1 Introduction

Who recently announced a goal of reducing 20 million metric tons of GHG emissions? We have posed that question to dozens of audiences at public events and in university classrooms, and the answers we get invariably assume that government is the actor. In some cases the answers are cities like Seattle or New York. In other cases the answers point to states and provinces like Rhode Island or British Columbia, or countries ranging from China to small island states.

The correct answer? Walmart. Working with the Environmental Defense Fund (EDF), in 2010 Walmart announced the 20 million ton goal, and the effort ultimately yielded more than 28 million tons of emissions reductions between 2010 and 2015 from Walmart's suppliers in China and around the world. Moreover, on the heels of this achievement, Walmart announced the even more ambitious goal of reducing its GHG emissions between 2015 and 2030 by one billion tons, which would be roughly the same reduction that would be achieved by a government regulation that required the U.S. iron and steel industry to cut its emissions to zero.[1] Whatever your views are about Walmart, we suspect that taking a leading role in greenhouse gas (GHG) emissions reductions is not the role you envisioned for the company.[2]

In this book, we examine why climate debates so often default to an assumption that government must be the actor that responds to climate change and that the action must be some form of international agreement, or domestic law, policy or program. Although the climate problem will not be solved without government responses, we demonstrate that private actors – including corporations, advocacy groups, individuals and households, civic, cultural, philanthropic and religious organizations, colleges and universities, and hospitals – are achieving major emissions reductions in the United States and around the globe. We explain why they are acting, and we identify additional opportunities that could add up to a billion tons per year of additional emissions reductions over the next decade. A focus on actions by the private sector is particularly important because climate policy is deeply polarized along liberal and conservative

lines, but private sector responses, which we call private climate governance, can bypass "solution aversion" – the resistance to climate change that arises from concerns about a big government response.[3] A billion tons of emissions reductions per year over the next decade will not solve the climate problem, but these reductions will buy additional time for public opinion and public support to catch up with the climate science.

Corporate climate initiatives such as the Walmart example are the most visible example of private governance, and these initiatives have proliferated in the USA and around the world in the last decade. Walkers Crisps, the largest potato chip producer in the United Kingdom, feeling pressure to examine its carbon footprint, learned that because it was buying potatoes by the pound, farmers were responding by picking the potatoes when they were wet and storing them in humidified warehouses, only to have the company dry them before it turned them into potato chips. This process boosted energy use and carbon emissions, and wasted money. Similarly, an effort to identify potential carbon emissions reductions by Virgin Atlantic Airways revealed that providing pilots with information about jet fuel use could improve fuel efficiency pre-flight, in-flight, and post-flight. Research by several economists suggests that providing this information could lead to thousands of tons of carbon emissions reductions and hundreds of thousands of dollars of cost savings per year for Virgin Atlantic, and the ability to extend these findings to other airlines and transportation sectors has yet to be explored.[4]

Apple has pushed for lower carbon emissions from its suppliers in China. To address concerns that the suppliers could not reduce their carbon footprint because they could only buy coal-fired electricity, in 2015 Apple partnered with its suppliers to provide two gigawatts of renewable energy (the equivalent of roughly two to four major electric power plants) to these suppliers. In 2016, Apple took a similar step in Arizona, committing to build a major new solar power plant to offset the emissions from a new manufacturing facility.

In the United States, Microsoft, Google and dozens of other major companies have publicly committed to become carbon neutral. Hundreds of others have committed to less ambitious but still important emissions reduction goals. For instance, Dell Computer has committed to 40 percent carbon emissions reductions.[5] Some of these actions may have been taken in anticipation of near-term government regulations that look increasingly unlikely, at least in the United States, but many clearly are not the product of near-term government pressure.

