

IT'S NOT TOO LATE!

***Crisis, Opportunity, and the
Power of Hope***



**Frances Moore Lappé
& Small Planet Institute Team**
Limited Edition for Your Feedback

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Crisis, Opportunity, and the Power of Hope

March 2021 Edition

By Frances Moore Lappé
& Small Planet Institute Team

Note to readers

We are delighted you've chosen to read our initial, online-only edition book. We wrote it because we find its stories of climate action so motivating and are eager for your input to make it stronger as well as your advice for sharing this edition ever-more widely. We prepared this book—for your review—during the height of the COVID-19 pandemic. We hope that publishing it initially online will make it easy for readers to weigh in. Then, we will incorporate all of your feedback and decide how best to publish the result. Also, a note about the “voice” in which the book is written. I chose to use the “we” voice often because this work is very much a team effort, as you will see in the extensive acknowledgements. When I am also referring to my compatriots, I use “we Americans.” The “I” voice I use only when referring to an experience or feeling that is distinctly mine. Now, please, dig in and read with a critical eye!

—Frances Moore Lappé and the Small Planet Team

[Link to feedback form here!](#)

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—Frances Moore Lappé

Introduction: Humanity's Emergency & Vast Opportunity

We write this modest book amid history-making events, both tragic and immensely promising.

A global pandemic is bringing vast suffering, loss, and forced isolation, while simultaneously revealing our deep connection and interdependence. Its economic devastation exposes in sharp relief our nation's wealth divide, one of the world's most extreme. At the same time, finally, our culture may be beginning to reckon with its deeply rooted racism and to awaken to the immediate threat of climate chaos—most harmful for those already burdened by racism.

In this unique moment we also see great possibility: From suffering, loss, and shock can come new clarity, passion, determination... and even courage.

We are taking the unusual step of offering our book “for review only” because we believe that, in facing the existential climate threat, despair is humanity's worst enemy. Thus, we could not wait for a prolonged publishing process to share what keeps us out of that deadly pit: the remarkable, yet underappreciated, climate-smart steps being taken by bold citizens in diverse communities and at every level of leadership across America and beyond our shores. Preparing this book has opened our eyes to new possibilities and fortified our commitment to action.

Plus, now that Americans have chosen a president pledged to make climate action a priority, we dare to hope this book can help the new administration—and all of us—quickly grasp what's been working so that we can *immediately* take it to scale.

Part of our new clarity is an enhanced awareness of our connected fates. We can see that awareness now reflected in the notably large share of Americans who prioritize climate action: More than 70 percent of us agree that it's important for the US Congress to act on climate and back legislation to achieve a 100 percent clean energy economy by 2050.¹ The public also appears more open to addressing the climate crisis with a Green New Deal.²

Even before the pandemic, in early 2020 a survey of Americans' views about climate found a majority agreeing that dealing with climate change should be a “top priority” for the president and Congress. Almost 80 percent of Democrats agreed, but among Republicans only about one-fifth were on board.³

Yet, with our economy suddenly in meltdown and broad appreciation of the trillions of dollars required to revive it, more and more Americans might say: “Of course, let’s invest it in ways that also soften the blows of our human-made, climate disaster.”

Thus, we offer this brief book in the spirit of possibility.

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Our title is bold. And we stand by it—though we know it’s already too late to avert much suffering and loss brought on by the climate crisis.

Floods, droughts, and heat waves already ravage the lives of millions, not to mention the devastation we’ve wrought for other sentient beings. It is too late to save the 150 or more species we lose every day.<sup>4</sup>

With ice caps melting, forests dying, and permafrost thawing, we now know the risk of “abrupt and irreversible change” is much higher than we’d grasped even a few years ago, warns the Intergovernmental Panel on Climate Change.<sup>5</sup> As of early 2021, we are on track for worst-case melting of polar glaciers and resulting sea rise.<sup>6</sup> The high temperatures in the High Arctic during the last 15 years weren’t predicted to occur for another 70 years.<sup>7</sup>

Still, a sense of possibility drives our own motivation to do all that’s still very much within our power. We’re convinced that it is not too late to turn the climate emergency into our species’ greatest opportunity to reset our sense of ourselves: to move from seeing only deadly division to recognizing our common humanity—one people who will, together, live in dignity or die.

In such do-or-die moments, humans have sometimes achieved huge shifts in consciousness, allowing choices that before were believed to be impossible.

In the mid-eighteenth century, for instance, how many would have bet that a handful of unruly British colonies could give birth to the world’s first constitutional republic? Or, amid the worst pain of the 1930s’ Great Depression—with one in four Americans jobless—how many of us could have imagined that the very next decade would usher in four decades during which every income class doubled its real family income?<sup>8</sup>

Since the climate crisis is the first global emergency touching all of us and—more specifically—threatening all our lives, is it not ridiculously presumptuous simply to assume that we are not up to the task?

This is not a time to let self-doubt trip us up.

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## Deadlines + Possibility = Action

When stakes are high, many of us find deadlines helpful, but never before has our species shared a common one—a deadline that, in this case, gives the term a literal twist. Deadlines focus the mind, so we can thank the Intergovernmental Panel on Climate Change for giving us clear ones—dates backed by hard science and the realities of cascading climate chaos.

But the question for many remains: Is meeting them even possible?

Above, we claimed that the basic human need to jump into action—whether it's to achieve racial justice or women's right to vote or to stop a wrongheaded war—is a double awareness: We need to feel, first, that acting is essential to protecting what we love, and second, that our action might make a difference. With these two pieces, humans don't need certainty nor even a high probability of success to get going. If we care enough, all we need is a sense of possibility.

So, this book's premise is not naïve optimism nor head-in-the-sand denial. Rather, it's that getting our heads and hearts to this place of possibility is worth the effort required—the invigorating effort of digging deep into the roots of the crises and connecting with solutions.

Oh, you say: Really? A sense of possibility amid all the frightening climate news?

Yes, it's a stance we can actively cultivate.

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Now to some of the big realities that ground us.

The potential impact of rising greenhouse gas levels has been known for more than a century, and in 1979 scientists at the first World Climate Conference began calling on us to act to prevent the harm of a warming climate.⁹ By late 2015, at the 21st conference of the United Nations Framework Convention on Climate Change, parties pledged to hold the average global temperature increase to “well below 2°C above preindustrial levels” before 2100.¹⁰ It went into effect in 2016.

The Paris Agreement to address the climate crisis, adopted by 196 Parties in 2015, has now been ratified by almost all of the world's countries.¹¹ They've pledged to keep the global temperature spike to 1.5°C or less.¹² As of early 2020, it was 1.16°C.

Note well: The agreement links its goal to a requirement to work together to bring greenhouse gas emissions to net zero by the second half of the 21st century.

In 2019, the UN Secretary General called world leaders to a Climate Action Summit in New York City to commit to “concrete, realistic plans” to quicken the pace of action in line with reducing greenhouse gas emissions by 45 percent over the next decade and reinforced the deadline of 2050 to reach net zero emissions. He stressed that he wanted “plans” not “speeches.”¹³

Importantly, the parties stated in the agreement that they would go about reducing emissions on the “basis of equity, and in the context of sustainable development and efforts to eradicate poverty.” Throughout the book, we highlight this foundational understanding.¹⁴

Then, in late 2019, the UN issued a dire warning that earth is on track to warm by a potentially catastrophic 3.4 to 3.9 degrees Celsius by 2100. Greenhouse emissions would have to be slashed more than 7.5 percent every year for the next decade to have “any hope of keeping warming below 2 degrees.”¹⁵

In 2019, global emissions did fall by a historic 7 percent, but the cause was our global pandemic—not the solution we’d planned for.¹⁶

Clearly, we’ve missed the opportunity to avert much suffering, but it is also true that our united action now holds the possibility of avoiding almost unimaginable loss.

The trajectory leading to climate chaos is not a straight line. Rather, “what we’re talking about is a point of no return, when we might actually lose control of this system,” observed Australian National University researcher Will Steffen, co-author of a paper in *Nature* published leading up to the late 2019 UN Climate Summit.¹⁷

“Humans are playing Russian roulette with Earth's climate by ignoring the growing risk of tipping points that, if passed, could jolt the climate system into a new, less habitable ‘hothouse’ climate state,” the researchers warned. Especially alarming, they wrote, is new evidence that if we exceed the tipping point of one system—for example, the loss of Arctic sea ice, major destruction of boreal forests, or widespread thawing of the permafrost— we escalate the risk of pitching the entire biome into chaos.

“It's not going to be the same conditions with just a bit more heat or a bit more rainfall,” Dr. Steffen warned. “It's a cascading process that gets out of control.”¹⁸

But if we act now, it is not too late to reduce the likelihood of such system collapse.

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Of course, addressing any system breakdown—from a family to a nation—requires identifying and healing its root causes. In today’s world, that means examining and reshaping our economic and political rules so that they support the life we want.

Here in America, we see the roots of the climate catastrophe in both in our grossly unfair economic system and our deeply compromised democracy—each reinforcing the other.

Specifically, what are the economic roots of the climate crisis?

Greenhouse gas emissions reflect, in large measure, an economy driven by what brings the highest return to wealth-holders, with scarce accountability to the “general Welfare” that our Constitution’s preamble puts forth as a founding national purpose.

Given this brutal form of capitalism, it follows that over the last half-century, incomes of the top one percent have grown one hundred times faster than those of the bottom 50

In the US, over the last half century incomes of the top 1 percent have grown one-hundred time faster than those of the bottom 50 percent.

