of harm faced by billions of the most vulnerable. This builds off my argument on taking

[67] William D. Nordhaus, *The Climate Casino: Risk, Uncertainty, and Economics for a Warming World* (New Haven: Yale University Press, 2013).
[68] "A Nobel Prize for the Creator of an Economic Model That Underestimates the Risks of Climate Change."

responsibility for the negative consequences of one's actions. Reparations extend to Lomborg's argument that future generations will be richer, therefore the effects of climate change will be less severe, informing his prioritization of modern issues. Aside from concerns about procedural fairness in discerning who deserves reparations, there is a deeper moral dilemma. Paying someone for a harm they have incurred is not morally analogous as demonstrated by the following thought experiments. Imagine if someone punched you in the face, without your permission, then simply compensated you what they think is a fair rate for the harm you have incurred. This does not mean they are no longer morally culpable since they violated your autonomy. In fact, many would see the compensation offered as offensive on top of the harm.

This moral principle applies to climate change in several ways. First, as I will argue later, solutions to climate change must actually reverse the harm being caused, as opposed to simply paying those affected. Additionally, it shows that economically efficient outcomes, such as Lomborg's proposal for adaptation and geoengineering, are not sufficient alone. Finally, environmental philosophers, such as Cass Sunstein, who argue that money should simply be redistributed to the poor from the rich are misguided.[69] This approach would not only stop treating countries as moral agents; it would also not hold those who have not contributed to climate change accountable. As I will argue in the subsequent chapter, culpability expands beyond those whose actions can directly be perceived, and remediation must go above monetary compensation.

[69] Cass Sunstein and Eric Posner, "Climate Change Justice," *Law & Economics Working Papers*, August 1, 2007, https://chicagounbound.uchicago.edu/law_and_economics/107.

Conclusion

The threat of climate change is real and the harms are significant. Due to the human caused nature of these harms, there is a special obligation to stop contributing towards climate change and to actively mitigate or help others adapt to the worst effects. This obligation pertains to warming on every scale, although the nature of the obligation correlates with shifting scientific evidence and growing risk of extreme tipping points. Aggressive mitigation to limit warming to 2 degrees today may cost more than the benefits it provides to society. However, a prudential limit on warming may also be the only way to stop runaway warming, where damages are unknown and likely to be catastrophic. Although this duty must be balanced with more imminent threats to human health and well-being, climate change deserves more capital and global attention than Lomborg allocates. I will further explore how such a duty can be carefully balanced for individuals and small actors in the next chapter, without being too restraining.

A new global strategy is required, and this will incorporate elements of Lomborg's plan, however, these solutions are incomplete. As I will argue in subsequent chapters, understanding how to allocate the duty to combat climate change and which strategies to pursue will clarify the moral obligation and provide a roadmap on how to best proceed. Specifically, I will investigate which actors have a duty to reduce carbon emissions or go carbon neutral, looking at universities as specially motivated actors. While the goal of carbon neutrality may be insufficient given the inertia of warming that has already occurred, it is likely the full extent of what such actors may achieve today. This next chapter will outline why universities have a positive duty to raise awareness of moral catastrophes, like climate change, and a negative duty to not increase the risk of harm.

Chapter Two

I have argued that a duty to mitigate climate change exists, yet the next natural question is who has this obligation and to what extent. Although there are particular actors who have a magnified role in contributing to climate change, in some capacity nearly everyone has played a role in emitting greenhouse gases into the atmosphere. As such, this collective action problem has disproportionate responsibility, yet it is too large and complex to fixate merely on just the top emitters. As I will argue, given the urgency of this problem, even small changes can be of moral relevance.

In this chapter I will argue about the role of small actors, specifically universities, and the special obligations they have informed by the urgency to act, which I have subsequently argued for in the previous chapter. First, I argue that universities have a general positive duty to do good, and thus, are not exempt from their role responsibility to take action to mitigate climate change. This positive duty, however, is further influenced by the historical role of universities in social injustices. I will argue that universities are specially situated to do good and influence others. Furthermore, while universities exist primarily to promote truth-seeking and knowledge, failure to act accordingly in urgent cases, such as climate change, threatens a university's credibility. This hypocrisy, may also erode public trust. Universities must be concerned with educating citizens, not just specialized workers, and to this end must set an example and provide integrative opportunities.

In addition to this positive duty, universities also have a negative duty to not cause harm through their emissions. In this section, I will argue that even small emissions can be morally relevant due to the expected utility of minor acts and moral risk. These arguments are motivated by the scientific gravity of the situation, as outlined in the previous chapter. As a result,

universities have a pro-tanto duty to take action on climate change or any other extreme social injustices.

Ultimately, this chapter will answer questions about general responsibility for small actors, and the specific responsibility of universities as uniquely positioned actors to spur greater progress. While I recognize the contributions and power of large actors in the greater picture, little has been written about why universities ought to take action on climate change. Understanding moral and practical reasons for action provides greater incentive to act and can motivate how universities achieve their carbon reductions.

Large Actors

Looking at top emitters provides an introductory frame of reference for where to start, yet is an incomplete picture. Much has been written about the responsibility of developed countries such as the United States, China, India, and Russia which together account for approximately 57% of global emissions.[70] Other literature focuses on major corporations such as Saudi Aramco, Chevron, and ExxonMobil which are among the top 20 companies responsible for 35% of emissions since 1965.[71]

On a macro-level this focus makes sense. Similar to carbon neutrality measures themselves, going for the largest areas of improvement promises the fastest route to meaningful results. Furthermore, these top countries and companies are locked in a global prisoner's dilemma. If all major actors agreed to meet the goals set out by the IPCC, then climate change might be a controlled speed bump, rather than a brick wall. Conversely, if each major actor

[70] "Each Country's Share of CO2 Emissions | Union of Concerned Scientists," https://www.ucsusa.org/resources/each-countrys-share-co2-emissions.
[71] "Carbon Majors: Update of Top Twenty Companies 1965-2017," Climate Accountability Institute, October 2019, https://climateaccountability.org/pdf/CAI%20PressRelease%20Top20%20Oct19.pdf.

stubbornly refused to alter their trajectory they would impair the ability of other actors to turn things around. Consider if every global nation decided to go carbon neutral yet China, with 29% of global emissions and rising, decided not to comply. Although the extent of climate change would be lessened due to these global efforts, China alone could still push the world over many global tipping points. As such, China, or any large country, can free ride off the efforts of other nations yet collectively everyone, including those who invested massive amounts into achieving carbon neutrality, still suffer. This could reduce the incentive to mitigate for other actors. Under such a scenario, if enough relevant actors do not take substantial action extreme warming will likely occur regardless of what other actors do. To the individual actor, mitigation is no longer incentivized, and the rational choice becomes adaptation or other methods which do not solve the root of this dilemma.

Thus, major actors are important, largely responsible, and highly influential regarding our future. It seems, then, that the exclusive focus of climate change efforts should be how to best influence, pressure, or even coerce these actors into making the necessary change. For the individual and on a collective level, voting, protesting, or taking other measures to influence the big actors appears to be the best course of action. Yet, while this may be a way of achieving the greatest magnitude of social change, it is not mutually exclusive from the obligations of individual actors. In fact, while small separately, together individual behavior cumulates to about one third of emissions in the United States or 8% globally.[72] Such individuals or organizations are not in a position to make the level of change alluded to earlier, yet should all their action and attention be focused exclusively on pushing big corporations and countries to change their

[72] Vandenbergh, Michael, and Anne Steinmann. "The Carbon-Neutral Individual." NYU Law Review, November 7, 2014. https://www.nyulawreview.org/wp-content/uploads/2018/08/NYULawReview-82-6-Steinemann.pdf.

behavior? I argue while small actors should seek to accomplish this goal, it does not excuse them from their own duty to reduce emissions.

Although the public rhetoric has prioritized removing responsibility for climate change away from individual small actors, and focusing the spotlight on large companies, these companies are selling products, purchased by individual consumers. While they must be held accountable, I argue the obligation requires more than holding the largest perpetrators accountable. Specifically, I will be looking at universities as specially motivated actors who do not meet the threshold to make the scale of difference needed to achieve IPCC goals, yet also have a heightened ability to make change and influence others.

The Role of Universities in Social Injustices

Universities have a long and successful history of pushing for social change, often when government or other organizations have fallen short. In these areas, universities are what economists refer to as first movers. Usually the idea of first movers refers to profit seeking-companies being the first to seize a market, thus building brand recognition, customers, and time to perfect their product. For social norm change, first movers often have the most to risk and need incentives to push them, yet will play a pivotal role in the long-term success of any novel initiative.

Universities, both through student and faculty led protests and administrative action, have rarely strayed away from controversy in the public eye. Many students are able to use the credibility of their institution's name and expertise of professors to garner legitimate reception. Additionally, there are notable examples where university administrators followed the lead of students or started their own movement. Looking throughout history, universities have played

crucial roles in bringing awareness and igniting action on several social injustices. During the Vietnam War, universities were especially prolific for teach ins, where students and faculty used freedom of speech against the war. This movement began at the University of California Berkeley but quickly spread across the country. Many teach ins served a dual purpose, sending a clear message to the government while also educating future leaders and spreading awareness. Historians credit these protests as being prolific in putting pressure on the US government to eventually leave Vietnam.

Decades later, students at UC Berkeley again started a far-reaching protest against apartheid in South Africa, successfully convincing their University to divest $3.1 billion from companies doing business with the apartheid government. Nelson Mandela personally credited the actions of UC Berkeley, among other higher education institutes, as being especially significant in helping abolish apartheid.[73] In this example, university administrators acquiesced to student demands, taking on a new role where the university as a whole took a stand on a global injustice. This precedent was pivotal in ultimately convincing 155 universities to divest their own endowments, showing how the university itself could be used as a tool for fighting social injustice. These examples, among many others, show how universities, and students specifically, are willing to publicly address social issues and are often successful in turning small scale movements into larger action.

Most recently, university attention has turned to climate change. In 2006 the American College and University Presidents' Climate Commitment (ACUPCC) was devised. At the time 12 schools signed on to pledge to achieve carbon neutrality. Today almost 700 institutions have signed on to this pledge, representing a sizable majority of approximately 6 million students and

[73] "How Students Helped End Apartheid," University of California, May 4, 2018, https://www.universityofcalifornia.edu/news/how-students-helped-end-apartheid.

growing.[74] In doing so, universities have not only committed to reducing emissions, but to increasing education and other sustainability efforts, promoting climate change in classrooms, and spurring public awareness and action.

In these examples universities fill a distinct role in society. They successfully advocated or took action for social causes, however, did not fit the mold of the usual think tanks, NGOs, or non-profit activist groups, often perceived as having an implicit agenda. Instead, universities took a rare departure from their role as educators of students to become political actors in society. It was clear through these examples that historians credit universities for playing a critical, yet unexpected role, in advocating for their cause. Still, the question remains, should universities take on such a role?

Separation of Role: Objections to Political Action at Universities

In examples, such as apartheid, one cannot deny that universities played a positive impact on several global injustices. Nonetheless, some argue that universities should not take any political position, regardless of the outcome. This argument for "distinctiveness of tasks" seeks to separate the primary purpose of universities, academia, and the political stances which must be reserved for other groups. Proponents of this view, such as Stanley Fish, a former university president, argue that universities exist "not to change the world, but to interpret it" and although the research produced at universities may promote real world efforts, academia should not be inherently designed for application.[75] Fish's argument finds an analogy with the division of labor. Universities serve one primary function in society's assembly line, educating, and should

[74] "Second Nature History," https://secondnature.org/history/.
[75] Stanley Fish, "Opinion | Why We Built the Ivory Tower," *The New York Times*, May 21, 2004, sec. Opinion, https://www.nytimes.com/2004/05/21/opinion/why-we-built-the-ivory-tower.html.

leave separate acts, such as political action, to those best equipped. In practice, this separation would allow a university to analyze the pros and cons of a certain policy proposal, for example, but condones advocating for action on either side.

Opponents, argue that in cases like apartheid or climate change universities must stand down from making political statements. Fish acknowledges the importance of these cases, yet feels universities can best fulfill any obligation through knowledge sharing.[76] Doing so is the only way to a public or private university from imposing political values on others in society. Instead, universities should commit solely to promoting knowledge, rather than a specific agenda. This aligns universities with their intended purpose in society, and prevents them from turning into tools for a political agenda.

While Fish's argument for upholding the main purpose of a university is important, I disagree that universities do not have a special duty to take political action and that such action can harm the university's core mission. I argue there are certain extreme injustices, like apartheid or climate change, which universities must take action on. First I believe that certain extreme injustices do not just require a general negative duty to not contribute, which I will explore later, but a universal pro-tanto positive duty to alleviate suffering. Universities have taken action almost exclusively in such extreme cases due to their distinct nature. Furthermore, hypocrisy, between teaching and action, discredits the integrity of the university, and this loss of credibility hurts the aim of teaching. Finally, universities do not just create good students, but good citizens, and must act in accordance with virtues they wish to instill, while promoting political activism beyond graduation.

[76] "The Unbearable Virtue-Mongering of Academics," The Chronicle of Higher Education, December 4, 2019, https://www.chronicle.com/interactives/20191204-Gutkin.

Fish acknowledges that almost all academic work is inherently political, which is to say the academic world cannot be separated from the society it studies. However, Fish draws a line between analyzing two academic sides of a debate and advocating action or application of what is taught. For many issues of little moral weight, Fish's argument may hold. If instead of focusing internally on research or curriculum a university was preoccupied with political action, there is a fear that this could overwhelm the intended purpose of such institutions. This argument, therefore, must take into account a reasonable balance. As a whole, universities are still predominately concerned with educating and there is no indication that the few instances where action has been taken is reflective of a deeper trend. Instead, such cases must be viewed as situations whose urgency require an obligation from all actors in society, regardless of perceived roles.

Drawing such a line may seem subjective, yet universities have shown that the distinction is fairly clear. In fact, university administrators have only taken a collective political stance on small sample of issues like apartheid and recently climate change. This rarity of action should be interpreted as a signal of urgency; universities act out of necessity. Consider the racial violence of apartheid. During this chaotic time in South Africa's history, similar to segregation in the United States, black citizens faced horrendous human rights violations, were denied the right to vote, and protestors were arrested, killed and beaten. Overall, apartheid was a blatant moral catastrophe. To respond, universities, among other institutions, took action, such as divestment, as a calculated move to put pressure on the white supremacist regime.