Recent developments in our area, the U.S. Southeast, provide an example. The southeastern states would be the sixth-largest emitter if they were a country, and these states are not known as leaders on climate

policy.[6] Most have not only rejected state climate regulations, but also have litigated vigorously to prevent the federal government from enforcing national regulations that would reduce emissions from coal-fired power plants. Although these states are not pursuing carbon emissions reductions, Google, Facebook, and other companies are pushing utilities in the region to provide renewable energy for new facilities such as data centers, and they are extending their influence by encouraging other electricity buyers to do the same.[7]

Many of these efforts have occurred in a one-off, uncoordinated way, but in recent years private organizations such as We Mean Business, the Rocky Mountain Institute's Carbon War Room (CWR), CDP (formerly the Carbon Disclosure Project), the World Wildlife Fund (WWF), and Ceres have begun coordinating climate mitigation actions and quantifying the carbon emissions reduction potential of private climate initiatives across many sectors. Studies by these organizations suggest that our billion ton annual target for private climate governance is not unduly optimistic. In fact, in 2016 a joint We Mean Business-CDP report estimated that several corporate initiatives at the global level could achieve over 3 billion tons of annual emissions reductions by 2030.[8]

Climate Change and the Paris Agreement

Even if a private response is important in the United States, is it important on a global level now that the Paris agreement is in place? You would be justified in wondering about that given the December 2015 headlines around the world announcing the success of the Paris agreement:

"Nations approve landmark climate accord in Paris" (*The New York Times*)[9]

"COP21: Paris climate deal is 'best chance to save planet'" (*BBC*)[10]

"Chapter of Hope: India hails climate change, says it protects interests of developing countries" (*Asianage, India*)[11]

"Dilma says that global climate accord is 'just and ambitious.'" (*Natureza, Brazil*)[12]

In fact, the mood in the months after the Paris conference was so positive that World Bank Group President Jim Yong Kim felt the need to caution diplomats and policymakers to "wake up from the fog of success."[13]

What created that fog of success? The diplomats who participated in the Paris agreement negotiations were justifiably proud of their achievement. They avoided the rancor that had plagued international climate negotiations for many years. Finessing disagreements over the allocation of responsibility for causing the problem, the negotiators settled on voluntary, nationally determined commitments for the period from

2020–2025. They also agreed on a goal of achieving a global average temperature "well below" 2 degrees Celsius (2°C) above preindustrial levels and an aspiration of achieving 1.5°C. Other commitments focused on improving the ability to verify and coordinate compliance with the 2020–2025 commitments and an agreement to make further commitments for the post-2025 period.

The Paris Gap

Despite this progress, one thing was clear even before the US presidential election blew away the fog of success from Paris: The diplomats finessed but did not break the gridlock that has impeded the international process over the past two decades. Agreement was reached by stating an ambitious 2°C goal while lowering expectations about what the international process will deliver to achieve the goal over the next decade. Even with the full participation of the United States, the modest goal of the Kyoto Protocol – to cut developed nations' emissions 5 percent below 1990 levels by 2012 – was far in the rearview mirror at the Paris conference and was no longer even an aspiration of international negotiators for 2025, much less 2012.[14] In fact, the Paris agreement, even if all commitments are fulfilled, will allow an *increase* in global emissions of roughly 34 to 46 percent in 2025 over 1990 levels. These are emissions levels that will not keep the globe on track to achieve the 2°C target, much less the 1.5°C aspiration. Instead, even with full implementation of all Paris commitments, the globe is probably on a path toward a world with temperatures more than 3°C above pre-industrial temperatures.[15]

We call the difference between the emissions pathway necessary to achieve the 2°C goal adopted in the Paris agreement and the pathway that will occur even if all countries fully comply with all of their Paris agreement commitments the "Paris Gap." Even with full participation by the US, the Paris Gap is large: over the next decade, it averages roughly 3–9 billion tons of carbon dioxide per year, which adds up to a total of roughly 30–90 billion tons. This book focuses on carbon dioxide emissions from fossil fuel consumption and industry, and if we focus on these types of emissions, the Paris Gap is roughly 54 billion tons of carbon dioxide over the next decade, or an average of a little more than 5 billion tons per year. The Paris Gap will only widen to the extent the United States and other nations withdraw from the Paris agreement or otherwise fail to meet their commitments. In addition, although the agreement provides a process for new commitments for the period after 2025, the agreement also relieves the pressure on the participating countries to make additional emissions cuts before then. The Paris agreement thus acts not only as a floor of minimum

reductions that are likely to occur but also as a ceiling, limiting the maximum reductions that nations feel pressure to meet through 2025.