—Gabriel Zucman, University of California, Berkeley, 2019



percent.<sup>19</sup> Three individuals now control as much wealth as the entire bottom half of our country's population combined.<sup>20</sup>

So, today, in addition to the almost 40 million Americans trying to survive in abject poverty, another 122 million working-class Americans earn on average \$18,500 a year.<sup>21</sup>

Not only do such meager livelihoods limit the possibilities to become engaged in public solutions, they make us vulnerable to destructive “shame and blame” messaging. Our culture’s “up by our bootstraps” mythology encourages us to blame ourselves if we’re struggling economically, and racially tainted messages encourage us to blame the “other.” Both divert attention away from real solutions requiring equity and cooperation.

Moreover, such extreme concentration of economic power enables those profiting by climate harm—including the oil giants—to discredit climate science and twist public policies toward their ends. Exxon and other fossil fuel companies have spent more than \$5 billion to cast doubt on climate science and to fight clean energy policies.<sup>22</sup>

Cognizant of the depth of the inequity crisis, throughout this book, we show how solutions to the climate crisis can simultaneously address climate justice—i.e., benefiting those most harmed by the crisis and those with the least capacity to protect themselves.

And the roots of a democracy in crisis—how do they relate to the climate challenge?

The power of private wealth over public decisions denies citizens the effective democratic problem solving essential to addressing any crisis. Aware of the undue influence of private, moneyed interests in our democracy, many Americans are near despair about our federal government’s dysfunction. No wonder trust in our government has fallen from 77 percent in the mid-1960s to 17 percent today.<sup>23</sup>

Distrust and despair are truly dangerous, as they lead us to retreat from engagement just as it’s needed more than ever. Our final chapter fights such danger by celebrating the underappreciated, yet powerful, work of everyday Americans on behalf of democracy the citizens—work that is essential to avert catastrophe.

With Joe Biden as president, we have an opportunity to counter despair.

As a candidate in spring 2020, he enlarged his campaign pledges on climate action and infrastructure investment centered in environmental justice. Now, early in his presidency, Biden seems to be making good on his promises to uphold the “Biden-Harris Plan for Climate Change and Environmental Justice” as a cornerstone of the administration’s platform.

Merely days after being sworn in as our 46<sup>th</sup> President, Biden signed an impressive total of 50 executive orders, 19 of which were direct reversals of the damage caused by his predecessor. Among them were the cancellation of the Keystone XL Pipeline, renewing the United States’ commitment to the Paris Agreement, and beginning the process of reversing the Trump Administration’s attacks on the environment.<sup>24</sup>

Biden’s appointment of John Kerry to the new post of special presidential envoy for climate is another signal that he prioritizes the climate crisis.<sup>25</sup>

We hope readers will find this book helpful in keeping the pressure on and in persuading others of the importance of not only voting, but also insisting that democracy and climate-equity measures be central to the new president's economic recovery agenda. Passing legislation is only the beginning. Then comes the work of holding legislators, corporate actors, and ourselves accountable continues to build.

Throughout our research, one observation grounding our sense of possibility is the positive link between the distributed power of citizens—as promised and protected by democracy—and distributed energy sources, made possible by our choice to go green.

The immediate triggers of the climate emergency arise from our dependence on wasteful, non-renewable energy sources, wildly inefficient transportation systems, chemical-dependent and corporate-controlled agriculture, and more. So, throughout, you'll find our focus is on energy, while we also discuss transportation and agriculture.

Fossil fuel dependency tightens both energy power and human decision-making power. As fossil fuel sources are spatially concentrated and fossil fuel requires huge capital investments to extract, process, and deliver, it thus lends itself to monopoly. Fossil fuel corporations' profits are greater than the entire GDP of most nations.<sup>26</sup>

Fossil fuel dependency concentrates both energy power and human decision-making power—in the form of tightly held wealth and control. Clean energy decentralizes and democratizes both.

Note also that these industries have been major players in keeping us on our dead-end trajectory toward climate catastrophe. This travesty has been abetted because our political system allows—even welcomes—the vast influence of private power over public choices. In 2018, fossil fuel industries made almost \$90 million in political contributions, primarily to Republicans, who protect their interests in Congress.<sup>27</sup>

By contrast, green energy—wind, solar, water and geothermal sources—are dispersed, and the equipment needed to make them—turbines and panels, for instance—can also be decentralized in manufacturing, installation, and control.

Of course, without sound regulation to prevent it, monopolies could also emerge in green energy industries. And that's one reason we must step up our work to remove the power of large corporations, and private wealth more generally, within our democracy—a theme to which we return in the final chapter.

Our point here is that political democracy can nurture and draw sustenance from green energy.

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Throughout our book—because of evidence that hope itself has the power to organize our brains toward solutions—we focus on solutions already arising across the nation. We share breakthroughs about which most Americans are still unaware in order to trigger the vastly greater engagement needed to take them to scale.

In Chapter 1, we offer a quick overview including the scale of the climate challenge: its key contributors and health impacts, plus ways we can cover the big public investment required. In Chapter 2, we showcase public policy tools already showing promise in cities and states. In Chapter 3, we briefly explain our strong focus on wind and solar power. Then, in Chapter 4—which most lifts my spirits—we share stories of states and localities responding to citizens’ climate concerns in partnership with their constituencies. Chapter 5 digs into the underappreciated contributions of farming, land use, and our diets, both to the problem and to win-win solutions. Finally, in Chapter 6, you’ll hear about some of the citizens’ climate mobilizations most energizing us. This closing chapter challenges the assumption of extreme political polarization among Americans on key matters and introduces the energizing citizens’ Democracy Movement that’s already making progress toward healing our damaged democracy.

Fortunately, as you’ll read in the pages that follow, many savvy, courageous Americans are addressing the climate crisis with strategies that intentionally deliver the greatest benefits to low-income communities. These strategies can especially improve the lives of Americans historically thwarted by racism—and, more generally, by climate disruption and fossil fuel pollution.

In unleashing solutions-oriented action, we meet the very deep human need for a sense of personal power—of knowing we have a real voice in our future. And, in the process, we also satisfy our equally essential need for meaning beyond ourselves and for connection with others in common purpose.

Thus, amid the beginning of our reckoning with systemic racism during a deadly plague—not only of illness but also of loneliness and meaninglessness—the growing and global movement to save our planet offers new life.

Chapter One: The Power of Possibility

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Chapter One: The Power of Possibility

Welcome to our book on climate solutions. But of course, no problem can be solved without first exploring in where one stands; so, we begin with a quick intro to current realities.

As noted, the UN International Panel on Climate Change lays it on the line: To prevent utter catastrophe, we must cut global, net, human-caused carbon emissions by almost half in a decade and reach net-zero emissions by 2050.¹

Now, that's a tall order.

Yet, it is one we can choose. In this moment, we can escape the paralysis of fear and despair, while creating new meaning and purpose in our lives—and discover that by meeting the climate crisis vigorously and holistically, we not only protect future life but reap multiple benefits today.

Roughly eight in ten Americans accept scientists' consensus that human activity is what fuels climate change, and about half of us believe "action is urgently needed within the next decade if humanity is to avert its worst effects."²

That's a start.

But action that is up to meeting this unprecedented challenge first requires a shift in perspective—the realization that acting to prevent all-out catastrophe is not a "choice."

Here's what we mean.

If, say, your child was dying of a disease that only a costly drug could cure, wouldn't you go to any lengths to get it? Stupid question! Of course, you would. You wouldn't pause to make a "choice." You'd simply spring into action.

Each American contributes more than three times the world's per-person greenhouse gas emissions.

—M. Crippa et al., European Joint Research Centre 2019

And that's exactly where we are today, as 97 percent of climate scientists sound the alarm over our human-caused climate crisis.³ With our children's future dying, not to mention a habitable planet for millions of other species, action is no longer a choice. It is simply what we must do—and with all the smarts and energy we've got.

Grasping Where Things Stand

In choosing where and how to focus our action, we need first to wrap our heads around the big picture and how our country fits in it.

Humanity's challenge is not just to swap fossil fuel for renewables. Yet we must start by appreciating that getting beyond fossil fuel means electrifying virtually everything—beginning with vehicles and homes. That means globally we'll need to double the share of our end-use energy that is electricity.⁴ At the same time, scientists estimate that overall demand for power will be 57 percent lower when we transition to renewables.⁵ And soon we'll explain why this counter-intuitive makes sense.

In this transformation, what jumps out first?

We Matter

Earlier we noted that as humans, we share a basic need to feel that we count, that our voice matters. But to jump into action to meet this need two perceptions are necessary: first that acting is essential to protect what we love, and second, that our action might make a difference.

In this vein, consider our potential influence, starting with the negative:

Just two countries—China and the United States—together emit almost half of the world's carbon dioxide. In 2020, the Chinese were responsible for almost 30 percent, and Americans for 15 percent.⁶ So, China looks bad. But our population is only about a quarter the size of China's, meaning that on average each American is a much greater greenhouse gas emitter. In fact, each of us contributes more than double the emissions of each Chinese citizen—16.6 tons vs. almost 7.1 tons.⁷

Each American contributes more than double the emissions of each Chinese.

—Union of Concerned Scientists, 2021

Put another way, today an average Chinese citizen contributes about 70 percent more than the world average of 6.7 tons, whereas an average American citizen contributes more than three times his or her share.⁸

Taking a historic snapshot, the United States looks even worse. Over time, we've emitted more CO₂ emissions than any other country—since 1751, adding 400 billion metric tons, or roughly a quarter of total historical emissions.⁹

On the one hand, I'm ashamed our country has become such a negative outlier. On the other hand, we can acknowledge that since 2007 we've begun a gradual, albeit unsteady decrease in our own annual emissions rate.¹⁰

Also note many European countries, with much lower per-person emissions, provide ample evidence that enjoying a comfortable standard of living doesn't require our huge carbon footprint.