Fish argues that such action was wrong, since universities were making a political statement and specialize in educating, not acting. This line of reasoning is misguided for two reasons. First, universities were successful in advancing this endeavor, evidenced, in part, by

Nelson Mandala's personal gratitude, proving that going outside their specialization in educating is not a hopeless or unproductive endeavor. Secondly, in the case of extreme injustice, universities, have the same general positive duties to try and solve suffering as any actor would. I will not go into great detail about the nature of this duty, however common sense morality would object that in an instance of extreme suffering, such as climate change or apartheid, it is morally praiseworthy to take action to mitigate suffering, and morally blameworthy to turn a blind eye. In the rare cases that universities have taken action, I believe they have correctly judged the urgency and weight of the situation, and found that as actors in society they are no less culpable of ideally sitting by, regardless of their intended role in society. Fish argues that universities should be shielded from responsibility simply because doing so would shift their intended purpose, yet in these two examples what is at stake for universities is trivial compared to the gravity of the issue at hand.

Universities are not obligated to help every political cause, doing so would be overwhelming and unproductive. Yet, it seems in these examples that what has been gained through university action is overwhelming to what might be lost. Furthermore, the singular role of universities, which Fish is so dedicated to maintaining, is itself flawed, as universities have greater potential than simply passing down academic knowledge. Overall, I have argued why Fish's argument fails due to a positive general duty to act against extreme injustices. I will now show how university action on these issues can help uphold the credibility of universities and promote better citizens.

Credibility and Hypocrisy

Throughout these examples, there is a common theme of universities being among the first to bring awareness or criticize human rights violations, as well as taking corresponding action, whenever possible, to prove their credibility. When one's walk doesn't match the talk, such hypocrisy sends a negative signal and can be detrimental to the ultimate aim of social movements. To many, a hypocrite may be even more off putting than someone who is upfront about their indifference. Research shows the hypocrites are despised more than an indifferent observer due to false signaling, deception, and an attempt to impose paternalistic measures on others while not upholding the same standards themselves.[77]

For universities, hypocrisy is especially objectionable because of the organization's role as an educator. When politicians or companies vocally raise awareness about climate change while simultaneously exacerbating the problem, critics are quick to point out such flaws, yet many cynics often know that competing interests damn such groups from the start, these are often simple publicity acts. Universities, however, have worked towards upholding a reputation for creating and promoting factual knowledge. Many universities have made significant strides in researching climate change as well as solutions. A large number of scientists on the IPCC panel come from Universities. These scientists are urging action, yet cannot install change at the very institution they work at. This is not to say that the credibility of scientists and the institution they work at should be directly related, however, in an age of denialism such a disconnect sends a convoluted message. Universities are sounding the alarm on climate change while remaining dormant and must back up their message with action if they want the rest of society to understand and act on the urgency of the situation.

[77] Jillian J. Jordan et al., "Why Do We Hate Hypocrites? Evidence for a Theory of False Signaling," *Psychological Science* 28, no. 3 (March 1, 2017): 356–68, https://doi.org/10.1177/0956797616685771.

Aside from just science, universities also seek to promote ethical decision making and critical thinking in students. Academics agree and argue that "some forms of advocacy are not merely permitted but positively mandated by certain fields of study."[78] To these aims, the credibility of the institution as a whole, of faculty, and of school leadership may be at risk if there is a lack of synchrony between calls for action and internal measures.

Social research supports the necessity of perceived ethos in professors and institutions through action which demonstrate good will, resulting in more trustworthy and attentive students.[79] Although this research mainly focuses on micro-level classroom dynamics, there are strong parallels to how students interpret larger social issues. Consider one of several academic fields which incorporates climate change into the classroom. The professor would likely present the scientific consensus, highlighting the depth and urgency of this problem and the need to act. If the university is taking significant action to mitigate their own emissions, then this message, echoed by professors, is embodied. If, on the other hand, the university is not taking action, students will likely believe the science, but the gravity of taking action, making deep lifestyle changes or seeking alternative technologies, might be lost. The key is signaling. Students are acutely aware of how the institution they live in and engage with daily takes action. If the university signals a commitment through strong and visible action, then students are able to internalize the legitimacy of such calls to action.

The idea that universities must always act in accordance with what they teach is not absolute. There are many situations where a certain field might promote one course of behavior,

[78] Aaron M Kuntz, "Academic Citizenship: The Risks and Responsibility of Reframing Faculty Work," *Journal of College and Character* 7, no. 5 (June 2006): 4, https://doi.org/10.2202/1940-1639.1197.
[79] Jason J. Teven and James C. McCroskey, "The Relationship of Perceived Teacher Caring with Student Learning and Teacher Evaluation," *Communication Education* 46, no. 1 (January 1997): 1–9, https://doi.org/10.1080/03634529709379069.

yet it would be paternalistic for the university to force this on all students. A professor of nutrition might say from an academic standpoint that offering deserts in the dining hall is contrary to all scientific research. Furthermore, there are several fields where there is disagreement about what the correct course of action is. However, climate change does not fit into either of these categories. As I have argued, there is no disagreement about whether human action constitutes a harm, and universities are often at the forefront of publishing research on damage or inventing alternative technologies. When all this is front and center, it remains nearly impossible for a university to uphold its commitment to knowledge when such a blatant transgression is ignored.

It is not the primary purpose of a university to promote social causes, yet when failure to do so threatens the purpose and credibility of such institutions, the necessity of action is heightened. Many professors may teach in unrelated fields or feel that their individual research of teaching can be separated from the action of the collective university. It would be bizarre if universities existed only to achieve carbon neutrality or other important social aims. At the same time, students and faculty must expect their administration to recognize urgent social dilemma and align action with teaching. Failure reinforces the narrative that climate change is someone else's problem or something that will magically disappear.

I have given several examples where expert consensus is unclear or universities are pushing a clear political campaign, unwarranted by the demands of justice. Given the unwavering scientific consensus and urgency to act, climate change is not one of these issues. Studies have shown that climate change educational campaigns can increase acceptance across the political spectrum, but it only takes a few misleading statistics to significantly lower

acceptance.[80] Given the rise of misinformation campaigns and political polarization, universities, more than ever need to present a universal front for their acceptance and embodiment of the knowledge they promote, not just in the classroom, but outside as well.

Taking action in-line with what is being taught in the classroom is one condition for upholding credibility, but this must strike a reasonable balance with manageable goals. The hypocrite label is often used as an ad-hominem attack against many of the most prominent climate change activists. While these organizations or individuals may try their best to minimize their emissions when travelling or eating, eventually, often due to the carbon intensive nature of our society, they resort to some form of carbon emitting activity. Many of these individuals are doing the most to spread awareness about climate change, it seems they may be trapped by the limitations of society which they are protesting against. Thus, the hypocrisy fear has an upper bound. If an individual or organization wishes to truly commit to an issue, it must take corresponding action to signal rigidity and unwavering support for this cause. However, climate change presents certain challenges, which I will address in more detail, where even wholehearted efforts to go carbon neutral are restrained by technological advancements. Renewable energy, for example, only recently became economically efficient and battery storage still has a long way to go.

Thus, universities must be seen as taking real tangible efforts to reduce their emissions, while at the same time the idea of putting these institutions under a microscope must be discouraged, as it ignores holistic considerations. Anytime an advocate speaks out on a social issue, they invite the public spotlight. Most, if not all, academic institutions publish or promote climate change research. From an outsider perspective, if the same organization which publishes

[80] Michael Andrew Ranney and Dav Clark, "Climate Change Conceptual Change: Scientific Information Can Transform Attitudes," *Topics in Cognitive Science* 8, no. 1 (2016): 49–75, https://doi.org/10.1111/tops.12187.

scientific reports on the damages of climate change does not view these same reports as evidence to change their own behavior, this likely affects how such articles are perceived and acted upon. As a result, universities must take meaningful steps to reduce their emissions, and this action should be highly visible. However, as a small actor, their obligation to reduce emissions is not absolute, and while ambitious goals should be encouraged, it must be considered among other ways universities can make a difference.

Installing Civic Virtues: Beyond Knowledge

The final reason universities should take political action for extreme injustices is to set a positive example, not just as an educator, but as an institution that can help foster better citizens. Through both intended and inadvertent aspects of higher education, universities promote certain behaviors that reflect general qualities society values. I argue that universities have and should continue to make the intrinsic value of higher education more transparent, and take active steps to encourage better citizenship, including civil engagement. To this aim, the university itself must provide opportunities to practice and role-model these behaviors, both in and out of the classroom. Academia should not impose a barrier between the work of professors and students and the real world impact. While removing this barrier opens up a door for political bias, this encourages students and faculty to debate and think about the stakes of their work. Failure to take action on social issues sends a negative signal to students and neglects an opportunity to teach and apply good civic behavior.

For most of higher education's history the focus has been two main aims, the instrumental purpose of entering the labor market and the intrinsic goal of helping students make

autonomous choices to determine a life worth living.[81] Although both are valued, lately, with the rising costs of higher education, students are demanding more ways they can see a monetary return on their large investment, often at the cost of the intrinsic value of higher education. Many universities are actively responding through career services programs and networking events. While many students see this as the primary reason for attending university, this end goal does not interfere with nor discourage what universities can accomplish in the interim.[82] Universities have the opportunity to help students shape their own habits and worldviews, providing active participants in society that keep democracy functioning.

Whether intentional or not, many young adolescents are transformed by their years at university and credit their institution for helping them find meaning and answers questions about what kind of life they wish to live. Although universities were not set up for this role, it seems they have inherited it due a lack of other institutions in a democratic society. While democracy requires engaged and active participants, no formal institution has been set up for this exclusive purpose. Instead, universities have found themselves as a last buffer between the bubble of education and the real world, and thus have accepted a responsibility to promote the characteristics of good citizens in a democracy. In this aim, universities seem to serve as an unbiased guide, laying out potential paths for students to follow, yet at its core this nudging cannot avoid a notion of right and wrong.

While universities encourage students to find meaning and purpose, there is an inherent political nature to promoting good citizenship, which is how to define good citizenship. Many

[81] Theocharis Kromydas, "Rethinking Higher Education and Its Relationship with Social Inequalities: Past Knowledge, Present State and Future Potential," *Palgrave Communications* 3, no. 1 (October 13, 2017): 1–12, https://doi.org/10.1057/s41599-017-0001-8.
[82] Jennifer L. Schultz and Jeanne L. Higbee, "Reasons for Attending College: The Student Point of View," *Research and Teaching in Developmental Education* 23, no. 2 (2007): 69–76.

virtues of good citizenship can be taught by universities without bias. Universities pride themselves on improving critical thinking skills, communication and public speaking, and levels of empathy among other measures that reflect good citizenship. While doing so in a classroom setting may be one way of achieving such goals, educators and students have both found that applying these skills is the best way to practice and appreciate them. In an effort to encourage application, universities have increasingly promoted community-based learning, volunteering opportunities, and speakers on a range of important topics. These methods not only appeal to students, as they take such concepts out of the passive world of academia, but they have high success rates. Studies find that even with selection effects, students who participated in the aforementioned "high-impact experiences" displayed a more active role in applying knowledge and participating in political issues during and beyond their time in higher education.[83]

Although universities can create productive and connected citizens, should they if doing so risks taking a political stance? I have argued that universities must do so when they are morally required to act in cases of extreme injustices, however, I also believe that universities should promote political activism for intrinsic reasons and to produce better citizens.

First, universities should resist the aimless pursuit of objectivity as taking no stance on an issue serves to promote the status quo. Recognizing the futility of trying to be neutral in a political world, universities must recognize what can be gained by promoting activism. Failure to do so discourages professors and students from thinking about the real world implications of their work. On a student level, the disconnect would be even more backwards. Universities avoiding political action aim to educate students on civic activism, yet deny students the perfect opportunity to practice in a low stakes setting.

[83] Andrew J. Perrin and Alanna Gillis, "How College Makes Citizens: Higher Education Experiences and Political Engagement," *Socius* 5 (January 1, 2019): 2378023119859708, https://doi.org/10.1177/2378023119859708.

Translating these arguments into concrete action, universities should focus on three main goals. First universities should allow and encourage students to promote whichever social cause fits their passion, and provide resources to allow them to practice civic engagement. Secondly, faculty should not be prevented from expressing political opinions and should remain connected with the ramifications of their work on society and students. Finally, on an administrative level, universities may also take political action for student led initiative or severe injustices. In allowing for active debates, universities promote the skills that a democratic society will require and encourage action over complacency.

Issues like climate change highlight this opportunity. Students, faculty, and administrators recognize climate change as a crucial problem current and subsequent generations will need to grapple with. Students will not just need to know the science behind climate change, as active citizens they will be expected to deal with the political fallout. While university presidents proactively signed agreements to go carbon neutral, they knew the efforts to achieve these measures would require heavy student involvement. Installing virtues of sustainability while allowing students to practice civil activism fits a progressive model of higher education that encourages students to take academic debates outside of the classroom. Universities serve an important role in our democratic society, and the increasing shift towards public displays of activism should be encouraged for its consequential and intrinsic value. Not only will academia realize the potential for applying knowledge outside the ivory tower, but students will continue to embody political activism and engaged citizenship.

Negative Duties and Small Risks: Expected Value in Times of Moral Urgency

Aside from signaling and maintaining credibility the question remains, should universities reduce their emissions for intrinsic moral reasons? The arguments I have presented have been for a positive duty, which is less demanding. Furthermore, many of these efforts bring a positive spotlight on universities, which could create misguided incentives to act. Universities often take on praiseworthy social goals, but if this is to merely uphold their credibility or move up on a ranking, such behavior is gilded. Fortunately, many university presidents have taken the task of carbon reductions seriously. Although tracking cumulative emissions is a messy process and numbers are not exact, an estimate from 2005 predicted that U.S. institutions for higher education made up 2% of domestic emissions.[84] This number puts universities in a prolific spot. Together they are influential enough to garner attention. At the same time, their cumulative efforts will ultimately be trumped by what government and large carbon intensive companies decide to do.

On a micro level the question remains, are the emissions of one small college within this large system significant? Answering this question opens up the debate on small chances, morally acceptable risk, threshold levels, and how taking action can create a domino effect to spur larger cumulative change. I will argue how seemingly small effects on individual small actors, whether one student, a small liberal arts college, or larger universities, can be morally relevant. This duty is critical, but not absolute, and I use pro tanto language to define the obligation. This will take into account the difficulties in measuring the full effects of small acts and the levels of risk we view as morally acceptable in society today, as well as agent-relative relations, technological limitations, and equity concerns. This duty may not be steadfast, but superfluous emissions must

[84] Parikhit Sinha et al., "Greenhouse Gas Emissions from U.S. Institutions of Higher Education," *Journal of the Air & Waste Management Association* 60, no. 5 (May 2010): 568–73, https://doi.org/10.3155/1047-3289.60.5.568.

not be viewed in accordance with everyday morality. Without an upper-bound, such acts unethically increase the risk of harm and deprive the least advantaged from their fair share.