The Paris Gap is important. To achieve the 2°C goal of the Paris agreement, global emissions would need to decline by roughly 65 percent below current levels by 2050. A few decades after that emissions would need to become negative, meaning that more carbon is removed from the air through human activity than emitted.[16] To meet a more realistic 3°C target for warming, global emissions could grow slightly between now and 2050 but would need to drop significantly after that.[17] The emissions pathway over the next decade matters because the next round of reductions, even if they can still achieve a 2°C pathway, which we believe is unlikely, will need to be deeper and steeper than the policy process can be expected to yield without some near-miraculous technological developments or very high costs.[18] In addition, although no one can predict all of the effects of global temperature increases of 3°C or more, remaining on this path presents substantial risks. Temperature increases in this range will almost certainly increase the frequency and severity of deadly heat waves around the world. They also will increase the likelihood of crossing tipping points in the climate system and in human systems that could make the consequences of climate change, such as sea-level rise, even worse. In short, waiting a decade for national and international processes to yield more aggressive reductions is a risky option.

Closing the Paris Gap

So how should we close the Paris Gap? Until now, experts and policymakers have largely focused on how governments at all levels can respond. International climate efforts have focused on the motivations for national governments to reach international agreements and the policies that can be included in the agreements. One response to government gridlock at the national and international levels is to focus on those pollutants, such as soot, that are easiest to control because they cause current, localized harms and thus generate more public support for action.[19] Another is to bypass international gridlock by focusing on how small groups of nations can reach agreements that other countries may want to join over time.[20] Other approaches seek to bypass national gridlock by pursuing government action at regional, state, and local levels, an approach that has become known as a "bottom-up" response.[21] Yet others have focused on technology development or geoengineering in the event that mitigation efforts fail.[22] Several public-private campaigns also have attempted to mobilize corporations, religious organizations, and

others to push governments to act, particularly in the ramp-up to the Paris negotiations and in response to the US announcement that it would withdraw from the Paris agreement.[23]

All of these government-focused efforts are likely to be important over the long term. Yet after the 2016 US presidential election, it is clear that in the United States and many other parts of the world the public does not consider climate change important enough to pressure politicians to adopt more aggressive policies. At some point, the threat posed by climate change will become far more apparent to the general public, and politicians around the world will scramble to get in front of the parade. When that happens, many of the options that have been favored by climate policy analysts for decades, including a price on carbon that is adopted by all major emitting countries, may be viable. The evidence that climate change poses a genuine threat currently rests on detailed statistical analyses, though, and it may be many years before more directly visible evidence emerges. This suggests that a new era of public support for major emissions reductions may not begin for a decade or more.

The Emergence of Private Climate Governance

In this book we outline a new approach that shifts the focus away from government, not as a substitute but to buy time until substantial shifts occur in public support for climate mitigation. To bypass the gridlock over government responses to climate change, we explore how private climate initiatives can help close the Paris Gap over the next decade and complement more comprehensive government climate action when it occurs. Efforts to induce additional government action at the international, national and sub-national levels will be critical to closing the Paris Gap, but we make the case that governments are not the only important actors for climate mitigation – private actors are not just advocates for or against government action, but they can make an important, and perhaps essential, contribution on their own. In other words, closing the Paris Gap requires more than just government action; a concerted effort is needed to mobilize private actors to reduce their emissions and push other private organizations to do so as well.

As we mentioned at the outset, our analysis suggests that private climate initiatives in the corporate and household sectors alone can reduce carbon dioxide emissions by roughly a billion tons per year over the next decade, on top of the emissions reductions that could be achieved from government climate policies. These private sector–driven emissions reductions are not enough by themselves to limit global warming to 3°C,

much less 2°C or 1.5°C, but they can be an important piece of a larger strategy to buy time, improve the odds of avoiding catastrophic climate change, and reduce the costs and intrusiveness of the emissions reductions that will be necessary after 2025. Even after governments adopt additional policies, private governance can play a complementary role, providing additional information and motivation to achieve emissions reductions.