On the other hand, I see an odd twist here: The very fact of our grossly outsized negative impact means that any positive change we make can also bring outsized benefits. Moreover, because the US has long been viewed as a "world leader," our action has often set a bar for others

in the community of nations. Presently, we set a very low bar—with global impact. Imagine the ripples as we reset the course.

And, overall, in what direction is our world heading?

Not a good one.

Above we noted earlier progress, but global carbon emissions in 2018 hit an all-time high of 33 gigatons—and remained at this level in 2019.¹¹ In 2020 global emissions fell 7 percent, but of course this progress reflected the pandemic’s slowing of economic output, not necessarily positive steps.¹²

In the European Union, a political and economic alliance of 27 countries with a total population nearly 36 percent larger than ours, emissions have leveled off. Of course, leveling off is better than rising, but way worse than the region’s prior decades of “strong falls” in carbon emissions.¹³

And what about all those signers of the climate agreement?

As of early 2021, 189 countries, together causing more than 80 percent of global emissions, had ratified or otherwise joined the Paris Agreement. Several—including Canada, Germany, and Mexico—have come up with long-term plans to “decarbonize.”¹⁴

Unfortunately, however, plans put forth by almost three-quarters of the signatory countries are “partially or totally insufficient,” observes a team of international scholars writing in 2019 for the Universal Ecological Fund. In their eyes, only a small group of about 35 nations have plans that are sufficiently ambitious. They include each EU country, plus a few more, such as Norway, Switzerland, Moldova, and Ukraine.¹⁵

With this news, it’s no surprise that these scholars warn us that the world is on track to heat up by a catastrophic 5.4° to 7.2°F (3° to 5° C) by the end of the century.¹⁶ That’s double the temperature cap that the best science now declares necessary to avoid all-out disaster. Among any number of devastating consequences, we would have to abandon many islands and coastal population centers, including Venice, New York, Tokyo, and Sydney.

Clearly, we must radically alter the current trajectory.

New Eyes

This do-or-die mindset changes everything.

Suddenly, we begin to see possibilities that we’d totally missed before. And, today, with remarkable speed, this shift is galvanizing millions of Americans.

Many are quickly moving beyond denial: More than half of us report seeing climate-change impacts in our own communities—from heat waves, floods, and droughts, to damage to forests, plants, and wildlife.¹⁷ More than two-thirds agree our government isn’t doing enough to battle it, and that includes a significant number of Republicans.¹⁸ More than three quarters of us—including nearly two-thirds of Republicans—say that, to meet energy needs, developing renewable energy is more important than expanding fossil fuel.¹⁹

Plus, courage is showing up among key elected leaders.

In 2019, Congresswoman Alexandria Ocasio-Cortez and Senator Ed Markey made history when they stood up with insight and courage to propose H.R. 109—a Green New Deal that grapples with the huge scope of the crisis.²⁰ By early 2021, 101 members of the House and 14 Senators had signed on as co-sponsors.²¹

Green New Deal

By early 2021, 101 members of the House and 14 Senators had signed on as co-sponsors to the legislation: H.R. 109. & Senate Res. 59.

—Congress.gov, 2021

Two important movements—Justice Democrats and the youthful Sunrise Movement—helped motivate this resolution to address the crisis via a decade-long mobilization that would help cut global greenhouse gas emissions roughly in half by 2030, compared to 2010. The strategy would meet 100 percent of US power demand “through clean, renewable, and zero-emission energy sources,” while creating millions of new jobs.²²

Over 80 percent of registered voters were soon on board.²³

Unfortunately, though, this existential threat hasn’t yet opened everyone’s eyes. Key Republicans immediately mocked the Green New Deal as “radical” and “socialist.”²⁴ Senate Majority Leader Mitch McConnell called it “delusional.”²⁵

Even a few key Democrats challenged the approach. They included Senator Dianne Feinstein, who admonished young environmental activists that “there’s no way to pay for [the Green New Deal].”²⁶ But the Senator failed to note the cost of *not acting*.

Estimates are in the hundreds of billions a year—and that’s not considering the impact of truly catastrophic events like reversing the Gulf Stream or the melting of Greenland’s ice cap.²⁷

On top of the impact of climate heating itself, the cost of not acting also includes continuing pollution largely from fossil fuel—now linked to seven million deaths each year. To put that toll in perspective, it is more than three times the deaths from COVID-19 so far.²⁸

In a sense, our whole book takes on such attacks, showing just how wrong they are.

Holistic = Realistic

Instead of being turned off by the Green New Deal’s ambitious scope, many Americans love it. They see that, because our entire economy and its infrastructure are implicated in the climate crisis, its challenge can be addressed only through a multi-faceted approach and in ways that engage—and directly benefit—all of us, not just in the distant future but today. The Green New Deal’s wide scope, they argue, is its core strength.

Economic Gains of Going Green

Writing amid an historic pandemic that's fast sinking our economy gives new urgency to this book's message. Now is a rare and exciting moment of choice: Can we generate economic recovery by tackling the climate challenge with investments bringing better quality of life for all?

Already, roughly 3.2 million Americans work in the clean energy sector, outnumbering fossil fuel jobs about 3 to 1.

—Jose Zayas, US Department of Energy, 2015

In this chapter and throughout, we explore the economic benefits to be realized in facing the climate challenge. Yes, we have a lot of work to do. But the great news is that in addressing the climate crisis vigorously and holistically, we not only protect the future life but also reap multiple benefits today.

Since a premise of the Green New Deal is that economic equity and environmental health are inseparable, what do we know about the potential for good jobs—simultaneously contributing to climate solutions and to greater equity—as we escape the danger of greenhouse gases?

Even with little national leadership or mobilization, already roughly 3.2 million Americans work in the clean energy sector, outnumbering fossil fuel jobs about 3 to 1.²⁹ These jobs typically pay very well. Energy-efficiency workers are earning about \$5,000 more than the national median, and solar workers' pay is averaging above our national median wage of \$17 an hour.³⁰

And green jobs aren't concentrated in a few spots. They are being created across the country, from the coasts to rural communities, including the Rust Belt.

Seventy percent of wind farms, for example, are in counties with below-average income, and each year they bring in more than \$222 million to rural landowners.³¹ Overall, the financial bonanza could rise to over a billion by mid-century if the US achieves the goal—spelled out in the US Department of Energy's *2015 Wind Vision Report*.

The Department has modeled scenarios to achieve sourcing one-fifth of our electricity from wind by mid-century. Most of it would be from land-based turbines, but about a fifth is projected to come from offshore wind, with lease payments rising from \$15 million to \$440 million in 2050.³²

Yes, we have a lot of work to do. But in addition to creating new jobs and leasing income, our savings will also be enormous.

Take just wind energy alone: It could result in "cumulative system cost savings of \$149 billion by 2050," reports the Department of Energy.³³ That's about \$9 billion a year.

Wind energy alone could result in a "cumulative system cost savings of \$149 billion by 2050."

—U.S. Department of Energy

The Department also predicts that wind energy has the potential to support over 600,000 jobs in manufacturing, installation, maintenance, and related services by 2050.³⁴

Plus, embracing clean energy—benefiting working-class and low-income Americans the

Globally, each day air pollution caused by fossil fuels costs us \$8 billion.

—Aidan Farrow, Kathryn A. Miller,
and Lauri Myllyvirta, Greenpeace,
2020

most—can help address our economy’s extreme unfairness. One measure of this unfairness takes our breath away: The three wealthiest Americans control more wealth than the poorer half of the population.³⁵

Keep in mind, too, the worldwide economic burden from which we free ourselves as we embrace

clean energy: Globally, air pollution caused by fossil fuels costs us \$8 billion a day—by 2018 adding up to almost \$3 trillion a year, reports a Greenpeace study.³⁶

Meeting the Climate Crisis—It’s Good for Your Health

Meeting the climate crisis improves not only our economic well-being but also our health. A 2019 report found pollution to be the largest cause of premature death on the planet, responsible for nearly one death in seven.³⁷

This realization is especially good news as the COVID-19 pandemic sensitizes all of us to the heightened threat of disease for people with underlying health conditions, now suffered by too many Americans.

The Green New Deal resolution calls on us to “secure for all people of the United States for generations to come: clean air and water; climate and community resiliency; healthy food; access to nature; and a sustainable environment; and climate and community resiliency.”

Such a lofty list could sound dreamy, but looked at with a different lens, it is bracingly realistic.

Consider, first, our air.

Right now, roughly half of Americans breathe unhealthy air. That’s nearly 150 million of us.³⁸ So by one estimate, moving away from fossil fuel could prevent almost 63,000 deaths each year from polluted air.³⁹

The harm is felt especially among those relegated by income and racism to neighborhoods with greater industrial pollution. Compared to the air the wealthy breathe, the air that poor Americans of all races breathe has a third more dangerous small particles that lodge in the lungs. African Americans get doses roughly 50 percent higher than whites and are more likely to die from that pollution.⁴⁰

A recent NAACP study identified 75 coal plants in the US—of the remaining 241—as the worst environmental-justice violators: More than half of the 4 million people living within three miles of them are people of color whose average per capita income is \$17,500—well below the average in every US state.⁴¹

Every year, air pollution from fossil fuel kills 7 million people worldwide.

—António Guterres, UN
Secretary General, 2019

And worldwide? Every year air pollution kills 7 million people.⁴² Consider that toll, as we suffer shock and grief at more than 2.6 million deaths from COVID-19 as of early 2021.⁴³

It turns out that not only do fossil fuels worsen air quality, but the warming temperatures they cause also end up making some polluting substances even more dangerous.

One is ozone.