Acceptable Levels of Risk

Every day we make choices that involve risk or uncertainty. The act of driving a car provides some insight into this spectrum of moral risk. Driving a car is one of the most dangerous activities we engage in and is a leading cause of death in the US and several other countries, yet many treat this activity with casual regard. While driving is by itself a hazardous activity, most of the harm that results from accidents is limited to those who consent to facing these risks, by entering a highway for instance. However, on the highway there are limits on acceptable levels of risk for consenting participants. Consider speed limits. While not perfect, they are imposed to put an upper bound on speed following the logic that when one is driving faster, they have less time to react or are more likely to lose control. If one is caught speeding there are, of course, legal ramifications, however, speeding is rarely seen as an inherently immoral act. This is because speed limits are often see as too conservative. Many drive at least slightly above the speed limit and statistically such behavior does not contribute to accidents in a highly discernable or public degree.

Distracted driving shows how the spectrum shifts as one engages in riskier behavior. Although relatively new, there is good evidence that distracted driving is significantly more hazardous than speeding. Thus, when one is caught driving while texting, they not only face legal ramifications, many may also condone such behavior on a moral level. Looking away from the road puts the individual, passengers, and others on the road in greater danger and shows a lack of regard for safety.

Finally, intoxicated driving is seen as one of the worst violations one can commit on the road. The level of risk is so high that if one is able to drive home without causing an accident it is seen as a near miracle. Furthermore, there doesn't have to be a victim of drunk driving for society to view it as morally wrong since the individual was willing to impose such reckless actions on themselves and innocent bystanders. Not only is drunk driving punished with the highest penalties in our legal system, those who take on such risk are acting immorally, regardless if someone is actually harmed as a result of their actions.

Throughout these illustrations, I have shown how varying degrees of risk reveal how we translate relatively abstract percentages into moral judgements. Many do not need to see actual statistics on the aforementioned behaviors, they simply have a gut reaction regarding the morality of such acts. In the previous examples how one drives the car is seen as a moral question, yet the act of driving the car is rarely viewed with the same critique. Although individuals know the fossil fuels they put into their car emit greenhouse gases, rarely does one scrutinize such behavior with the intensity of distracted or intoxicated driving. I argue this disconnect, although understandable, is morally misguided. One study roughly estimated that the emissions of the average American is at least responsible for the suffering and/or deaths of at least two future people.[85] Given the moral urgency of climate change, outlined in the first chapter of my thesis, if the science is to be taken at face value, then the moral risk of emissions is high, possibly akin to distracted or drunk driving.

While it is clear that for large actors their emissions have a much higher probability of causing a bad outcome, I argue small actors are not exempt of responsibility. This is due to expected utility calculations which, simply put, multiplies the chance that something bad

[85] John Nolt, "How Harmful Are the Average American's Greenhouse Gas Emissions?," *Ethics, Policy & Environment* 14, no. 1 (March 1, 2011): 3–10, https://doi.org/10.1080/21550085.2011.561584.

happens by how bad it would be. In regards to climate change, there are two relevant expected utility calculations which show why relatively small actors, such as universities or individuals, would not be taking sufficient precaution through reckless emissions. The first is in the climate system itself and the second involves market mechanisms.

As I have argued, greenhouse gases create instability in the climate, creating new weather conditions that are overwhelmingly negative. Within the climate system there are several thresholds for change. Some of these thresholds involve positive feedback loops. Others may involve the extra degree of warming that intensifies a hurricane or expedites thermal expansion which floods a village. A rational actor must acknowledge that if any of these events were to occur, the results would be so catastrophic that all prudent precautions should be taken to prevent this outcome. The rational actor, however, does not know exactly what level of emissions are sufficient to cause these harms. They do know that for each additional emission of greenhouse gas there is zero probability that the carbon or methane released can do no good or harm. The scientific evidence points that emissions past a certain are overwhelmingly likely to cause harm, and we are moving dangerously past that threshold. When one engages in superfluous emissions there is an expectation of harm, even if it is not visible. Thus, given the instability of the climate and the extreme harms of global warming, expected utility holds we should reduce emissions across the board.

Additionally, further expected utility calculations show how individual acts may turn into larger effects. Building off of Peter Singer's argument for vegetarianism, while supply does not always respond exactly to consumer demand, there are certain thresholds. Consider airplane travel, an activity which emits some of the highest levels of GHGs. One might argue that regardless of what they do, the airplane will take off either way. Yet, consider if that plane is full

and your ticket purchase incentivizes the airline to operate an additional flight. Then your personal footprint would be exponentially higher. Again, this is not absolute, but even a slim probability of such an event, given what is at stake, is of great moral weight.

Even though individuals contribute towards this tragedy of the commons, some philosophers feel the individual contribution is too minute to be of moral significance, even given the catastrophic harm. Walter-Sinnott Armstrong is one such philosopher who famously argued that one's individual contributions play no part in warming the atmosphere and one should not feel responsible to reduce luxury emissions, such as a Sunday drive.[86] One thought experiment involves four individuals pushing a car off a cliff. In such a case, the car is sufficiently heavy that it requires four individuals to move it, yet no more. Armstrong argues that one's individual emissions are like an additional person pushing the car, neither necessary nor sufficient for the harm, the car falling off the cliff, to occur.

I argue Armstrong commits two errors in such an argument, ignoring small acts and chances. First, climate change, unlike pushing a car off a cliff is not a "one and done event". In Armstrong's example there are only two outcomes that can occur, the car is pushed off the cliff or the car is not pushed off the cliff. Unfortunately, for climate change there are what philosopher Ben Almassi refers to as "rungs on a climatological ladder."[87] As such, the degrees of harm are morally relevant. A little bit more warming may not seem catastrophic, but the real world implications could entail additional deaths.

[86] "Walter Sinnott-Armstrong, It's Not My Fault: Global Warming and Individual Moral Obligations - PhilPapers,", https://philpapers.org/rec/SININM.
[87] Ben Almassi, "Climate Change and the Ethics of Individual Emissions: A Response to Sinnott-Armstrong,", http://www.ucd.ie/philosophy/perspectives/resources/issue4/Perspectives%20Vol4_%20Ben_Almassi%20Climate%20Change%20and%20the%20Ethics%20of%20Individual%20Emissions-%20%20A%20Response%20to%20Sinnott-Armstrong.pdf.

This argument builds off Derik Parfit's Mistakes in Moral Mathematics.[88] Parfit's first argument uses a thought experiment of 1,000 torturers and 1,000 victims. In the first scenario, each torturer tortures one victim, slowly increasing the level of pain from unnoticeable to discernable to unbearable, until the victim is clearly being tortured. However, in the second example, each torturer is torturing a different victim, meaning each individual push of a button cannot be directly linked to making one individual suffer more. In the end, the outcome is the same, yet the two scenarios seem morally different. Armstrong argues that in the latter case no torturer harms any individual, yet in the end 1,000 innocent individuals are tortured.

This mistake is also morally relevant for Armstrong's appeal that small actors can deflect guilt onto large actors. In such a thought experiment, it takes 1,000 pushes of the button for the individual to be tortured. Large actors have already pushed the button 900 times. Although they have disproportionate responsibility, one individual's action is separate. You know that pushing the button, after it has been pushed 900 times, will play a much more significant role expediting the harm to the individual. Furthermore, there is no evidence the large actors will stop pushing their button or are able to reverse their pushes anytime soon. While your press of the button or your emissions are small, given the current level of carbon in the atmosphere, the aggregate effect of each individual's actions constitutes an immoral conclusion. Just like with emissions, the first hundred or so emissions do not cause any real harm, it is only when a sufficient number of actors contribute. Thus, each action must be seen as dependent on the actions of others. A Sunday drive in isolation is not morally objectionable, but given the levels of GHGs in the atmosphere and signs that such warming is only increasing, the scenario changes. Given this, the common sense morality Armstrong proposes no longer applies to collective harm.

[88] Derek Parfit, *Five Mistakes in Moral Mathematics*, *Reasons and Persons* (Oxford University Press), https://www.oxfordscholarship.com/view/10.1093/019824908X.001.0001/acprof-9780198249085-chapter-3.

In addition to these small effects, Armstrong also disagrees with Parfit's argument for small chances. As I have argued, moral risks exist on a spectrum and must be evaluated carefully. There are no calculations or numbers that can accurately ascertain exactly how risky one drive or flight is and what the expected utility of each act is. Nonetheless, Parfit offers some guiding principles that can help make sense of drawing a line. Ignoring small chances when the stakes are incredibly high or when an action will be repeated many times are two criteria which call for a greater sense of urgency. Parfit offers the case of a nuclear power plant. A one in a million chance of failure may seem sufficient for something benign, however, in the case of a nuclear power plant thousands or millions of lives could be at stake. As the plant is running every day, these constant iterations only increase the chance of catastrophe.

In response, Armstrong might argue that such a low tolerance for risk would be too restrictive on daily life, paralyzing many essential functions. This argument is similar to the fear of too low a discount rate, and must be balanced accordingly. There are countless risks which a similar argument could be made for. Consider banning the use of computers out of a fear of future AI development or stopping all antibiotic prescriptions to prevent a superbug. If an alien species could come to our planet and easily destroy us all, why not invest significantly in space defense? These thought experiments get at the slippery slope of how too much risk aversion may be overbearing or take away resources from more important causes. In response, I simply assert that the science surrounding climate change, outlined in chapter 1, presents overwhelming evidence to support the damages that will arise if nothing is done and other risks do not have this evidence. Furthermore, the different thresholds in the climate system and increasing stream of emissions only heightens this moral risk. As a result, efforts to reduce even small levels of

emissions are not alarmist, and such a duty does exist, although defining this duty reveals the opposing obligations that must be weighed.

Specifying the Nature of the Obligation

Given my argument that a duty exists, there still remains the larger question on how to turn abstract levels of risk into concrete moral duties while not unnecessarily restricting autonomy or causing more harm in the process. Throughout this paper I have tried to strike a delicate balance between extreme viewpoints, however, there are morally relevant reasons to push back against too strong a duty to mitigate individual emissions. Given a low enough discount rate and sufficiently high damages, one could use an expected utility calculation to argue that everyone should cut their emissions to the bare minimum to survive. Peter Singer seems to make such an argument, taking a hard utilitarian stance that what is lost is trivial to the net gain for those most disadvantaged today.[89] I object to this notion of a perfect negative duty and instead argue there are pluralistic considerations that must be considered.

First, individuals have what Sam Scheffler refers to as "agent-centered prerogatives" to pursue private concerns rather than maximizing overall utility. This is not to say that individuals should actively try to not maximize overall utility, but that there are permissions to not do the best, or even to allow harm to others, in accordance with commonsense morality. Consider an example where one is on their way to perform CPR on a dying close friend. Along the way they pass someone drowning. They can only save one individual and the other is guaranteed to die if this person does not save them. In such a case, one's spatial position seems less relevant than the value of their friendship. If one thought otherwise, then a friend or family member dying would

[89] "Famine, Affluence, and Morality, by Peter Singer," https://www.utilitarian.net/singer/by/1972.htm.

be no different than the death of any random individual. Derik Parfit expands upon this distinction by delineating between agent-neutral reasons to alleviate suffering, which are objective reasons for everyone, and agent-relative reasons which cannot exist for other agents.[90] The intrinsic value of these relationships provide strong person-affecting reasons to deny the cold calculus of pure utilitarianism.

As a result of pluralistic considerations, I call for a pro tanto obligation which allows for the weight of other obligations to be balanced. There are several ways one imposes risks on others through their emissions, yet denying them this right would cause unjust harm to that individual or jeopardize their personal relationships. Just as we do not expect everyone to pursue careers that maximize utility for society or donate all surplus income to charity, the demandingness of emissions reductions must be proportionate to the level of sacrifice required. This balance, however, is not a blank check to use agent-relative or self-motivated reasons as an excuse to contribute to climate change.

Proportionate emissions reductions provide general guiding principles for delineating between emissions for sustaining everyday life and luxury emissions which impose unnecessary risks without moral justification. Armstrong argues for extreme "black and white" examples, such as boiling a pot of water to argue how many relatively innocuous and essential every day activities are at stake. As Armstrong points out our economy is highly dependent on carbon and many functions, such as hospitals or keeping medicine cold, could be at risk. Furthermore, technological development has offered some, but not many, alternatives to everyday activities that omit GHGs, many of which are vital to sustaining life. Such "necessity" examples highlight a clear allowance for an individual to emit.

[90] Derek Parfit, *Reasons and Persons*, *Reasons and Persons* (Oxford University Press), https://www.oxfordscholarship.com/view/10.1093/019824908X.001.0001/acprof-9780198249085.

Still, there is a large moral grey area where the line between essential and luxury, while accounting for personal prerogatives, is blurred. It seems obvious that flying on a private plane is excessive by any measure, yet does this nullify flying commercial, likely the highest GHG activity for the average individual, to visit a sick relative? Some philosophers argue these subjective questions can only be answered by individuals themselves, building off Kant's definition of imperfect duties.[91] In such instances, only the individual has all the relevant information to make such a decision, although this does not permit unrestrained access.

Given the apparent difficulties in weighing conflicting duties and freedoms, I roughly endorse the philosophy behind Steve Vanderheiden's proposal, arguing that everyone should be able to emit what is needed to ensure subsistence, while luxury emissions should be distributed on a per capita basis, taking into account the needs of special groups. While this theoretical concept may not work perfectly in application, it supports the underlying argument that superfluous emissions have more to do with equity and depriving others of their share, than unjustly increasing the risk of harm to others.

Baylor Johnson argues that in tragedies of the commons, like climate change, one's individual behavior does always constitute a harm, but rather overuse, which *can* be harmful, but is not always.[92] Thus, the stronger objection to Johnson's view is not that superfluous luxury emissions will harm "X" more individuals, but that it will unjustly deprive "X" more from their fair share of emissions, which they also have self-motivated and person-affecting reasons to

[91] Baylor L. Johnson, "Ethical Obligations in a Tragedy of the Commons," *Environmental Values* 12, no. 3 (August 1, 2003): 271–87, https://doi.org/10.3197/096327103129341324.
[92] Johnson.

pursue.[93] So, to answer Armstrong's question, taking a joyride in an inefficient SUV may be permissible, as long as one stays below their overall cap.

This still leaves questions on defining the cap and determining what behaviors are essential for different individuals. Likely a "western lifestyle" would require a deep-rooted transformation, but this obligation will depend heavily on financial and social circumstances, as well as technological limitations. Building off the ethical principal that "ought implies can," "can" will depend heavily on these factors. Many actors, like universities, will be in much more capable positions to keep luxury emissions to a minimum, and will have less justification to not make such reductions. Thus, a notion of a cap, while not perfect or absolute, reflects the scarcity of emissions and is a move towards more individual responsibility when circumstances allow.

Finally, building off Lomborg's argument to not ignore the opportunity cost of inefficient efforts, not all mitigation actions are equal. Likely, a notion of scarcity will push actors towards efficient ways of reducing their carbon footprint, prioritizing "low-hanging fruit" or solutions that maximize the ROI, which I will explore in my next chapter. Examples of these include energy efficiency measures, switching to renewable energy, and even eating plant based meat as it becomes less distinguishable from methane intensive red meat. As I will explore, many of these measure also save the individual money. In such cases, where the tradeoffs are low and the risks of harm and gluttony are high, there is little moral justification to not seek out "win-win" alternatives.