The private sector opportunity exists because new private governance initiatives can be started, and existing initiatives expanded, by organizations and individuals who are not subject to the barriers that confront governments. In fact, control over private governance initiatives is in the hands of the readers of this book and is not contingent on ending the deep government gridlock over climate change. In many cases private initiatives also cannot be blocked by the government policymakers who are doing what they can to prevent shifts away from fossil fuels.

A related advantage of private climate initiatives is that they have the potential to confound, if not bypass, the role that liberal and conservative worldviews play in delaying the response to climate change. By now, it is not news that worldviews shape beliefs about the climate science and attitudes toward climate mitigation.[24] People do not simply accept new facts and form a worldview, they begin with a worldview and engage in confirmation bias – they accept facts that fit with their worldview and reject those that do not. They also engage in motivated reasoning, seeking out those facts that will provide confirmation.[25] Equally important, as we mentioned at the outset, individuals engage in "solution aversion" – they allow concern about the policy implications of new information to affect whether they accept that information.[26] These are responses we all share to some extent, and they are an important source of the government gridlock on climate policy in the United States and many other countries. In the United States, roughly two-thirds of the population believes that big government is the greatest threat facing the country, suggesting that many view government solutions to climate change as a bigger threat than the climate problem itself. Private responses hold out the promise of tackling solution aversion by shifting the actor from government to private organizations and by shifting the action from legislation or regulation to a range of private sector initiatives. In other words, for those who are concerned about carbon emissions but fear big government more than climate change, private governance provides an opportunity to contribute to climate mitigation without requiring a change in worldview or support for unpalatable solutions.

Can private actions yield sufficiently large emissions reductions to be worth the effort? Our research suggests that private climate governance is not a sideshow but is one of the few ways to bypass government gridlock and

achieve major emissions reductions over the next decade.[27] International, national, and sub-national actions are obviously important, but private initiatives already are reducing annual global emissions by millions of tons through the individual and collective actions of corporations, private certification and standards groups, advocacy groups, religious organizations, colleges and universities, households, and other actors typically viewed as lobbyists for or against government action, not as important players directly in climate mitigation. In addition, new initiatives such as the private climate prediction market and climate legacy registry discussed in Chapter 7, along with a full-throttled effort to exploit the potential of the corporate and household efforts discussed in Chapters 5 and 6, can yield major new reductions.

Why do we believe that private actors can make this contribution? In this book we not only explore numerous examples of private climate governance but also develop a theory to explain why it has occurred and explore its potential moving forward. In some areas of policy, scholars have developed a new regulatory tool, and policymakers have later learned about it and pursued it. The idea of taxing pollution is an example: It was developed by economists in the 1960s and 1970s before becoming an accepted government policy tool in the 1980s and 1990s. Private climate governance has emerged the other way around: Corporations, advocacy groups, and others have acted in the United States and around the world, leaving scholars scrambling to explain what has happened and where these efforts might go in the future.

The examples of corporate climate initiatives we discussed at the outset arose without explicit government regulatory pressure, programs or resources. In other cases, initiatives organized or funded by governments have stimulated corporate climate actions. For example, the 2012 Rio Summit included a coordinated set of announcements by corporations and other "non-state actors" to reduce carbon emissions. Following up on these announcements, a concerted effort leading up to the Paris conference developed additional corporate and local government commitments, along with a registry to provide recognition for emissions reductions and a tally of the total claimed reductions from these organizations.[28]

After the announcement that the United States would withdraw from the Paris agreement, initiatives such as "We Are Still In" included statements of support by city and state governments as well as corporations and universities. As we have seen with the data center initiatives in the US southeast, though, in many cases governments have not been pushing or funding these types of efforts, and in some cases policymakers have even tried to discourage private actions. As a result, we believe it is a

mistake to rely solely on government efforts to stimulate climate change mitigation efforts.