A common gas generated by both natural processes and combustion, ozone in the stratosphere is critical and beneficial to life on earth. It forms a protective blanket shielding us from destructive ultraviolet rays. But ground-level ozone is something else entirely. It is dangerous—a potent lung irritant. When inhaled, it can burn lung tissue, worsening chronic lung disease and thus contributing to early death.⁴⁴

Soot—ultra-fine particulate pollution from all forms of combustion—is another common yet deadly health threat. We have long known that wildfires, wood burning stoves, coal-burning power plants, and diesel engines not only contribute to climate change, but also emit these tiny soot particles into the air around us.⁴⁵

No more than one-thirtieth the width of a human hair, they can lodge deep in our lungs, triggering asthma attacks, heart attacks, and strokes, and contributing to lung cancer—all shortening American lives.⁴⁶

We've Stepped Up Before

It's encouraging to recall that when Americans have faced serious pollution emergencies in the past, both political parties have responded to citizen pressure to protect us from environmental danger. In 1963, under Democratic President Lyndon Johnson, Congress passed an early version of the Clean Air Act—the first federal law to control air pollution. Then, in 1970 and 1990, under Republican administrations, Democratic Congresses amended the Act in major ways to further reduce these harmful emissions.

As a result, by 2017, the US had cut emissions of key air pollutants by almost three quarters since 1970.⁴⁷ Sulfur dioxide was down 88 percent, ozone down 22 percent, nitrogen dioxide, 56 percent. Compared to 2000, fine particulate pollution was down 40 percent.⁴⁸

Unfortunately, though, in recent years we've reversed course: By 2018, pollution worsened again, causing an estimated 10,000 additional deaths.⁴⁹ Today, eleven of our most-polluted cities still violate the Clean Air Act's air quality standards.⁵⁰

The takeaway?

Climate action can compel us to meet commitments we've already made. Limiting coal and other fossil fuel emissions has saved lives in the past, and as we rise to leave those emissions behind for good, we will save vastly more.

In 2018 pollution began to rise again, causing an estimated 10,000 additional deaths annually.

— US Environmental Protection Agency, 2017; Daniel Ingraham, Washington Post, 2019

And Water in Hotter Times?

Of course, just as much as clean air, we need water to thrive.

Our warming climate is making precipitation patterns more unpredictable and extreme. Though it was not expected until around 2100, the Arctic Circle in June 2020 hit a record 100.4° Fahrenheit.⁵¹ Temperatures in this range are expected to trigger a cascade of negative effects from disrupted hunting seasons to melting permafrost and the flooding of coastal cities.⁵²

Parts of the West and Southwest are expected to become much drier, with more frequent droughts and massive fires, while the Northeast and upper Midwest become wetter, with more frequent and severe sudden downpours.⁵³

As temperatures rise, droughts become more frequent. Already fifteen significant U.S. rivers are running dry—including the Colorado River that runs through the Grand Canyon and the Rio Grande.⁵⁴ And here's a new threat of a drier climate I hadn't imagined: Dust now blowing off these dry Western lake beds is becoming a serious health hazard.⁵⁵

And then there is the problem of stormwater runoff triggering polluted water.

In the East and Midwest, more frequent and powerful rainstorms are causing outdated sewage infrastructure in many cities to dump billions of gallons of raw human waste into recovering waterways, including some public water supplies.⁵⁶ More severe weather can also increase the incidence of manure “lagoons” at huge livestock holding pens overflowing into our waterways. Imagine: North Carolina's pigs alone produce 10 billion gallons of manure every year.⁵⁷

Fossil fuel powered plants producing electricity account for roughly 47 percent of all water used in the U.S., and in the process, harm ecosystems.

– US Geological Survey, 2018; Union of Concerned Scientists, 2013

As water becomes ever more precious, keep in mind these startling facts about how much water our current energy production uses: Fossil-fueled power plants using oil and gas—providing almost all our electricity—are mostly driven by heating water to make steam that's converted to electricity.

Chiefly to cool their equipment, these plants take up roughly 47 percent of all water used in the U.S., according to the latest data collected in 2015. And in the process, this type of water usage harms ecosystems as well.⁵⁸ I was shocked.

But the good news?

Renewable energy saves water—a lot of it.

Wind turbines and solar panels don't need water to operate—of course. In 2015, as the US generated 191 million megawatt-hours via wind—instead of coal, natural gas, or nuclear power—we saved nearly 73 billion gallons of water.⁵⁹

This water savings comes to 220 gallons saved yearly for each American.

Of course, our need isn't just for water; it's for *clean* water. The Green New Deal's emphasis on strengthening our infrastructure addresses this problem, too. "Infrastructure" sounds pretty boring, until you take in horrific facts like this:

Because of our decaying, long-neglected water infrastructure, childhood lead-poisoning rates in nearly 4,000 neighborhoods nationwide are at least double those of Flint, Michigan, during the peak of its water-contamination crisis.⁶⁰

In 2015, as some Americans shifted to wind energy instead of fossil fuels, the water savings alone came to 220 gallons for each American.

—American Wind Energy Association, 2016

While Americans living in poverty are the most harmed by lead, these thousands of communities span the whole country, endangering rich and poor, rural and urban, Black and white.⁶¹

Thus, mobilizing for new energy infrastructure as part of a Green New Deal opens opportunities to greatly reduce harm as we also reconstruct water delivery systems, ensuring to all Americans the long-abused human right to clean water.

Growing Proof, From Far and Wide

Instead of moaning and groaning under the weight of the challenge, we can take heart in recalling that countries enjoying a "standard of living" comparable to ours already have achieved per-person greenhouse gas emissions far below ours. On average, each citizen of Europe emits less than *half* as much carbon per person as we do.⁶² Such contrasts offer living proof that we can vastly improve our energy mix and efficiency.

Here at home also lies striking evidence of possibility.

As we explore in depth in Chapter 4, in less than two decades, oil-rich Texas barreled into leadership in wind energy. If it were a country, Texas would rank as the world's fifth-largest wind-energy producer.⁶³ In 2019, 19 percent of its energy came from wind.⁶⁴

If it were a country, Texas would rank as the world's fifth largest wind-energy producer.

—American Wind Energy Association, 2019

Plus, ten states already generate a fifth of their electricity from solar and wind combined.⁶⁵ In Kansas, that's a third, and in Iowa and Oklahoma the share is more than a quarter.⁶⁶

Also striking is the estimate of what's possible. Taken nationally, rooftop solar offers the "technical potential" to generate about 75 percent of our residential electricity consumption, estimates a 2018 federal laboratory study, as long as required storage is built in. Plus, the report emphasizes: The highest potential is in lower-income counties.⁶⁷

Are there other motivating signs?

Energized (and worried) citizens are succeeding in pushing their legislators to act boldly, showing the way for others. Chapters 2 and 4 zero in on what their leadership is achieving.

Plus, people's movements are gaining momentum with youth in the lead, perhaps more strongly and convincingly than perhaps ever before—and we celebrate this in our closing chapter. Those movements offer evidence that hope is not what we find in evidence, but what we become in action together.

When We Humans Step Up...

As noted, to gain confidence in possibility, it helps to grasp evidence of our past climate progress. Many Americans may not realize that our carbon emissions dropped 14 percent during the eleven years after 2005.

Unfortunately, the biggest drop—contributing a third of the improvement—resulted from our moving away from coal toward natural gas, when natural gas is *not* a clean-energy, renewable solution. However, wind power's expansion provided another fifth, followed by our reduced use of electricity, mainly by industry.⁶⁸

The decline took us halfway to the 2025 emissions goals set in the Paris Agreement.⁶⁹ Then, in 2019, US emissions fell by 2 percent, again led by less use of coal.⁷⁰ In 2020, the COVID-19 pandemic brought the biggest drop in world emissions on record; and the U.S. experienced the single largest national decline—12 percent.⁷¹

The very fact that we have continued to progress even without federal leadership suggests what's possible. Chapter 4 fills in this picture, shining the light on states, cities, and farms taking strong action.

Our point is simple. Given that we managed to make forward strides in the past, even without committed national leaders or a sense of urgency among most citizens, surely it is not naïve to imagine a climate-solutions movement taking off as more Americans wake up to the crisis.

We've seen throughout human history that it's not the magnitude of a challenge that crushes the human spirit, it's feeling futile that does us in. And this do-or-die-moment offers so many ways to feel needed. So we can resist the naysayers dimming our confidence, as we step up.

We Can Do This!

Fortunately, we now have a wide array of proven approaches to address the global climate emergency—across industry, transportation, our food supply, forestry and land use sectors—leaving fossil fuel behind.

And we also have in-depth, far-reaching—yet easy to grasp—guides to a safe trajectory to clean energy.

One such pathway has been developed by Stanford professor Mark Z. Jacobson, UC Davis researcher Mark A. Delucchi, and colleagues across the country. In 2011 they cofounded the Solutions Project, now based in Oakland, to spread the word. This team took on the gigantic task of modeling the energy needs of 139 countries—those for which enough data is available—and how they can be met without fossil fuel or nuclear power.⁷² Their infographic “roadmaps” involve

electrifying all energy (transportation, heating/cooling, industry, agriculture, forestry, and fishing), then making virtually all electricity from solar and wind power. The Solutions Project predicts that transitioning to solar and wind, plus small doses of hydroelectric and tidal/wave power, could meet each country's energy needs and keep us from surpassing the 1.5° C additional global warming limit we must heed.

In 2017, however, *Scientific American* published sharp criticism of this team's work for modeling flaws and understating the challenge.⁷³ Jacobson and colleagues, however, responded by digging deeper to refine their strategies and projections, and in 2021 Cambridge University Press published Jacobson's extensive textbook entitled *100% Clean, Renewable Energy and Storage for Everything*, which cites dozens of studies reinforcing his team's findings.