In my previous chapter I have argued there is a duty to take action on climate change, but this duty is also not immune from well-intended concerns that it may grow too absolute. Preventing a world of runaway warming promises large benefits to society that I argue outweigh

[93] Christian Baatz, "Climate Change and Individual Duties to Reduce GHG Emissions," *Ethics, Policy & Environment* 17, no. 1 (January 2, 2014): 1–19, https://doi.org/10.1080/21550085.2014.885406.

the costs, but this marginal benefit decreases with limiting warming to 2° C, 1.5° C, or even less. Many of the solutions required to fully abate these warming scenarios will not be easy solutions, but will involve technologies that have not reached economies of scale. An investment in solar panels 10 years ago would have taken money away from R&D or other important carbon neutrality efforts, while the same investment today would actually save money on energy costs. While I have presented a skeptical approach to CBA for selecting global efforts to pursue, there are strong reasons to rely on CBA for efficient solutions. Offsets provide one avenue today, which I will address in my next chapter, but after a certain point efforts to reduce "high-hanging fruit" present a costly stretch.

Armstrong and Johnson have argued that an individual actor should try to lobby the government to ban carbon emitting behaviors while still enjoying them. This argument fails to take seriously the perils and failures of government as well as the urgency of the situation. Furthermore, there's a strange contradiction in working for a collective solution, while ignoring one's internal duty. I argue activism and action are not mutually exclusive, and while there are several contradicting duties I have considered, those capable have a responsibility to reduce their share of superfluous emissions, to limit risk and not overindulge in a limited resource. Progress on a larger scale is laudable, but it does not excuse the individual actor from their negative duty.

Stigma

A final relevant point about morally contentious activities is the role of stigma and convenience. This section seeks to contextualize why certain unethical behaviors can become commonplace and give insights that will motivate how university action can create new moral norms, which I will explore in depth in my next chapter. While not absolute, many morally

egregious behaviors from humanity's past were not stigmatized as such, often due to the convenience of such behaviors, or simply there was too much to gain that ignoring moral questions became common place and easy. This builds off Alexander Guerrero who argues that in cases of moral ignorance it is better to act prudently.[94] One example Guerrero gives is past uncertainty on whether owning slaves was wrong. Many individuals in past centuries may have claimed to be ignorant on whether slavery was morally wrong. Guerrero argues that in such cases the stakes were sufficiently high that one had a clear obligation to discover the truth.

I think Guerrero's argument has parallels to climate change in several ways. Not only has climate change reached the scientific urgency that all actors have an obligation to become educated on the facts and risks of their individual action, there is also a similarity in how convenience clouds moral judgement. Behaviors were not stigmatized due to conflicting incentives, however, we now look back on what was gained as trivial to the moral catastrophe that was allowed to continue. In the future, there is a high probability that our actions today will be stigmatized with the same disdain.

Climate change is of particular moral danger due to its hidden nature. When emissions come out of a car or plane or factory, they are not visible. The effects of climate change, as well, are hard to grasp. The most vulnerable, those residing in third world countries and future generations, are also not visible to those most responsible for emissions. Furthermore, the advantages of ignoring such effects are clear. Carbon is imbedded into almost every aspect of our economy and everyday life. Any call for a radical and quick transition would require immense effort and sacrifice. These difficulties, and past failures, point to a moral dilemma, one that is relevant to actors large and small. Armstrong may be concerned only about the former, however,

[94] "Alexander A. Guerrero, Don't Know, Don't Kill: Moral Ignorance, Culpability, and Caution - PhilPapers," https://philpapers.org/rec/GUEDKD-2.

given past miscalculations, the potential urgency of the situation requires effort from all who play a contributing role.

Influencing Others: An Imperfect Positive Duty

Finally, small actors, such as universities, should take action to reduce emissions to motivate other actors. This argument expands upon the influence of small actors beyond what Armstrong believes is possible. Armstrong argues "people like to see themselves a more influential than they really are." While for some individuals this may hold true, I have argued universities are especially positioned to create change, using historical examples and highlighting their role as educators for activism in democracy. I will now present a moral justification for such action, which expands upon the concept of reducing the overall risk of climate change, using one's negative duty to spur a greater change in stigma and corresponding action. This argument will extend into my next chapter which goes into greater depth about the "why" and "how" of such norm change. The creation of social norms has higher consequential value due to the potential to spur larger scale change. Since this is a positive duty, actors are not expected to uphold an unlimited expectation to maximize utility. Nonetheless, they can take effective steps for relatively small costs. Throughout this chapter I have shown how universities are perfectly situated for this role, I will now argue why they should take steps to expand upon their impact within the bounds of their position in society.

We like to think that as humans we make each decision in our daily life autonomously; however, this is not always true. As creatures of social habit, we tend to follow the crowd, looking for norms or behavior to fit in or model. Consider the famous Asch line experiment

which sought to demonstrate the influence of social pressure on our decision making ability.[95] Participants were asked which line out of three best matched the height of a fourth line showed parallel. Two of the three lines were clearly taller or shorter with only one being the correct height. In fact, researchers expected a 100% response rate. In the experiment, however, researchers placed actors in control groups who would purposely give blatantly wrong answers aloud before an unsuspecting subject gave their answer. In such groups, a surprising 75% of subjects gave at least one incorrect answer. When asked why these choose an answer that conflicted with their intuition, many subjects admitted to simply "going along with the crowd". This experiment, among many in psychology, gives some insight into the inner-workings of decision making and social change, which can be of moral relevance for motivating small actors.

I have argued for a negative duty for actors, such as universities, to refrain from harming others, but there is an additional positive duty to produce desirable outcomes, in this case motivating a larger pool of actors to take corresponding action. Striving for carbon neutrality is not an isolated act. It is often very public and has an effect on those made aware of it. This spillover or domino effect can encourage, alarm, or shame other actors who then take action. Many see action as proof of the scientific urgency, other may feel they are not pulling their weight, and some may simply follow in the steps of first-movers to keep up with the masses. On the other hand, not taking steps to reduce emissions is interpreted as preservation of the status-quo, in this case passively agreeing that continuous emissions are morally acceptable even when the science is clear that such practices are not sustainable.

Rather than a responsibility to avoid harm, the responsibility to promote good, while less strict, is still of great moral weight. Universities are well-suited for the tasks of promoting

[95] Solomon E. Asch, "Opinions and Social Pressure," *Scientific American* 193, no. 5 (November 1955): 31–35, https://doi.org/10.1038/scientificamerican1155-31.

scientific knowledge, creating good citizens, and standing up to global injustices. n Imany cases they are expected to fill this role in society and include doing so as part of their mission. These roles fit with the positive duty of promoting sustainable behavior as a new social norm. Furthermore, the costs associated with achieving carbon neutrality are the highest, which paves the way for norm activation. Universities have taken on the ambitious goal of carbon neutrality for intrinsic and consequential reasons, but it would be counterintuitive to not work towards motivating other actors to follow aspects of the behavior they model, when the costs of achieving norm buy-in are relatively low and the payoffs can be exponential.

Opponents like Armstrong simply assert that individuals or even organizations are not influential, thus any action taken will not cause any snowball effect. While I will refute this claim with more evidence in my next chapter, this conclusion seems highly improbable. Even if we are not greatly influential, any influence is of moral relevance in the expected utility calculations. Consider a petition that needs 10,000 signatures to pass. If passed, the petition would save 100 lives. A supporter can simply sign the petition or sign and share it with friends or post it online. Since one does not know how others will act, taking action which increases the chance of a good outcome is morally praiseworthy. One signature or one actor reducing emissions is not always highly visible, but how such behavior influences others can be. The effect of this spillover, iterated enough times, cannot be underestimated and provides a final justification for the efforts of universities, large and small.

Conclusion

In this chapter I have argued why universities, as relatively small but specially motivated actors, should take action to reduce emissions. I have argued for some practical reasons, such as

maintaining credibility and inspiring active citizens in democracy, as well as moral reasons, including both positive and negative duties. In the next chapter, I will look further into social change and how universities can leverage their position to spur a much larger impact, influencing a wide array of actors to reduce emissions or strive for carbon neutrality. While this may produce more visible results, I still believe the intrinsic reasons for reducing emissions hold. Armstrong argues one should prioritize social activism over individual action. Universities must advance both, raising awareness on climate change, encouraging student activism, and redefining moral expectations, all while walking the walk.

Chapter 3

I have argued for morally relevant reasons to combat climate change, even for seemingly small actors. Contributing to larger social change is one motivating factor for such action. In this chapter I will explore the research supporting this claim, arguing how universities can serve as first movers and create a larger domino effect. First, I will examine the social science surrounding norm change, both to understand the power of cultural norms in society and highlight best practices to create new norms and disrupt old ones. This type of implicit behavioral change will be most prolific for those closely connected to universities, including students, faculty, and local governance. The second potential for universities is to use their position as first movers to influence large actors, such as big corporations or organizations. Universities, many of which were the first to undertake this ambitious goal, can provide a roadmap for achieving carbon neutrality, collaborating to share knowledge and best practices. These paths, while different in nature, provide two avenues for universities to turn their individual contribution into much greater social change.

Introducing Social Norms

As humans we like to fit in with the crowd. The line experiment alluded to in the previous chapter is one clear demonstration of how far our behavior can be influenced. Social norms are rules largely understood by a group used for dictating human behavior without laws.[96] These norms, while not absolute, create a range of acceptable or "normal" behaviors. Such

[96] Robert B. Cialdini and Melanie R. Trost, "Social Influence: Social Norms, Conformity and Compliance," in *The Handbook of Social Psychology, Vols. 1-2, 4th Ed* (New York, NY, US: McGraw-Hill, 1998), 151–92.

norms funnel and scaffold our behavior, guiding lifestyle choices and creating new incentives to take action that might otherwise be neglected.[97]

Like the line experiment, no one wants to be the odd one out. Furthermore, if a sufficient group is acting a certain way, their strength in numbers serves as reinforcement that it is the correct way to act. In fact, creating social pressure is more effective at changing behavior than educational campaigns or telling people how to act. One study on reducing energy consumption measured the effect of different persuasion methods including environmental benefit, benefit for society, financial benefit, and social influence.[98] Although subjects in the experiment felt social influence had the least effect on their consumption, the study found that normative social influence yielded the greatest change in behavior. Another study tried two different methods to encourage towel reuse at a hotel.[99] The first message encouraged guests to help save the environment, while the second read "Join your fellow guests in helping to save the environment. Almost 75% of guests reuse their towels during their stay." Researchers saw a 26% increase in towel reuse with the second message. Guests don't like being told what to do, but the social pressure of what others are doing can be highly influential.

Given the promising research on the influence of social norms, universities are in a perfect position to start a new norm, changing trends and influencing individual behavior. Although there are several challenges, inherent to both universities and sustainability, with strong leadership and strategic vision they can be overcome. In this section, I will outline the research explaining why social norms are powerful in motivating behavioral change and how

[97] Saadi Lahlou, *Installation Theory: The Societal Construction and Regulation of Behaviour*, 1st ed. (Cambridge University Press, 2018), https://doi.org/10.1017/9781316480922.
[98] Jessica M. Nolan et al., "Normative Social Influence Is Underdetected:," *Personality and Social Psychology Bulletin*, May 9, 2008, https://doi.org/10.1177/0146167208316691.
[99] Noah J. Goldstein, Robert B. Cialdini, and Vladas Griskevicius, "A Room with a Viewpoint: Using Social Norms to Motivate Environmental Conservation in Hotels," *Journal of Consumer Research* 35, no. 3 (October 1, 2008): 472–82, https://doi.org/10.1086/586910.

first movers, like universities, can use this research to turn their own carbon neutrality efforts into an effective tool for demand intervention, both inside and outside the academic setting.

Descriptive Norms

Research on social norms commonly breaks up norms into two main categories, descriptive and injunctive norms. Descriptive norms refer to what is commonly done by others. This is similar to the towel or line experiment where participants engage in a certain activity simply because they see others around them doing the same thing. Social researchers point to several motivations for descriptive norms. One is that individuals simply don't want to stand out or ostracize themselves by dissenting from the general opinion. This desire to fit in pushes individuals to conform to the masses even if doing so is contrary to what they might otherwise do. Fitting in is incentivized by praise and shame, although descriptive norms rely more heavily on the latter. While fitting in is rarely praised, those who do not conform to norms clearly stand out. Cristina Bicchieri gives the example of social greetings, where conforming goes unnoticed but defecting is interpreted as rude and hostile.[100] Finally, individuals rely on descriptive norms, even arbitrary ones, to inform decision making.[101] Making decisions often involves knowing all the relevant facts, rarely an easy task. Relying on a large sample size gives legitimacy to a decision and offers an insurance policy on otherwise risk decisions. Rather than having to weigh all the pros and cons, one can simply follow the crowd, assuming that the leader took the time to deliberate such considerations and the strength of followers reinforces this logic.

[100] Bicchieri, Cristina. Norms in the Wild: How to Diagnose, Measure, and Change Social Norms. Oxford University Press, 2017.
[101] "Even Arbitrary Norms Influence Moral Decision-Making | Nature Human Behaviour," https://www.nature.com/articles/s41562-018-0489-y.

Injunctive Norms

Injunctive norms, on the other hand, reflect desirable behaviors or what ought to be done. Bicchieri holds that injunctive norms create greater normative expectations than descriptive norms, as the praise and blame incentives carry more weight. Injunctive norms relate more to morality. Those who conform to injunctive norms don't merely want to fit in but want to be seen as a good person. Furthermore, those who disobey injunctive norms may face harsher social shame. These incentives factor into the individual cost-benefit analysis, nudging people towards what are seen as more desirable behaviors. Studies find that this social accountability is not replicated with other social practices.[102] Although the carrot and the stick are not perfect, and many individuals do not mind social shame, injunctive norms are powerful incentives towards internalizing new norms.

On the individual level, injunctive norms change the balance of costs and benefits of particular behaviors. However, as Cristina Bicchieri points out, these decisions are not made in isolation.[103] Rather, norms can be further understood as a type of prisoner's dilemma game since one individual's choice is conditional on what others do. In a normal prisoner's dilemma, an individual actor will take the self-interested approach. However, Bicchieri argues that for social norms, the game becomes a coordination game where equilibrium is reached through conforming. For those motivated by social approval, conforming to moral expectations is in their best interest. Thus, new injunctive norms, centered on selfless behavior, may gain traction for self-interested reasons.

[102] Brennan, Geoffrey, Lina Eriksson, Robert E. Goodin, and Nicholas Southwood. *Explaining Norms*. Oxford New York: Oxford University Press, 2016.
[103] Bicchieri, Ryan, Cristina, Muldoon, and Alessandro Sontuoso. "Social Norms." In *The Stanford Encyclopedia of Philosophy*, edited by Edward N. Zalta, Winter 2018. Metaphysics Research Lab, Stanford University, 2018. https://plato.stanford.edu/archives/win2018/entries/social-norms/.