Fortunately, there are many sources of pressure on private actors to reduce emissions. For instance, investors are playing a major role in motivating corporate emissions reductions. Through the efforts of CDP, investors holding roughly $100 trillion in assets have induced large corporations to disclose and reduce their carbon footprints, and these efforts at least arguably contributed to emissions reductions equal to a major emitting country. Efforts by other advocacy organizations such as Ceres and by socially responsible investment firms, which control trillions in assets, also push corporations to reduce emissions. They do so not only by threatening to divest from certain companies but also by exerting pressure through public reports, shareholder resolutions, letters to corporate executives, and other more informal efforts. Major corporations such as Apple and Hyundai, as well as other organizations such as Columbia University, have taken a more direct approach to the investor sector, issuing "green bonds" that are designed to fund energy efficiency and other projects at favorable rates.[29]

In some cases, private efforts are taking the form of private certification and standards programs, which often involve collaborations between advocacy groups, corporations, and other stakeholders. For example, private forest certification programs and other private forest initiatives regulate forestry practices and seek to reduce deforestation around the world. Many of these programs are taking steps to reduce the GHG emissions from deforestation, although the research is not yet clear on whether they are achieving that goal. On a related note, deforestation is often driven by global demand for palm oil and other commodities, and commodity roundtable efforts initiated by the WWF and other groups have sought to reduce the carbon emissions that arise from the production of these commodities.

On the home front, even though government regulation of household carbon emissions would be controversial in the United States and many other countries, private advocacy groups and corporations have reduced household emissions through new home energy disclosure programs, programs that offer employees incentives to achieve energy efficiency at home, voluntary carbon offset programs, efforts to provide individuals with feedback on their energy use, and many others. Government efficiency standards for vehicles and appliances have been important, but they are complemented by these types of private initiatives directed at the household level. Even if the government standards are rolled back, the private initiatives can mute some of the effects of the rollback. As we demonstrated in a 2009 study, contrary to the popular impression that

household efforts are merely feel-good distractions, the potential for these initiatives is not trivial: Within a decade, simple household energy efforts in the United States could reduce annual emissions of carbon dioxide by around 450 million metric tons, equal to the all of the emissions of the host country for the Paris agreement – France.

When we wrote the 2009 article, we were still following the conventional approach to climate governance, assuming that governments would adopt laws, policies and programs to achieve this "behavioral wedge" of emissions reductions. We now realize the extent to which governments at all levels face barriers to tackling household carbon emissions, and in this book we identify a wide range of private organizations that have the motivation and ability to implement many of the behavioral wedge initiatives. For instance, even simple energy efficiency legislation is now subject to political polarization and gridlock at the federal and state levels in the United States. Similarly, under current public utility laws, in most jurisdictions electric utilities have some incentive to promote efficiency or renewables at low levels, but they do not have incentives to sell less of their product overall. They have incentives for these efforts to achieve minimum levels of success but not to go viral because that could lead to what some industry officials have described as "revenue erosion" for the utilities. Private organizations and advocacy groups have responded by developing private initiatives that can reduce household energy use with state-of-the-art programs. Even in some traditionally liberal states state legislatures have rejected mandatory home energy disclosure requirements, but realtors and environmental groups have begun to work together to add energy information to the data typically provided in multiple listing services for existing and new home sales.

Once the role of private organizations as regulators of their emissions and supply chains becomes clear and once we move beyond thinking of private organizations just as advocates for or against government climate policies, many other new private opportunities become apparent. The Catholic Church is a good example. In the 2016 Papal Encyclical, Pope Francis spoke eloquently about the moral and religious imperative of addressing climate change, and his message was an important part of the effort to increase the pressure on government diplomats at the Paris conference. This is traditional thinking: A private actor is important because of its influence on government. Thinking of the Catholic Church through the lens of private governance leads to another option, though: The Church is not only an advocate for government emissions reductions but also a source of emissions in and of itself, and it is a private regulator of its energy suppliers and supply chain contractors. As a source, the back-of-the-envelope calculations we discuss in Chapter 9 suggest