Note also, the Solutions Project's projections are in line with those of the International Energy Transition Commission, led by dozens of global leaders across energy, finance, and academia. The Commission projects that we can indeed reach a net-zero emissions economy by mid-century.⁷⁴

Note well: There may be debate about how fast we can go, but a lot of agreement on what we must do.

An obvious piece of good news that had escaped me, making their projection more believable, is this: Because the process of turning fossil fuel into useful energy itself requires so much energy, this shift would, by 2050, reduce US energy requirements by 68 percent; and for the 139 countries studied, by 57 percent.⁷⁵ We would simply need a lot less power.

Because wind and solar energy take so much less energy to produce than that from fossil fuel, moving to renewables could reduce US energy requirements by 68 percent by 2050.

—The Solutions Project, Stanford University, 2020

How could that be? How could our need for energy decline so much?

Just visualize, for example, all the energy that would no longer be needed to pump oil from a well in Saudi Arabia, ship it across the ocean, transport it to a refinery, transform it into gasoline, and ultimately ship it to a filling station and finally to pump it into your tank. That's a lot of energy no longer needed.

Moreover, worldwide, reduced air pollution could today mean 4.6 million fewer deaths.⁷⁶ Another benefit? A 24 million net increase in long-term jobs.⁷⁷

Globally, energy would also become more reliable, with fewer disruptions; and people's access to energy would greatly increase—making our unfair world fairer.

And the land required for this clean energy transformation? Well, less than 1 percent in the 139 countries studied.⁷⁸

Next, let's look at the cost.

We Can Pay for It!

In mid-2017, when the Trump administration began formally withdrawing from the Paris climate agreement, it deemed the “United States’ pledge to reduce greenhouse gas emissions” to be an “unfair economic burden imposed on American workers, businesses and taxpayers.”⁷⁹

In fact, the burden is fossil fuel. Leaving it behind will save us enormous sums.

Looking at the challenge for the whole planet, the Solutions Project cited above estimates the cost of transition for 143 countries at \$73 trillion. That sum could sound impossibly high until you learn that it’s lower than the cost of continuing business as usual. Getting off fossil fuel, as noted, could cut global energy requirements—and thus reduce energy costs by more than half, or about \$11 trillion a year. Thus, the transition to healthy energy could pay for itself in less than a decade.⁸⁰ Plus, consider the lives saved, illnesses averted, and productivity gained as we leave behind fossil fuel.

Note that the Solutions Project is talking about virtually the whole world. Yet the detractors of the Green New Deal claim that cost for the US alone would be \$93 trillion.⁸¹ Hmm...hard to take seriously.

Let’s look at other cost estimates for a US clean energy transition that scholars are taking seriously. Economist Robert Pollin at the University of Massachusetts, Amherst, projects that the US would need to spend \$18 trillion to reach net-zero carbon in twenty years, coming to about 2 percent of GDP by 2050. “Eighteen trillion dollars is real money,” Pollin told NPR. “But when you spread it out over 30 years, it’s entirely feasible, and it will have a lot of economic benefits in addition to getting us down to zero emissions.”⁸²

Other estimates are lower: The Solutions Projects’ price tag for achieving a US transition to clean energy is \$7.8 trillion.⁸³ And in 2019, the energy research firm Wood Mackenzie estimated the cost at \$4.5 trillion.⁸⁴

At the same time, the Solutions Project estimates that as much as \$742 billion each year could be saved in health care costs alone.⁸⁵ So, transitioning to clean energy, this team of scholars estimates, could pay for itself in as little as a year and a half in these big improvements: lower healthcare costs because of less air pollution, and lower costs overall from fewer climate-change disruptions.⁸⁶

A full transition to green energy could save as much as \$742 billion each year in health care costs alone.

– The Solutions Project, Stanford University, 2020

Not a Cost, an Investment

Still, climate naysayers insist that strong action on climate change will wreck our economy.

Actually, the opposite is true—as we have noted and will show throughout this book. Climate-smart action is creating new jobs and widening the benefits of growth: With the support of EU member states, “the European Commission intends to make its \$1 trillion Green Deal the centerpiece of its COVID-19 recovery,” reports *Forbes*.⁸⁷

It's becoming ever clearer that *not acting* to tackle climate emergency will quickly become vastly more expensive. If the world's nations fail to cut greenhouse gas emissions in half by 2030, estimated an international panel of scholars, damages from climate change-fueled hurricanes, droughts, fires and floods alone will total \$2 billion a day.⁸⁸

Of course, the long-term cost is incalculable, as few are willing to put a price tag on life itself.

Those blocking urgent action also fail to appreciate that “greening our economy” is not simply an expenditure—public or private—but an investment. It is an investment bringing many immediate returns and huge, long-term benefits. Investments in new energy sources, energy efficiency, and public transport all spawn new enterprises and new living wage jobs that generate greater private wealth and public revenue—as well as the “co-benefits” celebrated above. These include better health and thus lower health care costs, and so much more.

Nonetheless, investments do need sources of capital, and, fortunately, many are available to us now.

First, we can cut our losses. If we are truly prepared to reorient our economy to ensure a viable future supported by a habitable climate, the scope of opportunity both for savings and revenue is vast.

For starters, the US can stop shelling out tens of billions of dollars a year to subsidize fossil fuel—more than any other country except China.⁸⁹ These subsidies include those going to the fossil and nuclear fuel industries through a wide array of goodies: credit subsidies, liability caps, purchase mandates, tax breaks, and billions for storing nuclear waste.⁹⁰ Taxpayers provide an even bigger subsidy by not insisting that the fossil fuel industry cover the costs of the vast damage it causes, one that may reach to the hundreds of billions here in the U.S.⁹¹

On a global level, the size of hidden subsidies is vast.

The world's carbon polluters dump harmful waste into the atmosphere at no charge, reports the International Monetary Fund—while the public is forced to pay for the damage, a bill amounting to a \$5 trillion hidden industry subsidy. Nearly 90 percent of greenhouse gas emissions are released with no one made to pay for healing or compensating for their harm, observes the Fund.⁹²

Next, consider the revenue that would be available to deal with climate chaos if corporations contributed their fair share to the public purse—just as the rest of us do.

The US government subsidizes fossil fuel industry more than any other country in the world, except China.

– Doug Kaplow, Committee on Energy and Commerce, 2017; David Coady, International Monetary Fund, 2019

Worldwide, annual subsidies nations give fossil fuel companies amount to a \$5 trillion hidden costs for taxpayers.

– David Coady, International Monetary Fund, 2019

In 2019, sixty Fortune 500 companies paid zero taxes, including Amazon, which posted an \$11 billion profit that year.⁹³ We can also stop corporate legal tax evasion via offshore havens that cost our nation many billions annually in foregone revenue.⁹⁴

Plus, we can restore reasonable tax rates on the wealthiest, including on dividend earnings.

Indeed, in 2018, for the first time, the top 400 US earners paid a lower effective overall tax rate than working-class Americans.⁹⁵

And, then there's waste to be eliminated from our military budget. A suppressed 2015 Pentagon report estimated that savings alone at about \$125 billion over five years.⁹⁶

Small Communities, Big Savings

We have trillions of dollars to gain when we shatter old thinking and begin to design with renewable energy in mind. So, we close this chapter by turning from the global and national to the very local: to discoveries by two communities seeing with fresh eyes.

A school district in New Jersey that serves the towns of Flemington and Raritan wanted to build a new school. After construction had begun, town leaders realized that they were going to miss their energy savings target. The manager called everyone together to come up with new ideas. The subcontractors came back with 16 improvements to save energy. But the manager wasn't happy. Because their combined price tag would come to \$125,000, he knew the school couldn't afford them all, so he'd have to pick only a few of the projects.

But then it dawned on one of the architects that if they embraced all the proposed conservation measures, it would be a game changer. The reduced heating and cooling load would allow the school to switch to a much smaller overall heating and ventilation system. The school district predicted that over 15 years the changes would mean more than \$326,000 each year in energy-cost savings, bringing the total savings to over \$6.4 million.⁹⁷ So the district seized the opportunity.

After investing in a range of conservation innovations, a New Jersey school district predicts that over 15 years it could save over \$6.4 million.

—Flemington-Raritan School District

Similarly, in Lexington, Massachusetts, town leaders rejected older heating systems for two new pre-schools and chose instead bold new technologies. The Maria Hastings Elementary School and Lexington Children's Place, by going geothermal, will produce more energy than they'll use—pumping heat from the ground in cold months and pumping it back when it's warm. (Please see Chapter 3 for more on geothermal energy.)

As a result, the Lexington schools will save \$250,000 a year on energy. Instead of dangerous, expensive, and climate-destroying fossil fuel, the schools will save enough to pay for new teachers and programs!⁹⁸

In higher education, take a look at Swarthmore College in Pennsylvania. Founded in 1864, it is determined to meet today's urgent challenges. "We are translating sustainability from a value

into a core component of campus culture and operations,” Director of Sustainability Aurora Winslade, a dear friend, told me. Through a multi-year, collaborative process, the school is making big strides toward a carbon-neutral and zero-waste campus.

Its energy and utility master plan—called Roadmap to Zero—lays out a path for decarbonizing campus energy. And it is quickly moving from vision to reality. In the spring of 2020, for example, Swarthmore broke ground on a new, nearly all-electric dining hall and community commons designed to net-zero, “living building” standards. It includes a central, geothermal system offering carbon-free heating and cooling campus-wide.

The depth of the college’s commitment also shows up in a President’s Sustainability Research Fellowship program, designed for students to learn by becoming leaders in tackling sustainability challenges on campus and in the community.

We Matter—Someone’s Always Watching

We humans are social creatures who take our cues from each other. When we see others behaving badly—whether drinking too much at a party or failing to vote—it’s easy to be a copycat. We too often go with the crowd.