Furthermore, with each iteration of the game, efforts to conform to norms signal an ability and willingness to coordinate with other players through reciprocity and mutual understanding. An evolutionary approach to norms views such cooperation as integral to forming prosocial behavior patterns. Such behavior begins as young as infancy, and by mid-childhood sensitivity to norms for collaboration is fully developed.[104] This concept of reciprocal altruism highlights specific scenarios were "being the nice guy" provides a salient model for followers.[105] Repetition of such behavior is interpreted as a path of least resistance. Simply put, following adaptive behaviors is less cognitively demanding than trying to decipher the correct action independently.[106] Using an expected value calculation, followers are able to learn from past coordination efforts and imitate this success to gain social praise and avoid sanction for non-conformity.

Understanding descriptive and injunctive norms separately gives greater insight into their respective strengths, but harnessing the two together yields the most effective results. Research from Robert Cialdini finds that in a smoking experiment, the highest percentage of subjects were persuaded to quit when they had knowledge that others were quitting and felt that the public no longer viewed smoking as normal and began showing disdain for such behavior.[107] This combination of empirical and normative expectations drew individuals towards the new norm and incentivized them away from their old habit. Another study found that subjects were more likely to litter in a dirty place than a clean one, highlighting the descriptive norm that no one else

[104] Bailey R House, "How Do Social Norms Influence Prosocial Development?," *Current Opinion in Psychology*, Early Development of prosocial behavior, 20 (April 1, 2018): 87–91, https://doi.org/10.1016/j.copsyc.2017.08.011.
[105] "Robert L. Trivers, The Evolution of Reciprocal Altruism - PhilPapers," https://philpapers.org/rec/TRITEO-4.
[106] Cyril Hédoin, "J. McKenzie Alexander, The Structural Evolution of Morality," *Œconomia. History, Methodology, Philosophy*, no. 1–3 (September 1, 2011): 472–76.
[107] "A Focus Theory of Normative Conduct: A Theoretical Refinement and Reevaluation of the Role of Norms in Human Behavior - ScienceDirect," https://www.sciencedirect.com/science/article/pii/S0065260108603305.

is littering and injunctive social objections to littering.[108] In an area where there was litter, however, the descriptive norm goes away, and even though social shame for littering might still exists, it is seen as less prevalent or powerful.

Trending Norms

While this research is promising for norms that have reached maturity, Cialdini's research also found that when only a small minority of actors follow a norm it may actually backfire. For instance, few individuals take full measures to reduce their GHG emissions. Highlighting the small percentage of those who reduce emissions may be interpreted as a moral outgroup of "do-gooders" as opposed to a widely followed norm. Actors tend to heavily weigh majority opinion, even if misguided, and discredit minority opinion. In a study where low engagement in health protective behavior was intended to alarm participants, it instead reinforced descriptive norms that such behavior is unnecessary.[109] For carbon neutrality, those who go to further measures to reduce their carbon footprint may easily be dismissed at fervent environmentalists, separate from the everyday behavior of the masses.

In such cases trending norms emerge as a powerful tool. Research on trending norms shows that when individuals see an upward trajectory, they predict such behavior is likely to continue.[110] As a result, there is an incentive to join this trend early and be ahead of the curve, for strategic and social reasons. The study went on to find that communicating increases in popularity were more effective than communicating aggregate popularity, as individuals wanted

[108] Cialdini, Robert & Reno, Raymond & Kallgren, Carl. (1990). A Focus Theory of Normative Conduct: Recycling the Concept of Norms to Reduce Littering in Public Places. Journal of Personality and Social Psychology. 58. 1015-1026. 10.1037/0022-3514.58.6.1015.
[109] F. Marijn Stok et al., "Minority Talks: The Influence of Descriptive Social Norms on Fruit Intake," *Psychology & Health* 27, no. 8 (2012): 956–70, https://doi.org/10.1080/08870446.2011.635303.
[110] Chad R. Mortensen et al., "Trending Norms: A Lever for Encouraging Behaviors Performed by the Minority:," *Social Psychological and Personality Science*, December 27, 2017, https://doi.org/10.1177/1948550617734615.

to feel that others would be joining this behavior in the future. While descriptive and injunctive norms are important for understanding how norms can eventually become powerful motivators once developed, trending norms likely provide the best guide on how to proceed with carbon neutrality efforts at universities. I will now explore how universities can use this research to build upon their own efforts and convince others to follow in their footsteps.

Creating New Norms

Given the promising social research on changing norms to create a progressive domino effect in society, I will now explore how universities have, and can continue to, create a new social norm surrounding carbon neutrality. Since 2006, when The American College and University Presidents' Climate Commitment was founded, universities have been first movers in advocating and taking action on climate change. While a few small companies had begun pledging carbon neutrality in the early 2000s, there was little momentum behind this movement and no major actors had taken the imitative. Only a small coalition of 12 university presidents originally signed the founding pledge, but by September of 2007 the number of universities had jumped to 336. Understanding how this small group of universities expanded into the 677 universities and growing highlights the power of norm changes to incentivize others to follow. I will explore how the initial group of universities were able to act as first-movers to motivate fellow universities to join in pledging carbon neutrality and how these efforts can also create norm changes on and off campus, prompting faculty, students, and potentially large actors to make a similar shift.

First Movers

When creating a new norm first movers often must confront significant obstacles or penalties. They may be ostracized for their behavior and face an uphill battle to make their norm change accepted. As such, first movers are often worried of facing negative consequences for transgressing certain norms and seek assurance. Universities, however, are in a unique position where penalties for dissenting from popular opinion carry less influence. They have low norm sensitivity and less conflicting interests. This was likely a large influence in the role universities have played in past social movements I highlighted and why they were able and eager to be among the first to push for carbon neutral commitments

Rather than overwhelming stigmatization, carbon neutrality's main battle is with incentives. Climate change involves several prisoner's dilemma problems, and taking action to reduce emissions is one of the most difficult. It is collectively beneficial for everyone to reduce emissions, yet every individual actor wants to free ride and no one wants to be the sucker who puts in all the work while everyone else is allowed to benefit. Aside from good will, many of the first universities who signed carbon neutrality pledges were betting on the fact that their actions would serve as a signal to other players. When these actors sense an upward trajectory there is an incentive to hop on and be ahead of the trend.

First movers took a risk in pledging carbon neutrality, but they also changed the incentives for others to join shortly after. Those who jumped on early would be praised for taking action before doing so officially become a sanctioned norm, while those who stalled might fear social shaming from their colleagues, tarnishing their reputation. One university president referred to this "bully pulpit" as one of the most powerful motivators for rapid change.[111]

[111] Claudia H. Deutsch, "College Leaders Push for Carbon Neutrality," *The New York Times*, June 13, 2007, sec. Education, https://www.nytimes.com/2007/06/13/education/13green.html.

Universities may be among the first to act, but this action can only preside over majority influence if relevant actors view the first movers as prestigious. Looking within academia, which institutions pledged carbon neutrality first likely had an important influence, specifically schools with big names or influence in their respective circles. Outside academia, there is a larger question regarding the influence of universities on external actors such as government, corporations, or citizens. This legitimacy can be achieved through prestige strategies, where first-movers display competence in valued domains to elicit admiration.[112] Inferring an absolute answer to such a subjective and individual interpretation will never be precise, but universities are generally viewed with prestige for "conducting and applying research and offering high quality study programs."[113] Universities are not likely to start a new fashion trend, yet their role in society as homes for highly specialized experts lends them legitimacy on normative subjects. This expertise serves as a signal, universities carry unique information in society, and there is clear value in following these particular actors, even over majority opinion. Such influence will not hold for all, but this can work to break down conformism in an attempt to convince the consensus that carbon neutrality should not only be viewed as possible, but expected.

Reputation and Pledges

Another hurdle for carbon neutrality is that behavioral change takes time due to unique challenges. Achieving carbon neutrality does not happen overnight, it is a long continuous process and at the time of signing many universities did not expect to accomplish this goal for at

[112] Ángel V. Jiménez and Alex Mesoudi, "Prestige-Biased Social Learning: Current Evidence and Outstanding Questions," *Palgrave Communications* 5, no. 1 (February 19, 2019): 1–12, https://doi.org/10.1057/s41599-019-0228-7.
[113] Peter Maassen et al., "The Place of Universities in Society," *University of Oslo, Körber-Stiftung*, 2019, https://www.guc-hamburg.de/press/study-place-of-universities.pdf.

least 30 to 40 years. Given this vast time horizon, any momentum around norm change could easily die out. That is why publically announcing pledges to achieve a change in behavior is a powerful tool studied by norm change experts.[114] One study looked at recycling rates of participants and found that signing pledges raised awareness, increased social pressure, and ultimately led to higher recycling rates.[115] When a university commits to a certain goal, they put their reputation on the line if they fail. Failure to meet targets becomes a mark of shame and can lead to a loss of credibility.

Universities not only knew that this goal would take a lot of time, but that they would have to figure things out as they went, working to replace centuries of fossil fuel use which has become engrained into almost everything we do. Thus, while pledges were a powerful signal, without corresponding action, over time they could grow weaker. Actors could receive the publicity and praise that came with announcing an ambitious target for carbon neutrality, knowing that once the spotlight was removed there would be little regulation or public attention. The incentives seem ripe for abuse, yet fortunately regulatory bodies, and strong leadership committed to following through have paved the way for real progress.

Climate Action Plans (CAP) are one way universities were able to demonstrate commitment to action. CAPs were formed and published as evidence of concrete plans to take action, outlining a blueprint of how the university plans on tracking and reducing its carbon footprint. Furthermore, while many parts of these plans involve long-term commitments, in the

[114] Bicchieri, Cristina, and Hugo Mercier. "Normand Beliefs:How Change Occurs." In The Dynamic View of Norms, n.d. https://cpb-us-w2.wpmucdn.com/web.sas.upenn.edu/dist/2/334/files/2017/05/norms_and_beliefs-_how_change_occurs_copy-1dywraz.pdf.
[115] Margaret A. Reams and Brooks H. Ray, "The Effects of Three Prompting Methods on Recycling Participation Rates: A Field Study," *Journal of Environmental Systems* 22, no. 4 (January 1, 1992): 371–79, https://doi.org/10.2190/5EJN-QJH9-VWAW-KL3T.

interim leaders have focused on low-hanging fruit or easy and quick implementations to signal legitimacy and trust behind their intentions.

Just as the first 12 universities to sign their pledges both received praise for their action and pressured other schools to follow suit, the first universities to actually accomplish their goal on an accelerated timeline take advantage of these same two incentives. Middlebury College, for instance, was one of the first small liberal arts colleges to achieve carbon neutrality in 2016, pressuring rival schools to catch up. Even more impressive, American University achieved carbon neutrality in 2018, two years ahead of their intended goal. This was particularly impressive given substantial challenges the university faced with a larger student population and urban location. These schools are also joined by Colgate University, the University of San Francisco, Bates College, Bowdoin College, and Colby College, all having achieved full carbon neutrality.[116] While not every university will be as ambitious, slackers will slowly grow more obvious as more universities race to be among the first to reach their goals.

Another way universities are incentivized to take real action on climate change is to score well on several "green rankings" which have emerged to provide the praise and blame necessary to motivate behavior. From the coveted top 10 list of green colleges to flouting LEED certified buildings on campus, there is a clear benefit for universities that can back up their ambitious pledges with concrete and visible action. This of course might not send perfect incentives. Universities might become motivated to meet criteria identified by college ranking companies, however, many organizations have formed to solve this problem. The Association for Advancement of Sustainability in Higher Education (AASHE) created the Sustainability Tracking, Assessment and Rating System (STARS) program to encourage transparency and

[116] "Colleges Commit to Carbon Neutrality. Getting There Is Hard," https://secondnature.org/media/colleges-commit-to-carbon-neutrality-getting-there-is-hard/.

merit rankings on metrics that provide real carbon reductions.[117] STARS accomplishes several important goals for helping universities set the standard in sustainability. It encourages knowledge sharing among universities, not only in tracking their carbon footprint, but efficient approaches to reducing emissions and creative ways of incorporating this work into the classroom and larger campus community. Finally, through a bronze to platinum rating system that rewards real progress, universities can be held to a reputable standard without concerns of abuse.

Leadership

While signing pledges was an important step in raising awareness of a new norm, just as vital was the individual leadership backing the writing. University presidents needed to both acknowledge the ambition and importance of the task ahead, while also convincing others to follow in their footsteps. I will now explore the importance of leadership in bringing new norms to fruition and inspiring followers to jump onboard.

When faced with ambitious goals like going to the moon, winning a war on poverty, or mitigating climate change, leaders often like to provide easy answers. However, leaders must be realistic about the challenges they will face and sacrifices that need to be made. To achieve carbon neutrality money will need to be reallocated, budgets may need restructuring, and new positions will be required. Leaders who are upfront about such challenges are more convincing and articulate the abrupt transition in a more approachable and realistic manner.[118]

[117] The Sustainability Tracking, Assessment & Rating System. "About STARS." https://stars.aashe.org/about-stars/.

[118] Wendy Maria Purcell, Heather Henriksen, and John D. Spengler, "Universities as the Engine of Transformational Sustainability toward Delivering the Sustainable Development Goals: 'Living Labs' for Sustainability," *International Journal of Sustainability in Higher Education* 20, no. 8 (January 1, 2019): 1343–57, https://doi.org/10.1108/IJSHE-02-2019-0103.

Leadership and credibility is especially critical for selling a controversial vision. Research on leadership and ambitious goals shows that while selling followers on the vision is important, even more significant is the actual leadership itself. Followers want to be captivated by a confident, credible, and popular leader to buy-into. Those who agree with the vision are further inspired by the example set before them, however, even those who disagree with the vision can often be persuaded simply on the merits of the leaders. [119] Further social research emphasizes that charismatic leaders use a special set of linguistic techniques in an aim to break down and then rebuild or re-align the world views of followers.[120] Most challenging, and important, for leaders is building the trust necessary to break past tradition and guide followers on a new course. While this general theory is not always applicable, examples from JFK to Gandhi serve as reminders of how powerful a captivating leader can be, especially when followers buy into both the vision they are selling and the leader themselves.