Yes, that’s who we are. But note that it is not just recognized “leaders” who are seen. In truth, we are all influencers, moment to moment. True leaders are those with the courage to break with the pack—both for those they care about and for the survival of life as we know it.

As each of us sees that it is “not too late,” and takes action, we can be sure someone is watching, someone becomes aware, and someone maybe gets motivated, too.

We can also be sure that because of our nation’s size and clout, as we turn the United States toward climate-responsibility, its voice—our voice—carries much farther and has more weight than that of many countries.

In this vein, consider our potential influence.

I wonder, for example, could it be that our electing a president who mocked climate change affected China, the world’s largest contributor of greenhouse gases?

China had started reversing its negative trend: From 2012 to 2015 China kept its CO₂ emissions from fossil fuel and industry essentially flat.⁹⁹ By the end of 2019, China’s solar installations had reached a cumulative impact that was almost double its 2020 goal, amounting to three times US solar capacity and greater than that of the EU-28 and US combined.¹⁰⁰ In 2018 the country began cutting subsidies.¹⁰¹ Still, China is by far the world leader in producing solar equipment.¹⁰²

Nonetheless, China, still mining about half the world’s coal, is not giving up on that climate-destroying fuel.¹⁰³ Between 2015 and 2019, it built 360 coal-fired plants.¹⁰⁴ And China’s emissions are on the rise, propelled by a 4.5 percent increase in coal use per year. A similar trend is afoot in India, which saw a whopping 7.1 percent rise in coal use in 2018.¹⁰⁵

Could the fact that in 2016 we elected a president who mocked climate change could have played some role? If the “other world superpower”—the US—dismisses the crisis, might that have made it easier Chinese leaders to do the same?

We’ll never know for sure. What we do know is that now, with a new president championing climate action, we can have greater confidence that our pressure for strong climate measures counts. On that note, President Biden has declared that he will re-commit the US to the Paris Agreement as one of many steps his administration will take on climate.¹⁰⁶

A remarkable example of humans watching one another are the powerful reverberations of the voice of Greta Thunberg, age 17. We celebrated when *Time* made her person of the year in 2019 for her outstanding climate-crisis leadership, inspiring 4 million people to join in a global climate strike on September 20, 2019—the largest climate demonstration in history.¹⁰⁷

We can’t just continue living as if there was no tomorrow, because there is a tomorrow. That is all we are saying.

—Greta Thunberg, 2019

Most of us don’t imagine ourselves to be another Greta, but each act of boldness in the service of life is seen; and *we never know who’s watching*.

Here in the US, the Sunrise Movement engages millions of young people and their allies. In June 2019, Sunrisers sat in on the steps of the Democratic National Committee offices for three days until the DNC agreed to support a climate debate between the candidates for the Democratic presidential nomination.

In addition, in October 2018, drawing on theater, art, and tree planting, a leaderless and decentralized movement calling itself Extinction Rebellion gathered in London’s Parliament Square “to announce a Declaration of Rebellion against the UK government.”

In our final chapter, we return to celebrate these growing citizens’ movements, followed by a “moving into action” guide. Now, in Chapter 2, we feature exciting real-world strategies—tools already working across the US to help prevent and mitigate the worst impacts of climate chaos as they improve our lives now.

Be prepared to be surprised and inspired by how much is happening. We were.

Chapter Two: Tools That Work

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Chapter Two: Tools that Work

We humans are social creatures who love living in community—always trying to figure out how to make it work. Our communities live or die in large measure by the quality of the rules we make and live by. Whether spoken or unspoken, the quality of our rules should probably be judged by the degree to which they serve life, human and not.

So here we'll explore some new rules that Americans and others are making to guide our communities to meet the climate crisis and thus to serve life.

Standards Succeed

A lot of us feel good about “standards” and want to believe our own are quite high—whether in choosing a mate or a mattress.

But... “regulations”? Not so much. Unfortunately, to some, the word feels like a constraint, with “big government” bossing them around.

So, why not try a reframe?

Some clever folks did just that. They came up with the label “Renewable Portfolio Standard,”^A a policy approach that we are delighted to report has spread rapidly with real impact.

The Renewable Portfolio Standard is a public mandate, typically initiated by a state legislature with the

purpose of increasing energy from renewable sources—wind, solar and other alternatives to fossil fuel and nuclear power. Another purpose has been to drive innovation by signaling a predictable, growing market. The law sets production targets for utilities—either in the amount of energy they produce or as a share of their energy output—along with consequences for not meeting them, usually a fine.¹

Way back in 1983, Iowa became the first state to try it. The state’s Renewable Portfolio Standard mandated that Iowa’s two main utility companies own or secure by contract a total of 105 megawatts (MW) of renewables, or enough to power several hundred homes.²

Thirty states plus Washington D.C. and three territories have adopted Renewable Portfolio Standards, and since 2000 roughly half of the growth in U.S. renewable energy generation can be attributed to the policy.

— Galen Barbose, Berkeley Lab;
National Conference of State Legislatures,
2020

^A Also called Renewable Energy Standards

Not terribly impressive... but a start. From this baby step came a big leap. By 2019, the state was the third-largest wind power producer, after Texas and Oklahoma. Wind energy from more than 5,000 turbines powered 42 percent of Iowa's net electricity generation—a bigger share than any other state.³

Today, 42 percent of Iowa's electricity comes from renewables.

—US Energy Information Administration, 2020

As of early 2020, about 5,100 wind turbines were generating 99 times the energy of Iowa's original renewables target.⁴

Iowa's success has played a pivotal role in moving others to use the Renewable Portfolio Standard.⁵ Now, 30 states, plus Washington, D.C., and three territories have adopted the policy or a similar approach.⁶

Hawaii was the first to set its sights on a 100% renewable energy commitment, with Governor David Ige signing the bill into law in 2015. He explained, "As the most oil-dependent state in the nation, Hawai'i spends roughly \$5 billion a year on foreign oil to meet its energy needs. Making the transition to renewable, indigenous resources for power generation will allow us to keep more of that money at home, thereby improving our economy, environment and energy security."⁷

Since 2018, California has been a leader as well, with its goal of reaching 100% renewable energy production by 2045. Understanding the urgency of this act, then-Governor Jerry Brown declared to the press, "It will not be easy. It will not be immediate. But it must be done."⁸

The results are impressive. Clearly, lack of federal leadership did not stop significant state action.

Almost half the growth of U.S. renewable energy from 2000 to 2019 can be linked to such state Renewable Portfolio Standards—with more expected over the next decade.⁹ But that's about the only blanket statement one can make about them.⁸ They range from Washington, D.C.'s call for 100 percent renewable energy by 2032 to Iowa's modest, but long-surpassed, 1983 renewables goal.¹⁰

Different states use different financial tools for their renewable portfolios, too. Some specify particular technologies, while others give extra credits for favored technologies.¹¹ Some states impose penalties or fines—sometimes hefty—for noncompliance. Still, most states have met their portfolio targets, made easier by the falling cost of renewables.¹²

In creating investment certainty, states' "standards" mandates have been astonishingly successful in driving the growth of renewable energy and advancing renewable energy technology. In fact, the US now generates more than double the total renewable energy that was called for in the 29 states' standards all together.¹³

⁸ This reminds us of Justice Brandeis's observation nearly 90 years ago, perhaps no more important than today: "It is one of the happy incidents of the federal system that a single courageous state may, if its citizens choose, serve as a laboratory; and try novel social and economic experiments" New State Ice Co. v. Liebmann, 285 U.S. 262, 313 (1932) (Brandeis, J., dissenting).

Early actors, especially Iowa, helped spur the demand for renewables by providing a stable market. These sales enabled the industry to grow and innovate, continually making solar and wind projects ever cheaper.

Then, in 2018 and 2019, ten states took even bolder steps—upping their renewable standard requirements, moving their timetables forward, or increasing their percentage goals.¹⁴

Standards vary widely by state, as noted, but many mandate that renewables comprise a minimum share of retail electric sales—generally between 10 and 45 percent. But fourteen states are more courageous—requiring 50 percent or greater.¹⁵

Rather than mandating that a particular share of energy be renewable, two national leaders, Iowa, and Texas, require specific amounts of renewable energy capacity.¹⁶

Since 2015, other developments are increasingly encouraging renewables. They include the continued declining costs of energy as well as such successful state energy policies such as “net metering”—to which we’ll soon turn.¹⁷

If you want to discover where your state stands on these energy measures, here is a handy interactive site from the US Energy Information Administration: www.eia.gov/state/index.php.

The US now generates more than double the renewable energy that—together—was called for in the 29 states’ Renewable Portfolio Standards.

—Galen Barbose, US Department of Energy:
Lawrence Berkeley National Laboratory,
2019

Make a Regional Pact to Act

The climate challenge is so huge that some states are working together for more impact. This “team” approach makes a lot of sense, as we humans seem to prefer being part of a group when we are entering new territory; and we tend to follow through more when we’ve made public commitments.

An example is the Regional Greenhouse Gas Initiative (RGGI), a multistate effort building on the earlier, proven success of market-driven emissions-control approaches nationally implemented in the federal Clean Air Act Amendments of 1990.¹⁸ Founded in 2005, RGGI—pronounced “Reggie”—now coordinates the climate action of ten northeastern US states, from Maine to Delaware.¹⁹ Its purpose? To unify approaches so that all gain, including an agreement to cap emissions and then trade among themselves the permits to emit carbon.

Progress in 1st Decade 2005-2015

Northeast Regional Greenhouse Gas Initiative

Emissions down. CO₂ emissions from power plants were 50 to 90 percent lower than in the rest of the country. Carbon emissions reductions achieved by households going green totaled, over their lifetimes, equivalent to taking 1.6 million cars off the road.

Prices down. Electricity prices fell by almost 6 percent, while prices in the rest of the country increased.

GDP Up. The GDP of the nine states grew by 47 percent—almost a third more than the rest of the country.

Health benefits up. Between 2009 and 2014, the value of RGGI’s health benefits were estimated at \$5.7 billion.

—The Arcadia Center, 2019

Some point out that RGGI is not just a “cap-and-trade” program—it is really a “cap and invest” scheme. Member states not only agree to limit power plant carbon emissions but also to make plant owners and operators pay for allowances for their pollution. That is key. The annual emissions limit ratchets down over time, and the money collected is invested in clean energy and energy efficiency projects.²⁰

So, is RGGI speeding the transition to a green economy?

The answer is “yes,” although critics point that its carbon cap has been set way too high.²¹ During the program’s first ten years, RGGI states achieved big advances, enumerated in the accompanying box.²² And, by 2014, so successful were these states at reducing emissions that they decided to lower the 2008 cap on emissions by almost half. It helped that natural gas became cheaper than coal; and power plants shifted their energy production to lower-carbon fuels.²³

At that point, one of RGGI’s Massachusetts champions, former state environment commissioner David Cash, said in 2019 he was ready to “uncork the champagne!”²⁴

Then in 2017, RGGI members again reduced the cap, agreeing to tighten it by another 30 percent by 2030.²⁵

Cities Unite for Green

States are not the only standouts among climate action leaders. Cities are stepping up, too.

The Global Covenant of Mayors for Climate and Energy is a UN-supported alliance of more than 10,000 cities and local governments in nearly 140 countries. It represents 800 million people—that’s more than one in ten of us.

Since 2016, its goal has been to turn pledges outlined in the UN’s 2015 Paris Climate Agreement into action.²⁶ So the Covenant supports local-climate commitments and reports them to the world, fueling faster action against climate chaos.

By the fall of 2020, 174 US cities—home to more than 65 million people, or nearly a fifth of the nation—were participating in the Covenant.²⁷

Washington, D.C., is one. Among many steps, it’s working to improve climate resilience and reduce its carbon dioxide emissions through something the city calls “The DC SmartRoof Program.” Varied forms of special roofing—covering an area adding up to 643 acres—is being installed on office buildings, schools, and hospitals to battle the impacts of climate change.²⁸

The city’s goal is multifold—generating clean energy, reducing heat and flooding, and absorbing harmful carbon.

So far, toward its first goal, the city has added enough solar photovoltaic (PV) cells to the city’s roofs to power 1,125 homes.²⁹ For the second goal, now more than 669,000 square feet of white-colored “cool roofs” are mitigating the impact of climate-related heat islands. And third: Over 400,000 square feet of new vegetative roofs, or “green roofs,” are projected to reduce stormwater runoff by almost 100,000 gallons a year, reducing the threat of climate-related flooding from extreme weather.³⁰ And this is just a brief overview, I’ll return to the District’s exciting roofing initiatives, as well as its other green efforts, in Chapter 4.

Despite its status as an environmental leader, our capital city didn’t make it into the top ten “green cities in the world,” judged by Green City Times.

But, we are pleased to report, two US cities did:

San Diego, California, comes in eighth. It was the first major US city to commit to 100

By the fall of 2020, 174 US cities—home to more than 65 million people or nearly a fifth of the nation—participated in the Global Covenant of Mayors For Climate and Energy.

—Global Covenant of Mayors for Climate and Energy

percent renewable energy. (Burlington, Vermont, deserves credit as the first.) And to get there, officials pledge to shift half of city vehicles to electric by 2020 and to recycle close to 100 percent of methane emitted by its own sewage and water treatment plants.³¹ As of the end of 2019, the city more than doubled the number of electric-vehicle charging stations and committed to adding more electric and 100 hybrid vehicles to their safety fleet next year.³²

Portland, Oregon, ranks ninth. It has protected 92,000 acres of green space connected through trails and parks—surely one reason that it ranks first among US cities for biking to work. Its transit options include buses, light rail, commuter rail, and streetcars.³³

Impressive.

These examples affirm our opening claim that humans prefer to be part of a group—with common commitments—when trying something new.

Humans are also rule makers. So, another powerful tool is rules such as the Renewable Portfolio Standard that we create and enforce to achieve shared goals.

Green-Energy Users Become Producers

Another powerful tool in getting more of us producing and using clean energy is what most of the world calls a “feed-in tariff”: Households and businesses share the renewable energy they generate—beyond what they need—through the utility’s grid and get paid for it, often under long-term contracts.³⁴

But don’t let the term “tariff” confuse you—it is the opposite of a tax.

Households as well as businesses can count on a good rate—sometimes above retail price—for the renewable energy they generate, and for a set period—usually 15 to 25 years.³⁵ I think of it as a “clean energy-producing credit.”

The approach has been strikingly effective, with Germany the world’s trailblazer. The country introduced the feed-in tariff in 1991, and in 2000 updated the policy to reflect the fixed-cost model that is more common now. Today 40 percent of Germany’s electricity comes from solar energy at peak production times.³⁶ In the first quarter of 2020, renewables in Germany jumped to supply more than half of the nation’s energy for the first time.³⁷ Note, too, Germany is a solar champion even though clouds cover its skies for about two-thirds of all daylight hours.³⁸

And, the customer-as-producer strategy has caught on broadly.

In Spain, it’s helped double the nation’s share of power from wind-energy to more than 37 percent between 2006 and 2015.³⁹ This approach quickly spread to Algeria, Egypt, India, Israel, Japan, South Africa, Taiwan, Thailand and Uganda, plus nearly half of the EU’s 27 nations, among others.⁴⁰

Ten years ago, Kenya introduced the strategy, offering consumers a 20-year contract for generating electricity from renewables.⁴¹ Since 2018, renewable energy has been supplying 70 percent of the country's installed-electricity capacity.⁴²

Remarkably, today three-quarters of global solar power can be linked to the use of "feed-in tariffs."⁴³

Another positive?

The feed-in tariff encourages decentralized energy production and control, as well as citizen participation—in a major way. As evidence, advocates cite Germany, the global instigator of the approach.

There, most renewable-energy generation is by private individuals and cooperatives, with only 5 percent from power utilities.⁴⁴

The U.S. has lagged in these feed-in tariffs, but six states now have similar, mandatory programs, and several utilities offer customers a voluntary option.⁴⁵

Ours have typically been small, but Los Angeles is set to be a big exception. In 2019, it approved an expansion of the country's largest feed-in tariff program, one with generous pricing for consumer-producers.⁴⁶

In the US, 43 states have a variant of the approach—"net metering," in which consumers are paid the going retail price for the energy they contribute to the grid. Note this is not a "bonus" price like some other countries use to encourage participation. Plus, the US variant doesn't typically involve long-term contracts, unlike in other countries.⁴⁷

In all cases, energy meters must be able to register not just consumption but output as well.⁴⁸ With net metering, individuals, businesses, or groups, with solar panels, for example, earn credits when their electrical meters effectively run in reverse.⁴⁹ And was I surprised to be one of them, when a fat check arrived in the mail from my local utility for the "extra" energy our rooftop panels supplied in the previous year.

Go solar!

Overall, in the US, renewable-energy growth has relied more on net metering, tax-credit

incentives, and state Renewable Portfolio Standards than on "feed-in tariffs."⁵⁰

Globally, three-quarters of solar power can be linked to one policy tool—feed-in-tariffs—where consumers are paid for the power they contribute to the grid.

—Pete Polansky, Nicholas School of the Environment, Duke University, 2019

"Solar's abundance and potential throughout the United States is staggering. PV panels on just 0.6 percent of the nation's total land area could supply enough electricity to power the entire United States."

—US Office of Energy Efficiency & Renewable Energy

Beyond the Rooftop—Community Solar

Even if you would have a hard time covering the upfront cost of solar panels, or if you don't own your own home like about one-third of Americans, you could still tap into solar energy to lower your energy bills and cut CO₂ emissions by using "community solar."⁵¹

Community solar is simple.

Instead of solar panels owned by a single household, community solar panels are owned by many residents. Community solar makes it easy for people who rent, live in multi-unit buildings, or simply have shady roofs to draw on the sun to power their homes.

A huge example is California's Imperial Irrigation District community solar, owned by 12,000 households that rely on more than 100,000 solar panels. Locals call it the "first-of-its-kind community solar" because it enables low-income customers to enjoy renewable energy and at the same time reduce their electric bills.⁵²

Benefitting from such economies of scale, community solar is not only a cost-effective way to address the climate emergency and benefit low-income homes, but it also democratizes control of energy. No wonder it's so popular.

Forty states have at least one community solar project, making its aggregate capacity nationwide now over 2,000 megawatts, enough at peak capacity to power up to 380,000 homes.⁵³ With demand for residential solar predicted to double in the next three years, community solar could get a big boost.⁵⁴

Two keys to its success?

First are the strong, state Renewable Portfolio Standards we praised earlier, because they compel utilities to shift to clean energy. Second are laws that allow not only utility companies but also third-party providers—aka private businesses and social-benefit organizations—to provide renewable power.⁵⁵

Roughly thirty states plus D.C. and Puerto Rico allow power-purchase agreements that enable consumers to receive energy at a reduced price from solar photovoltaic systems on property owned by a third party.⁵⁶ The arrangement offers more flexibility for customers interested in using renewable energy but who aren't planning personally to invest in the purchase and maintenance of rooftop solar.