Social research also backs up the importance of strong role models in norm change as followers look for "belief managers" to guide their behavior. In one study followers were 13% less likely to free ride on a public good scenario when a leader was setting an example.[121] Further research confirms that leaders are especially powerful for shaping followers initial beliefs. [122] While many carbon emitting behaviors are engrained into our routine and have become automatic, individuals have rarely questioned the validity of these decisions. By suggesting to

[119] John C. Maxwell, *The 21 Irrefutable Laws of Leadership Workbook: Revised and Updated* (HarperCollins Leadership, 2007).
[120] C. Marlene Fiol, Drew Harris, and Robert House, "Charismatic Leadership: Strategies for Effecting Social Change," *The Leadership Quarterly* 10, no. 3 (September 1, 1999): 449–82, https://doi.org/10.1016/S1048-9843(99)00021-1.
[121] "The Effect of Leadership in a Public Bad Experiment - Erling Moxnes, Eline van Der Heijden, 2003," https://journals.sagepub.com/doi/abs/10.1177/0022002703258962?casa_token=7Hk9TF7JNK4AAAAA:feuGisVH6o5e4PeCWDBYW9q4u9cDTh3EHgRzYfixWUU-9vcIi0O46uJ01tYJ3RhftLVWv28B4SdM.
[122] Bicchieri, Cristina, and Hugo Mercier. "Normand Beliefs:How Change Occurs." In The Dynamic View of Norms, n.d. https://cpb-us-w2.wpmucdn.com/web.sas.upenn.edu/dist/2/334/files/2017/05/norms_and_beliefs-_how_change_occurs_copy-1dywraz.pdf.

followers that their normative beliefs are in fact misguided, followers may take the leader's credibility into account and follow a figure of authority. Thus, *who* starts a norm change is of great importance, and university presidents themselves, and the organizations they represent, have realized that they can use their credibility to influence others to follow.

Pushing back, while leaders should be lauded for the strong leadership required to garner support behind the carbon neutrality movement, the incentives for presidents signing the pledge and the leadership that will be required to carry it out are very different. In this case, the president signing the pledge received the immediate glory and praise for agreeing to undertake such an important and difficult task, yet the majority of leg work would challenge future presidents. This presents an interesting dilemma for leadership theorists. On one hand leaders are promoting a positive outcome and are likely heavily involved in setting the foundation and the hard work of planning. Yet, while the end result may be positive, there's also a chance those in leadership positions were perhaps too eager to jump into this ambitious project without proactively making long-term plans. Even though leaders who signed pledges likely had a variety of motives, their commitment alone was sufficient to spur behavioral change in followers.

Fortunately, many of the steps leaders have taken fit in with research on successful leadership and ambitious goals. In an empirical analysis of leadership, one study highlighted three key differential factors: a strategy management process, performance measures, and proactive support from external stakeholders.[123] University presidents acted quickly to create a strategy management process with CAPs, many numbering hundreds of pages, outlining how

[123]Kelman, Steven, and Jeff Myers. "Successfully Achieving Ambitious Goals in Government: An Empirical Analysis." The American Review of Public Administration, vol. 41, no. 3, May 2011, pp. 235–62. SAGE Journals, doi:10.1177/0275074010380450.

sustainability can be incorporated into all aspects of the campus, and timelines for achieving these goals. Performance measures come from self-reporting data through non-profits like Second Nature which help universities achieve this goal, as well as the STARS ranking system.

Finally, there are numerous external stakeholders that surround presidents, serving as valuable resources to bring these pledges to fruition. These include new positions such as director of sustainability at universities, committees dedicated to sustainability, and finally the coalition of other universities working together, which serves as a support network. Together these criteria add credibility to the leadership behind these ambitious targets.

Tipping Points

Finally, research on norm change highlights the importance of tipping points. Universities may work for months or years to publicize their work on carbon neutrality, educate others on science or the importance of taking action, and pressure other actors to take similar steps. Progress may be slow at first, but it eventually reaches a fulcrum where rapid change emerges. There was certainly a tipping point when carbon neutrality on university campuses went from a lofty dream of 12 college presidents to the new norm in higher education, seen by the rapid surge of universities signing on to the agreement.

Another tipping point can be seen on campuses themselves. Many university campuses serve as a social "bubble" and students on the campus may see campus behavior as a new norm, even if it is not replicated outside. This provides universities an opportunity to convince the majority of students that sustainable behaviors they model are not just for a minority of environmentalists, but rather actions that should be taken by all citizens. From energy and water reduction, changing diet habits, and reducing or substituting energy intensive travel, students

may begin to view such behaviors as a new norm, and spread praise and blame of this norm throughout dorm halls and beyond. Physical location is especially important in modeling norm change, and university campuses offer an excellent opportunity to impact a large percentage of students who will disperse throughout society, potentially impacting more followers.

Research on the exact percentage of buy in for a new norm varies, with estimates ranging from just 10 percent of a population up to around 40 percent. [124] A study from the University of Pennsylvania found just how dramatic the shift can be, placing the critical mass of a population at 25 percent.[125] Using laboratory experiments and real world online observation, the researchers found that even at 24 percent, public opinion could not be swayed, yet when 1 percent more of the population switched sides on a new norm, whether it be gay marriage or marijuana legalization, there was a sudden and rapid shift in group dynamic, radically changing the majority opinion. Given this research, there is a sufficient incentive for universities to be one of many voices pushing for behavioral change in carbon neutrality, on even the off-chance they are part of the one percent that tip the scales in a new direction.

From Theory to Application: Maximizing the Impact

Given the potential for social norm change, both within universities and externally, it's important to examine exactly what types of changes universities should make that will be salient to followers while making the largest impact. Research on environmental behavior change separates this type of transformation into three main categories. Consumer behavior, for instance buying a hybrid car, direct behavior, such as turning off the lights, and finally civic behaviors

[124] "Minority Rules: Scientists Discover Tipping Point for the Spread of Ideas | News & Events," https://news.rpi.edu/luwakkey/2902.
[125] "Experimental Evidence for Tipping Points in Social Convention | Science,", https://science.sciencemag.org/content/360/6393/1116.editor-summary.

like voting or protesting. [126] While norm activation affects all three, it is most powerful for civil activities, accounting for 30 percent of variance in behavior. Civil behavioral change is an important underlying goal, however, high impact change, measured in GHG reductions, is found in direct behavioral and consumer change. [127] Although norm activation can account for 19 percent of variance in consumer change, this observed upper bound presents a unique challenge for universities looking to replicate high impact behaviors. I will now explore how universities can strive to improve these margins, looking at obstacles to consumer change specific to carbon neutrality and strategies for overcoming them. While some examples have been successfully modeled at universities, I also prescribe novel methods based on social norm and sustainability research. Finally, I will investigate sustainable behaviors themselves, highlighting changes that yield the greatest carbon reductions, as well as "greenwashing" behavior, which look good, but accomplish little. I will conclude with a discussion of carbon offsets as an option, which when done properly, can fill in for areas with technological barriers.

Information

The first, and likely easiest way to increase sustainable behavior is through information campaigns, and universities are particularly suited for this task. Often a lack of knowledge is a leading cause of reluctance to reduce carbon emissions, however, misinformation may play an even larger role. The most important factor in turning education into action is tailoring audience

[126] Paul C. Stern et al., A Value-Belief-Norm Theory of Support for Social Movements: The Case of Environmentalism, 6 HUM. ECOLOGY REV. 81, 82 (1999).
[127] Joni Hersch & W. Kip Viscusi, Allocating Responsibility for the Failure of Global Warming Policies, 155 U. PA. L. REV. 1657, 1682–83 (2007).

specific approaches based on group-specific reception. While increasing scientific literacy at one school might be the match to ignite student motivation at one school, it could backfire at another.

Likely the biggest issue universities must combat is misinformation. In an era of record high social media misinformation campaigns, it is unfortunate that today a high percentage of individuals are misinformed about climate change, specifically some of the key ideas outlined in the first chapter of this thesis.[128] In one study, a majority of college students acknowledged the reality of human-induced climate change, yet did not fully grasp the scale of many carbon intensive process nor appreciate the potential consequences.[129] While denialism of even the basic science is clearly a large hurdle for changing behavior, even those who self-reported as "concerned" and "alarmed" about climate change gave estimates that the scientific consensus surrounding anthropogenic climate change is 73% and 84% respectively, when in reality it is 97%.[130] This is due in part to targeted misinformation campaigns, often from those with vested interests. On the other hand, climate change is further polarized by apocalyptic claims which either paralyze action or reduce trust in the general scientific consensus.

In these two domains, universities are perfectly positioned to make a real impact. Through classrooms, guest lectures, and orientations universities can set the record straight, using their reputation and credibility as experts in the field to make sense of scientific models and offer practical solutions. This will be of special importance for those who self-report as informed about climate change and sustainability efforts, but have gaps in their knowledge. While scientific knowledge is a vital base, studies show that being informed on issues, such as

[128] John, Cook. "Turning Climate Misinformation into an Educational Opportunity ," n.d. https://www.climatechangecommunication.org/wp-content/uploads/2019/05/Cook_2019_TMEO.pdf.
[129] Sandra Wachholz, Nancy Artz, and Douglas Chene, "Warming to the Idea: University Students' Knowledge and Attitudes about Climate Change," *International Journal of Sustainability in Higher Education* 15, no. 2 (January 1, 2014): 128–41, https://doi.org/10.1108/IJSHE-03-2012-0025.
[130] Anthony Leiserowitz et al., "Climate Change in the American Mind: April 2019," SSRN Scholarly Paper (Rochester, NY: Social Science Research Network, June 27, 2019), https://papers.ssrn.com/abstract=3532010.

climate change, fracking, or gun control, does not always correlate with corresponding policy support.[131] This is often due to misconceptions about the solutions themselves as a risk to one's worldview. I will explore how reframing information campaigns on solutions and ways an individual can contribute reduces polarization and is more effective in motivating action.

Climate change is an already polarized topic, with clear partisan divides. While university political climates vary dramatically, the approach I outline uses social research to examine those most resistant to behavioral change. As I mentioned earlier, norms led by minority groups can be dismissed as do-gooders, going above the call of everyday morality. Fortunately, studies on climate change education campaigns give guidance for how to best inform those most resistant to this type of norm change. These approaches focus on framing solutions in approachable ways, showing that one can maintain their world philosophy while also embracing small changes.

One study found that reframing carbon neutrality as part of one's personal responsibility to not harm others creates a more universal injunctive norm, pushing individuals to hold themselves to a higher standard.[132] Further studies recommend separating carbon neutrality measures from environmentalism entirely, as many feel there is an all or nothing requirement.[133] This allows individuals, especially those who often tend towards denialism, to maintain their worldview while making substitutions in their everyday life as part of their duty to reframe from harming others. Finally, keeping the message in a positive frame, such as highlighting how cheap

131 Dan M. Kahan, "Climate-Science Communication and the Measurement Problem," *Political Psychology* 36, no. S1 (2015): 1–43, https://doi.org/10.1111/pops.12244.
132 Jellison, Jerald M., and Jane Green. "A Self-Presentation Approach to the Fundamental Attribution Error: The Norm of Internality." Journal of Personality and Social Psychology 40, no. 4 (April 1981): 643–49. https://doi.org/10.1037/0022-3514.40.4.643.
133 Vandenbergh, Michael, and Anne Steinmann. "The Carbon-Neutral Individual." *NYU Law Review*, November 7, 2014. https://www.nyulawreview.org/wp-content/uploads/2018/08/NYULawReview-82-6-Steinemann.pdf.

renewable energy can save lives, leads to better reception than negative statements that make the situation seem hopeless. [134]

These studies demonstrate that university administrators and professors must carefully craft how they go about dismantling misinformation and building new knowledge without isolating those most resistant to change in the process. Luckily, solution-based approaches to education maximize reception for the largest audience. For students sympathetic to climate change science, high impact behavior changes such as reducing flights, meat consumption and individual automobile travel allows them to act on scientific evidence, reinforcing the importance of the task and providing direct ways to make tangible changes. For those resistant to climate science, highlighting "win-win" solutions such as energy efficiency measures or cheap renewable energy, appeals to free market ideals, thus not threatening their ideology while highlighting ways they can wet their feet.[135] This proves that solutions do not revolve entirely on sacrifice, and that there are often economic benefits in addition to doing the right thing. Maximizing the number of stakeholders receptive to these educational campaigns accelerates acceptance of new norms. Campuses that stress climate science in the classroom to a broad group of students will be best positioned to see the greatest norm acceptance of internal carbon neutrality efforts. These will be further enforced through clever incentives many universities are testing.

Incentives and Practicing Skills

[134] Paul Schultz and L.C. Zelezny, "Reframing Environmental Messages to Be Congruent with American Values," *Human Ecology Review* 10 (December 1, 2003): 126–36.
[135] Jessica; Feygina Santos, "Responding to Climate Change Skepticism and the Ideological Divide," *Michigan Journal of Sustainability* 5, no. 1 (2017), http://dx.doi.org/10.3998/mjs.12333712.0005.102.

Education builds a crucial foundation and to build upon this, universities are also experimenting with different incentive programs with promising results. Some examples include making the right thing to do the easiest, turning sustainability into a competition, and reinforcing norms through reminders and practice. These pilot programs prove that sometimes a clever nudge is sufficient to jump start small behaviors which can eventually build into long-term habits.

Often the quickest way to build acceptance of new behaviors is to remove barriers. The average individual simply follows the path of least resistance when making everyday decisions. Consider an everyday example of recycling a plastic water bottle. There is little confusion, almost everyone knows that while plastic bottles are bad for the environment and while reducing consumption is the best method of alleviating this harm, the next best way is recycling. Yet, a quick glance at an average trash can will likely yield dozens of these products. One solution is simple, next to every trash can, put a recycling bin, clearly labeled and visible, especially near areas of consumption. Faced with a choice between two identical options, a study at universities found students will follow the new norm if it is easier and clearly identifiable. [136] This same logic applies to many other applications. Universities can offer better parking for hybrid vehicles, plug-in stations for EVs, give out free reusable water bottles and fill campuses with refill stations, offer bike share programs and accessible shuttles to popular destinations. Many of these are not only easier, but can save both students and the university money, providing another powerful incentive.

Other methods are less obvious, but offer similar results. Nudge theory, popularized by behavior economist Richard Thaler, finds ways to increase certain behaviors without coercion.

136 "Effect of Number and Location of Bins On Plastic Recycling at a University," https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2998261/.

One study related to sustainability found putting sustainably sourced foods towards the front of the cafeteria increased demand for these items.[137] While more of an information campaign than a nudge, labeling foods with their carbon footprint increased knowledge on sustainable diet choices and directly lowered demand for carbon intensive red meat.[138] Lewis & Clark college used another kind of nudge by allowing students to opt-in to the purchase of sustainable energy for $20 per students. The program received 95% participation which allowed the school to increase wind energy to 22%.[139]

Other creative incentives seek to make sustainability competitive. Schools like Ohio State created a competition for energy use by hall and residence dorm, using smart meters and a prize incentive to increase compliance.[140] A similar competition between two rival liberal arts colleges, Bowdoin and Colby, yielded energy reductions of 7 and 8.7% respectively. The University of Hawaii created several energy challenges as part of the "Kukui Cup Project" which reduced dorm energy consumption by 15-20%.

Finally, many universities use behavioral cues, such as stickers in dorm rooms, to remind students to turn off lights or unplug unused electronics.[141] Phantom electricity from these devices can actually account for up to 10 percent of building energy use and are an easy way to make a significant impact. Other examples include signs in parking lots informing campus members that idling for more than 30 seconds uses more fuel than restarting the engine.

[137] Jolien Vandenbroele et al., "Nudging to Get Our Food Choices on a Sustainable Track," *Proceedings of the Nutrition Society* 79 (June 28, 2019): 1–14, https://doi.org/10.1017/S0029665119000971.
[138] *ibid*
[139] "Colleges Commit to Carbon Neutrality. Getting There Is Hard."
[140] "College Programs to Reduce Energy Consumption in Dorms," https://www.electricchoice.com/blog/college-programs-to-reduce-energy-consumption-in-dorms/.
[141] "Making Sustainable Behaviors the Norm at the University of Minnesota Duluth « Journal of Sustainability Education," http://www.susted.com/wordpress/content/making-sustainable-behaviors-the-norm-at-the-university-of-minnesota-duluth_2013_06/.

These effects may seem small and temporary, but there is a potential for positive inertia, in the campus and beyond, simply by practicing these behaviors on a daily basis. While many of the aforementioned examples are relatively minor, they serve as reinforcement to a new norm, reminding individuals of ways they can take action to mitigate climate change, even if they appear relatively inconsequential. If one engages in these practices enough, they become part of a routine, even if the incentive is removed. Furthermore, as part of a social norm, seeing these behaviors practiced routinely around campus reinforce the deductive and injunctive norms around these behaviors. Making such behaviors easier or attaching a reward are powerful and efficient methods of creating traction for a new norm and making it stick.

What Works and What Looks Good

Looking at specific carbon neutrality measures, I will now examine what steps universities are taking that yield the greatest carbon reductions. While many solutions offer both cost and GHG savings, these are behind the scene and at a large scale. These actions, while valuable, are of less use to individual norm change. I will briefly discuss different areas for reductions and how universities can balance these high impact practices with more salient, but less significant, day to day behavioral changes.

Any organization that wants to accomplish a massive task like carbon neutrality would likely look first to investments that require low upfront capital or pay for themselves, can be accomplished relatively quickly, and offer the greatest ROI in terms of GHG reduction. Luckily, data-backed studies provide a general guide on how to proceed, and many universities follow a similar model. The four main categories outlined for high efficiency reductions are energy efficiency measures including lighting, insulation, and motor-engine efficiency, low-carbon

energy such a landfill gas electricity or cheap renewables like solar or wind, carbon sinks such as forests, and behavioral change.[142] I have mainly focused on behavioral change throughout this chapter; however, behavioral change, while significant, is predicted to offer the least potential for GHG reductions of these four main categories. The other three categories offer the greatest results, but they often exist on an administrative level and present logistical, financial, and technological barriers which make individual replication difficult if not impossible. These areas provide a model for other universities or large actors to emulate, as I will explore later, but for the individual actor the majority of carbon reductions are not salient.

This provides a particular challenge. Just as universities are small actors relative to large coproations and countries, individuals too may feel that their contributions are too small to matter. As I argue in my last chapter, all contributions can be morally important, however, if actors view their actions as inconsequential, then norms may be interpreted as prioritizing looking good over doing good. This raises questions about greenwashing and moral hazards. Sustainability offices might tell students to use paper straws, compost and recycle, and fill a reusable water bottle, while significant carbon reductions happen behind the scenes. These individual behaviors may benefit the overall environment, but they are not sufficient for reducing climate related harms and must not be presented as such.

I have argued that actors with the greatest contributions to climate change should be responsible for a corresponding percentage of responsibility. This, however, is not mutually exclusive from what small actors can do. Similarly, behaviors with the highest ROI often exist on an organizational level, and are not available to individuals, especially students. Thus, an individual who cannot access many of these practices seems to have a stronger case to excuse

[142] "Pathways to a Low-Carbon Economy."

themselves of any duty. While these barriers may be a legitimate obstacle now, I still hold that what the individual *can* do is of moral and practical significance.

By reinforcing norms surrounding sustainable behavior, individuals add legitimacy and social support to a larger movement. Furthermore, they contribute to a mindset of shared responsibility vital for tackling the massive and unpresented project of combating climate change as a global collective action problem. However, I hold that many behaviors under the umbrella of sustainability must be contextualized. Just as norms created an incentive for universities to potentially make empty pledges, this same greenwashing can also spread to individual behavior, turning a culture of sacrifice into green materialism and conspicuous consumption. This has the potential to create a moral hazard, where individuals may feel relinquished of moral responsibility and social pressure by engaging in empty gestures.

Thus, universities must turn this dilemma into an opportunity for further progress, setting yet another precedent for transparency and research backed solutions which will delineate between meaningful efforts and faux sustainability. One method is turning "behind the scenes" efforts into learning opportunities and engaging students in the process. Solar arrays, energy efficiency measures, and land management can all be integrated into the classroom with hands-on learning to make them as accessible and salient as possible. Integrative learning paired with mindful behavioral change offers a win-win of meaningful change and education so students might take what they learn and apply it after they leave campus. Many students will eventually go on to leadership positions in business, government, and non-profits and will be able to apply lessons they have learned in high-impact areas of society.

Offsets

I have spoken in depth about areas where universities can and should make changes to the business as usual model, specifically around energy efficiency, vehicle standards, clean energy, and behavioral change. These categories encompass a large percentage of university emissions, but not all. In fact, on average at least 60% of all university emissions come from scope 3 emissions, which involve commuting, airline travel, and upstream and downstream purchases. For many of these activities, reduction and replacement is possible, through only to a limited extent due to technological limitations. Air travel, for example, ranks as one of the largest contributors to climate change yet is often needed for students who live far away or wish to study abroad. Faculty conferences also use a high allotment of a university's carbon budget. While alternatives exist and such attendance can be reduced, these conferences can be vital to sharing and creating new literature ins several fields. Thus, the question remains, can these behaviors coexist with a university's commitment to carbon neutrality? The answer, while not so simple, can be yes, and the solution lies with carbon offsets.

Carbon offsets have existed practically since the inception of carbon neutrality. The basic premise is purchasing credits which can serve as a sink for carbon, storing it underground, for example, or as a carbon free alternative that would not have otherwise occurred, like a solar field. These are just two example of many that exist in a constantly growing market. But with such saturation comes questions about quality and the ethics of buying "indulgences" which incentivize a business as usual lifestyle. Are carbon offsets consistent with the aims of carbon neutrality, the credibility of universities, and the type of norm change I outline? The answer: it depends. In this section, I will provide criteria to separate meaningful offsets from greenwashing and address moral hazard concerns.

As of 2018, the global market for carbon offsets was estimated to be around $40-120 billion.[143] Within this expansive market, offsets range in quality, assurance, and credibility. While many companies take scrupulous measures to back the legitimacy of their claims, cheaper and lower quality offsets are permitted without regulation. Literature on qualifying factors that separate good offsets from lower-tier alternatives hone in on a few key criteria.

The first measure is additionality or whether the activity funded through the offset would have occurred otherwise. Imagine ran investor builds a new wind farm, one they were set on building regardless of external influence. Then, after the farm is built, offsets are sold to cover costs of building this farm. Such an example highlights one type of offset where no additional benefit to the environment results from the purchase. Another concern with some offsets is bad incentives. While economic incentives, like cap and trade or a tax, have been effective in many environmental applications, sometimes these incentives can backfire. For instance, a study found that Chinese factories were paid based on GHG reductions. As a result, several factories ramped up their emissions beforehand so the reductions were higher, yet the net emissions remained roughly unchanged.[144] These bad incentives, while not ubiquitous, reveal problems that may arise, even in offsets with good intentions.

This relates to another criterion, double-counting. This has been especially contentious for countries like Brazil, who are arguing for the right to count their massive collection of rainforest as a carbon sink in their country footprint, while also selling offsets to other nations.[145]

[143] "Voluntary Carbon Market Insights: 2018 Outlook and First-Quarter Trends - Forest Trends," https://www.forest-trends.org/publications/voluntary-carbon-markets/.
[144] Damian Carrington, "Chinese Firms Blamed in Huge Greenhouse Gas Scam," The Sydney Morning Herald, October 27, 2010, https://www.smh.com.au/environment/climate-change/chinese-firms-blamed-in-huge-greenhouse-gas-scam-20101027-173yh.html.
[145] "Will Double-Counting Dust-Up Doom Katowice Climate Talks?," *Ecosystem Marketplace* (blog), accessed April 16, 2020, https://www.ecosystemmarketplace.com/articles/old-hang-up-over-double-counting-just-one-wrench-in-katowice-climate-talks/.

While organizations that certify carbon offsets seeks to ensure that no offset is not sold more than once, lack of regulation has made this a reoccurring problem that continues to mar the reputation of offsets.

Finally, for certain kinds of offsets, permanence can affect the lifespan and effectiveness of the offset. Planting trees is one method of removing carbon dioxide from the atmosphere. However, if there is a forest fire, which climate change increases occurrences of, this carbon is released back into the atmosphere. Even if the company providing the offsets is reputable and takes steps to minimize leakage, most offsets are not expected to last longer than 100 years, buying valuable time, yet not, perhaps, living up to the full essence of carbon neutrality.

While there are valid concerns for the offset market in general, highly vetted offsets are extremely efficient at removing carbon from the atmosphere with a high ROI. Planting costal mangrove forests stores up to 5 to 10 times as much carbon as an acre of rainforest.[146] Another great example is industrial gas destruction for HCFs and nitrous oxide, which is 300 times more potent of a GHG as carbon dioxide. Offsets like these offer real carbon reductions with scientific backing. It seems then, that universities might even consider skipping the arduous process of mitigation when they can simply offset their carbon footprint.

While this may seem like an appealing option, many push back and argue that even the most effective and highly regulated offsets are not morally permissible. Comparing the act of purchasing offsets to purchasing indulgences, one is allowed to continue their sinful behavior, having simply paid a small fee to do so. As a result, there may be a moral hazard where business as usual is incentivized and reckless behavior may increase, all while actors maintain a moral high ground.

[146] Umair Irfan, "Can You Really Negate Your Carbon Emissions? Carbon Offsets, Explained.," Vox, February 27, 2020, https://www.vox.com/2020/2/27/20994118/carbon-offset-climate-change-net-zero-neutral-emissions.

While this moral objection has valid points, I disagree that if an offset meets the criteria I have outlined it should have no place in an organization or individual's carbon neutrality plan. Earlier, I gave a thought experiment of punching someone in the face, and then paying them after for the damage inflicted. I argued there is no moral justification for such behavior since it violates one's autonomy, even if the sum matches the crime. I argue offsets are of a different nature than this thought experiment. In this case an offset, if credible, serves to remove the punch in the first place. Due to the dispersive nature of GHGs, a source on side of the planet and a sink on the other may truly counterbalance each other.

Even given such effectiveness, other moral philosophers attack the consequential framework itself. Michael Sandel argues there is more to weigh than simply net emissions. [147] He feels that rights, justice, and equity deserve equal consideration to quantitative measures. One thought experiment he offers to convey this argument is paying a fine to throw garbage into the Grand Canyon. Imagine, for instance, everyone who litters in this park is caught and fined, and then this money is used to fund employees who clean the park. In the case, the net trash is zero, yet there seems to be something inherently wrong with the kind of attitude where one, usually of greater wealth, is allowed to act without restraint while others, usually of lower income, are forced to clean up their mess. In this case there is also an opportunity cost, workers who could possibly be working to improve the park, are instead diverted to fix a problem caused by human behavior.

This prevailing attitude is of particular concern to norm change. It is possible that the progress in norm change I have outlined in this chapter could be reversed if actors believe behaviors themselves do not need to change and one can simply write a check. As Sandel writes,

[147] Sandel, Michael J. *What Money Can't Buy: The Moral Limits of Markets*. 1st ed. New York: Farrar, Straus and Giroux, 2012.

offsets might become "a painless mechanism to buy our way out of the more fundamental changes in habits, attitudes, and ways of life that may be required to address the climate problem."[148] While net emissions might remain the same, without new norms, high emission behaviors will not face the social shame needed for widespread acceptance. Those who buy offsets will be do-gooders and high carbon behaviors, such as driving an inefficient SUV, will be stripped of moral stigma. This removes any spillover or domino effect as buying offsets is not publically visible in the same manner as these behavioral changes.

While equity and justice deserve moral consideration, I hold that the lack of spillover-effect is the greatest loss of using offsets versus mitigating through behavioral change. In this sense, while some offsets may offer greater efficiency than behavior change, due to inconsistency, it can be difficult to truly ascertain the full impact of any offset purchased. Given this risk, and the lack of spill-over effect, organizations should avoid offsets when there are readily available alternatives to mitigate. Specifically, for scope 1 and 2 emissions, which an organization can directly control, real solutions should be prioritized. I argue, nonetheless, that there is a role for offsets in reducing scope 3 emissions where no alternative exists, often due to technological limitations. While faculty and students can purchase fuel efficient car, carpool, or take public transportation, they ultimately need to get to and from the campus when necessary. For these examples, offsets offer the next best alternative, a way for a university to reduce their footprint when all other methods are exhausted.

[148] *ibid*

Universities that purchase or create their own can follow certain steps for best practices. Projects in the vicinity of campus can help increase visibility and make a positive local impact. Finally, universities can exclusively purchase offsets pre-approved by credible organization, such as the Gold Standard founded by the World Wildlife Fund, which has a reputation for maintaining strict standards, taking into account the local social and economic effects of offsets in addition to maximizing the benefit of projects. With these criteria as a guide, universities can find a niche role for offsets while waiting for technology to catch up, setting a strong example for those who follow.

Large Scale Change

I have argued how universities can use internal campaigns to affect small individual actors, specifically students, and create a new social norm on campus. I will now argue that universities can create a similar shift, but for larger actors, such as corporations, states, or even nations, building upon similar social norm tools, while introducing strategic partnerships and knowledge sharing. The underlying idea is that universities face many unique obstacles as a first mover. Having achieved or made great strides in working towards the difficult task of carbon neutrality, universities are perfectly situated to guide others down the same path. An apt analogy can be seen with sledding. The first to go down the hill faces heavy and uncompressed snow, making it a slow and arduous process. However, after the first sled ride, the snow is packed down, and others are rewarded with a quicker and easier ride.

In this final section, I will start by looking at key criteria for partnerships between universities and corporations, and how both can maximize these relationships, specifically for collaboration on carbon neutral challenges. Finally, I provide several real world examples of

universities influencing large actors, either by working directly with partner institutions or sharing knowledge to achieve mutually beneficial outcomes.

University-Corporate Partnerships

Universities and other institutions, like governments or for profit corporations, have very different incentive structures and operations. A university has special obligations and goals that often conflict with profit driven interests. As former university president Peter Likins puts it, "A corporation's purpose is to maximize financial benefit while operating within societal constraints; the university primarily maximizes societal benefits within financial constraints." [149] Nonetheless, partnerships do exist, and when done properly serve to benefit both parties. Likins emphasizes that in such cases, universities are realistic about the importance of profit motives and industry accepts the need to make research public and accessible. Building off this framework, I will provide guiding principles to maximize this relationship for both parties, with a focus on finding common ground while remaining conscious of differences. Then, I will divide these partnerships into two broad categories: direct collaboration, such as consulting, and indirect collaboration, which includes norms, research, and training, using examples of current relationships that exemplify these opportunities. For the latter category, I will rely heavily on reports from the University of California's coalition of campuses, which have served as a "living laboratory" for carbon neutrality efforts, specifically solutions designed to scale up. While different in approach, all these efforts share the common goal of expanding upon existing carbon neutrality efforts, sharing knowledge to increase adaptation for some of the largest global emitters.

[149] "University-Corporate Partnerships," http://www.columbia.edu/cu/21stC/issue-3.1/likins.html.

Although such partnerships must face the intrinsic challenges of conflicting incentive structures, sustainability ventures provide unique opportunities for collaboration. The corporate sector rarely engages in knowledge sharing, seeking to profit of any novel innovation. However, the scientific urgency of climate change has led to a culture of transparency and collaboration not commonly seen.[150] This can be expanded through university-corporate alliances, which are most successful when both parties acknowledge their inherent conflicts, yet also bring something unique to the table. A study which summarized research on sustainability focused partnerships found that corporate partners look for projects with a strong business case and academic institutions which specialize in a core competency, setting them apart in some way.[151] Businesses are also looking to enhance their reputation and commitment to ESG (Environmental, Social, Governance) while learning leaner ways to reduce their footprint.[152] Furthermore, the demand from corporations for sustainability development is real and growing. In a global survey of 766 CEOs from 100 countries, 78% believed that companies should engage in sustainability related collaborations and partnerships, looking outside industry for novel approaches.[153]

On the other side, universities look for ways to solve real problems and learn from long-term partnerships, align faculty research with industry needs, and create learning and career opportunities for students. In these final sections I will provide examples of both direct and

[150] 10 G. Street NE Suite 800 et al., "Making Climate Companies' Business," World Resources Institute, June 27, 2013, https://www.wri.org/our-work/project/world-resources-report/making-climate-companies%E2%80%99-business.
[151] Giselle Weybrecht, "Partner With Business Schools to Advance Sustainability," 2015, https://www.unprme.org/resource-docs/businessbschoolpartnerships.pdf.
[152] Barbara Gray and Jenna Stites, "Sustainability Through Partnerships: Capitalizing on Collaboration," https://static1.squarespace.com/static/5d5156083138fd000193c11a/t/5d62ae9b2f2f230001e85db2/1566748369464/NBS-Systematic-Review-Partnerships.pdf.
[153] Lacy Peter et al., "A New Era of Sustainability UN Global Compact-Accenture CEO Study," 2010, http://livebettermagazine.com/eng/reports_studies/pdf/UNGC_Accenture_CEO_Study_2010.pdf.

indirect partnerships and recommendations on how to build upon these case studies, taking into account the needs of both parties.

Direct Collaboration

While less research is available on direct partnerships between universities and companies on sustainability efforts, these explicit partnerships serve as a model for what is possible, especially with the abundance of indirect assistance I will explore later. One study looked at three examples of corporate-university partnerships at Plymouth University in the UK, American University in Bulgaria, and Harvard University, using these case studies to extrapolate general results that can be applicable to future ventures.[154] First, Plymouth University highlighted how universities can serve as anchor institutions for large spread local change. Working with small and large local businesses, Plymouth University developed a regional innovation ecosystem, centered around a local circular economy. This partnership was unique in using sustainability as the glue to bring together the local business community into one innovation network, drawing in an impressive $40 million of public funding and $70 million of private investments.

At American University, administrators and students engaged with CEOs, particularly from the Bulgaria Soft Drink Association (BSDA), with companies including Coca-Cola and Devin Water. These CEOs were able to witness the value of internal behavioral change on campus and were inspired to use this educational experience as part of a long-term consulting engagement which is currently in progress. In fact, the strong institutional culture played a large

[154] Purcell, Henriksen, and Spengler, "Universities as the Engine of Transformational Sustainability toward Delivering the Sustainable Development Goals."

role in convincing these CEOs of the importance of keeping an open dialogue about sustainability at work and in private life.

Finally, Harvard University demonstrated the potential of a partnership as a "living laboratory" to test carbon neutral strategies through strategic engagements with local and global corporation. One example highlights how valuable the interdisciplinary nature of universities can be for leading the way in sustainability. A collaboration between Harvard's School of Public Health, Medical School, School of Engineering and Applied Sciences, Office for Sustainability worked with Google to co-create sustainable methods for construction of new buildings and renovations. In addition to this partnership, Harvard also seeks to share carbon neutral strategies with the Boston Green Ribbon Commission, a group of local business, civic, and institutional leaders. Specifically, Harvard focuses on research backed solution-based framing to increase reception and promote innovation.[155]

Harvard embodies the concept of a living lab by understanding that its campus, like many others, serves as microcosm of society, incorporating housing, food services, transportation, construction, energy, and building maintenance into one sustainability plan. This then creates a test bed where best practices emerge through trial and error and can be shared with partners. Of all the benefits of these collaborations, Harvard particularly shows how these direct partnerships benefit students, leading to interdisciplinary research opportunities, project-based learning, and engagement with business leaders.

Overall, these examples highlight three different methods for university-corporate partnerships, though, there are numerous other approaches possible. One key takeaway from all three universities was a feedback loop of engagement, where universities that publicized research

[155] C. K. Prahalad Ram Nidumolu, "Why Sustainability Is Now the Key Driver of Innovation," *Harvard Business Review*, September 1, 2009, https://hbr.org/2009/09/why-sustainability-is-now-the-key-driver-of-innovation.

and raised awareness on current initiatives were actively sought out for consultancy and custom research. Such projects will likely continue to grow as corporate demand for sustainability matures. I will now explore methods of indirect influence, whether through research, norm change, or training, which provide the best starting point to for universities that haven't formed these relationships to provide high-impact value or eventually transition towards direct partnerships.

Indirect Influence: An Opportunity for Greater Change

Although these indirect "partnerships" are less developed, universities committed to carbon neutrality are creating a model along the way, both as a norm of what is expected in society and a tangible guide for best practices, that large actors have and can continue to reference. In this final section, I will focus on the University of California as a powerful example of how universities can educate and set an example for similar large institutions, convincing them of the benefits of carbon neutrality and making the process seem less daunting. The transparency and depth of reports from the University of California is not an anomaly, and more universities could use it as a standard for knowledge sharing, which emphasizes scalability and future corporate integration.

With ten campuses, five medical centers, and three national laboratories, the University of California's carbon neutrality pledge is no small undertaking. Furthermore, the variation of campuses allowed for a living-laboratory approach where different techniques could be tested and compared. This ultimately led to the publication of two studies which reflect on challenges the university faced and opportunities for improvement and ten practical solutions that are scalable for states or even countries. In fact, the state of California, the 5th largest economy in the

world, used insights from these reports in guiding their own carbon neutrality efforts, and the campus was even visited by representatives from China looking for inspiration.[156] I will highlight key takeaways form these two research reports and argue that through similar reports universities can work together to help guide the world through carbon neutrality.

One of the biggest questions around carbon neutrality is what will it take and how much will it cost. From a business perspective, the latter question is crucial to convincing large corporations to even consider the idea. Without this financial data, it is much easier for efforts to be dismissed or put off. To this end, the University of California report titled "Overcoming Barriers to Carbon Neutrality" seeks to be very transparent and thorough about fiscal reporting.[157] Balancing funding constraints, debt capacity, and competing budget interests, administrators were able to highlight low-cost solutions that would keep operating costs as close to baseline as possible. For example, reinvesting energy efficiency savings in a revolving fund allowed universities to increase the carbon reductions of each dollar. The study found most energy efficient measures would start saving the school money within 5 to 10 years. Including these savings into cost analyses proves that many low-emission strategies are less expensive than they appear. Renewable energy provides another example, where administrators tested both the technology and the market. UC Berkeley and San Diego's campuses were used to run experiments on solar energy, battery storage, and micro grids to move away from carbon intensive forms of energy production. On the purchasing side, long-term contracts for solar

156 "Bending the Curve: Ten Scalable Solutions for Carbon Neutrality and Climate Stability," October 27, 2015, https://uc-carbonneutralitysummit2015.ucsd.edu/_files/Bending-the-Curve.pdf.
157 "Overcoming Barriers to Carbon Neutrality: A Report of the Carbon Neutrality Finance and Management Task Force," August 1, 2017, https://ucop.edu/carbon-neutrality-initiative/_files/overcoming-barriers-to-carbon-neutrality.pdf.

power offered the University cost savings and a fixed energy rate that can be locked in for decades.

The report goes on to list similar cost-focused recommendations for transportation, purchasing, offsets, and new building construction. Additionally, to further their understanding of costs and benefits, the university paid for third-party consultants to evaluate different pathways, and those results were published, providing further cost savings. Throughout the report, the authors note how these efforts can encourage and guide similar institutions, which often share more logistical similarities than differences. Given these similarities, there is a hope that research reports like this will increase the line of communication and knowledge sharing between academic communities and companies, developing skills and helping all parties involved advance their sustainable goals. The success of one institution, even relatively small, can be the success of all if knowledge is shared and more actors begin to buy in to the idea that this change is possible.

The report concludes by noting that science, engineering, and business will not be enough. To fill in the gaps, researchers emphasize the importance of social science research, particularly norms to shift understanding, attitudes and behavior. This reinforces the importance of cultural buy-in as the foundation for large-scale change. Other actors, whether corporations, states, or even national governments must also be aware of the limitations of "top-down" approaches to sustainability. Without this base, carbon neutrality efforts can only go so far. Luckily, universities across the country are modeling a positive example for carbon neutrality, proving that these necessary targets are not only feasible, but worthwhile. The University of California refers to its campuses as living laboratories for "the art of the possible," and often

merely proving a goal can be accomplished is a crucial first step in convincing reluctant actors to follow.

Conclusion

As the time of this writing, the current reaction to COVID-19 provides a near perfect analogy of how society has created new social norms for behavior based on scientific evidence and morally unacceptable levels of risk. Although there is a risk of getting the virus itself, the call for quarantining and social distancing focuses on doing one's part to help others. While one individual may be inconsequential in the larger picture, millions of individual actors taking similar steps to slow the spread of the disease can save lives. It would be easy for one actor to freeride off the good-will of others, but public opinion has largely shunned such behavior as selfish and reckless. Although measuring small levels of risk is difficult, and the causal relationship between actors and victims is more concrete with COVID-19, reducing spread of a disease passes the same expected utility test as reducing one's emissions.

More fitting, this effort was in part lead by universities. One of the first major shutdowns across the United States was of university campuses, some of which made the decision weeks before other major actors in society. This then spurred a very rapid and powerful chain reaction among universities, which eventually moved its way up to major companies and even government. Not only did universities feel pressured to take action in moving to online classes because other institutions around them were doing so, but there was also growing injunctive expectations that closing down the university was the new norm as part of a social responsibility to limit the spread of the disease. While many colleges and universities went remote to protect students or due to government pressure, other universities likely took their cues from trend setters in the academic community. When Amherst and Harvard College first shutdown and moved classes online, this put social pressure on other universities to follow suit due in part to

the influx of news articles and press. Of course, there was rational arguments behind these decisions, but the timing and pressure was highly affected by the rapid formation of a new trending norm.

It is clear that there was a spillover effect from universities' actions, leading the rest of society to take situation more seriously. Just as university carbon neutrality efforts send a signal about the urgency of the scientific data and the necessity of individual action, the rapid closure of practically all major universities in the US sent a signal to society before the waves of reported cases and deaths began to rise. Take another individual norm, wearing masks. In other cultures, particularly in Asia, wearing a mask is a norm associated with doing one's civil duty to prevent other from getting sick. In America, no one could have predicted that masks could catch on due to the stigma associated with wearing one and looking out of place. Yet, due in part to new social norms that have arisen, rooted in the urgency and gravity of scientific evidence, demand for masks outside the medical field have dramatically outpaced supply.

In both climate change and public health, the language of flattening the curve is used, acknowledging the harms of overly demanding solutions, but requiring society bring the risk down to manageable levels. The immediate danger of COVID-19, emphasized by growing infection and mortality rates, led to a very rapid transformation of norms and corresponding behavioral change that has been relatively successful in abating the worst damages of this deadly virus. Research on using analogies to teach climate change actually highlights analogies to medical diseases as a perfect example. Specifically, the similarities of human aggravated harms, progressively worsening damage functions, symptoms outside the range of past experiences, uncertainties for the future, side effects of treatments, and difficulty in reversing once past a

certain threshold.[158] Most critically, it is usually cheaper to proactively treat the underlying problem than dealing with the fallout later. Unfortunately, climate change, while similar on many levels, faces a time delay, thus making the consequences out of sight and mind. As I have argued, the moral reasoning behind inaction for a negative duty, regardless of time horizon, is inexcusable, yet the psychological explanation holds true. Unless we are able to start treating climate change with the urgency it demands, future generations will have to deal with the ramifications.

While reading the news on the current pandemic, I came across a quote from Michael Leavitt, the former Secretary of Health and Human Services, that I think applies perfectly to the pandemic we face now and the climate crisis we are heading towards. Leavitt said, "Everything we do before a pandemic will seem alarmist. Everything we do after will seem inadequate." I think this nicely sums up the challenge we face. Deniers downplay the science since it threatens their worldview. Others might dodge individual responsibility or underestimate the social influence of seemingly small actions. Finally, many will say carbon neutrality is not possible or unrealistic. I have argued all of these views are incorrect. Mitigating climate change passes a cost-benefit analysis and is supported by science. Individual actors play a role in this collective action problem, and given the moral urgency of the situation, small actions can yield unacceptable levels of risk. Finally, these actions are not in isolation and universities, as first movers, can initiate a chain reaction, proving carbon neutrality is both possible and expected and showing others how to get there.

Throughout this thesis I have referenced many domino effects. Some are deeply concerning, such as the positive inertia of climate feedback loops seen with latent heat or melting

[158] "The Promise and Limitations of Using Analogies to Improve Decision-Relevant Understanding of Climate Change," https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0171130.

ice caps. Others present moral dilemmas, like how behavior today can set in motion a chain of events that might commit future generations to a very different world, harming many during this violent change. Yet, in the face of a growing crisis, solutions too can scale to meet the challenge and create ripples in society. I have argued, optimistically I hope, that universities can have a local, national, and even global impact through teaching, advocating, and sharing solutions to climate change. What started as 12 tiny signatures now has the attention of the nation and the momentum to knock over much larger dominos. The goal is in sight and the path is paved, now all that is left is ensuring we get there before the timer runs out.