And note well: We can all bring pressure to bear. Let's tell our utilities to go for clean power and to open up their markets to businesses and households that will provide it. It's predicted that in ten years we could have enough community solar to power 8 million more homes, or almost 7 percent of all households.⁵⁷

And as more of us learn about community solar's potential, we can speed that growth. Finding enough land should not be an obstacle: "PV panels on just 0.6 percent of the nation's total area could supply enough electricity to power the entire United States," estimates the US Office of Energy Efficiency and Renewable Energy.⁵⁸

There are many ways to get into the act.

State and local governments are getting creative, too, working to bring renewable energy to the people. In Nebraska, residents of cities and towns are taking advantage of the public utility's SunWise Community Solar Program, approved in 2016. In Omaha, in under just two months, every share in the program was snatched up by eager customers of the city's Public Power District.⁵⁹

And here's a surprising opportunity arising from going solar:

Near Washington, D.C., in Fort Washington, Maryland, a former landfill turned out to be a great spot for a green-energy installation. So a large-scale community solar farm is brightening the area, producing enough electricity for more than 1,000 homes.⁶⁰

We'll close this section with some underappreciated advantages of solar, especially community solar, and recap its multiple advantages.

Control of solar power is more decentralized than the monopoly-controlled fossil fuel it is replacing. Small-scale as opposed to "utility scale"—solar made up about 40 percent of total solar capacity connected to the grid, as of late 2018.⁶¹

Plus, small-scale community solar draws neighbors into shared, local decision-making, an example of what we like to call "climate democracy." Unlike household-owned rooftop solar, community solar brings people together to work face-to-face to act to stop climate chaos. Moreover, it can be highly cost-effective and land efficient—even putting to good use otherwise problematic brownfields and other low-value, empty space.

Plus, community solar is less complex to implement, operationally simpler, and cheaper than going rooftop to rooftop.

What's not to like?

Plants & Solar Panels as Partners

Another breakthrough tool in getting to climate-safe energy is taking advantage of synergies.

A great example underway for solar power is called "agrivoltaics"—where agriculture and solar power meet in the field.

It couldn't happen as long as solar panels required concrete foundations that removed precious topsoil. But in 1981 German scientists hit upon agrivoltaics—that is, generating solar power while protecting healthy soil to serve as a (much needed) carbon sink. With solar panel costs continuing to fall, farmers now can generate power along profit to recoup recent farm-income losses and enjoy an additional, steadier income stream.

The key to agrivoltaics are two-meter high, raised panels that enable producers to generate solar-electric power right along with growing crops.⁶² Both the crops and the solar installation do yield less when they share land, but experts assure us the net gain is still significant.⁶³

China's got the largest such project, combining solar panels in fields of goji berries. The panels help cut soil moisture evaporation as much as 40 percent and increase biodiversity. France is Europe's leader with a surge in agrivoltaic projects.⁶⁴

Combining solar panels with grazing is another obvious pairing, says the American Solar Grazing Association.⁶⁵

This breakthrough underscores for us the power of "fresh eyes" on old challenges.

Later we will celebrate whirling wind mills amid growing crops in west Texas, a great win-win for wind.

More Bang for Your Watt

Energy efficiency in our homes and vehicles may be our least "sexy" weapon against climate chaos, but it's a strategy that's been quietly humming away for decades.⁶⁶ Energy efficiency simply means doing the same—or more—with less energy, so fewer greenhouse gases are wreaking havoc.

And, of course, we save money, too. Efficiency standards—set by the states since the 1970s and in some areas by Congress—have brought us more efficient motors and lighting, as well as better appliance and home design. To imagine the energy they are conserving, here are homey but striking statistics: Over 35 years, from 1980 to 2014, we cut the energy we use to wash our clothes by 70 percent and to run our refrigerators by two-thirds. Homes meeting new, model building codes now use 40 percent less energy.⁶⁷

Standards Work!

The requirement that appliance makers meet efficiency standards is a key reason that between 1980 and 2014 Americans cut energy used to wash our clothes by 70 percent.

– US Office of Energy Efficiency and Renewable Energy, 2017; Steven Nadel, Neal Elliott, and Therese Langer, American Council for an Energy-Efficient Economy, 2015

Another way of measuring efficiency is in the power it takes to create a dollar's worth of goods. And, over the years 1980 to 2015, the US economy cut that amount in half, reports the American Council for an Energy-Efficient Economy.⁶⁸

Thus, over these decades, energy efficiency has spared us from a huge amount of carbon dioxide.

Still, “efficiency” may not excite you. So keep this in mind: Even the renewables we love to tout, especially wind and solar, still do require energy to produce.

But “producing” efficiency? Nope—none.

Of course, efficiency improvements on a massive scale depend crucially on strengthening and enforcing efficiency standards of energy providers—read utility monopolies—and on manufacturers.

Given capitalism's drive for short-term profit, private utilities may not be motivated to sell fewer kilowatt-hours to save fuel rather than to burn it. That's why a market system needs accountable, trustworthy government, if it is to serve the “general welfare,” as called for in the preamble to our Constitution.

In the 1980s, however, President Reagan began undermining trust in government—calling it “not the solution” but “the problem.” And from that frame, observed the President of the National Audubon Society in 1989, Reagan failed to “create a national energy policy built on conservation and energy efficiency,” and instead “sought to rush the transfer of coal and oil from public lands and waters into private hands at bargain prices.”⁶⁹

Fortunately, though, green energy prices have been falling because it is becoming cheaper to produce than fossil fuel energy. And, due to state-level rule-setting—needed to establish the Regional Greenhouse Gas Initiative and Renewable Portfolio Standards, among others—the momentum has kept going.

So has ground-level, citizen advocacy—an approach abetted by robust support for energy efficiency across political orientation and age groups.⁷⁰ Whether red or blue, few Americans like waste, and greater efficiency itself promises huge gains.

By using a range of efficiency-promoting policies, from those that encourage retrofitting older homes to more efficient appliances and electric vehicle charging outlets, Americans could reduce their energy use by a third by 2040—putting us “on the path” to savings of 50 percent by 2050, reported the American Council for an Energy-Efficient Economy in 2016.⁷¹

Just by using energy more efficiently, the US could cut energy use by a third in 20 years.

—American Council for an Energy-Efficient Economy, 2016

Getting There, Literally

Twenty-eight percent of all carbon-emission equivalents we Americans put into the atmosphere come from getting us and our stuff from place to place.⁷² Transportation is the biggest culprit among US economic sectors when it comes to climate harm.

U.S. CO₂ Equivalent Emissions Contributors by Sector 2018

1. Transportation **28%**
2. Electric power **27%**
3. Industry **22%**
4. Commercial & residential **12%**
5. Agriculture **10%**

—US Environmental Protection Agency

But before jumping into transportation solutions, I want to pause to remind readers of the logic of this book’s flow: As you’ve seen, our primary approach has been to ask how we move to green power sources across sectors responsible for more than 60 percent of emissions—those numbered 2, 3, and 4 in the accompanying box on emissions by sector.

The 5th sector—agriculture and diet—gets its own chapter (Chapter 5) because farming is central in creating both the climate problem and its solutions.

That leaves us with number 1: transportation, which contributes 28 percent of emissions and is predicted to grow faster than others. Reducing emissions for how we get around demands many changes in our society.

Note, also that 72 percent of global transportation emissions are from road vehicles, involving a lot of individual choices.⁷³ And per mile private autos—per passenger—emit roughly 50 percent more greenhouse gases than do buses, and triple the average of all types of rail travel.⁷⁴

Energy trends in transportation are both good and bad.

Per person, the US has one of the highest rates of car ownership in the world. But some good news is that since 2000 the number of registered automobiles has fallen about 17 percent, even as population has grown almost that much.⁷⁵

But in five major US cities household vehicle ownership has been growing significantly faster than the population.⁷⁶

I’d heard that young people are increasingly rejecting car ownership. It is true that because millennials tend to live in urban areas and get married later, they also have lower car-ownership rates. But—after controlling for those factors—it turns out younger generations actually drive slightly more.⁷⁷ They are, though, less likely to enjoy and “romanticize” cars, which could make them more open to public transportation options as they become more available and convenient.⁷⁸

Unfortunately, our federal spending on transportation for most of a century has prioritized travel by car—building highways linking “job centers and typically wealthier, whiter areas” and forcing most Americans “to drive more and further,” notes Files for Progress.⁷⁹

In the US, the number of registered automobiles has fallen about 17 percent, even as population has grown almost that much.

—Statista, 2017; Macrotrends

Clearly, we must refocus on public transportation and do much more. So, what tools are proving to best reduce this huge negative for our climate? As with energy use in our homes, the rules we set through accountable government are key.

Luring More Riders onto Public Transit and into Ride Sharing

Among individual actions, a shift from private to public transport offers big returns in terms of reducing greenhouse gas emissions. Per passenger mile, buses produce 33 percent lower emissions than single-occupancy cars, and subways and metros are responsible for a whopping 76 percent lower emissions.⁸⁰

A couple of years ago, I shifted to the bus for my own commute. Not only did I feel like a much better “climate citizen,” but I enjoyed other rewards. An unexpected one was simply the opportunity to get to know my neighbors as we chat at the bus stop.

To get us out of our cars, about 100 cities worldwide—especially in Europe—now offer free public transit.⁸¹ And recently, some US cities are showing interest. Olympia, Washington, just launched a five-year pilot making buses free and in the first few weeks saw a 13 percent uptick in ridership.⁸² In the fall of 2019, a toll-free pilot in Lawrence, Massachusetts, saw the use of buses jump by a quarter.⁸³

To get us out of our cars, about 100 cities worldwide—especially in Europe—now offer free public transit.

—Ellen Barry, New York Times, 2020

Cities and states can also expand ways to encourage ride sharing, also lowering our carbon footprint. For example, preferential lanes and tolls for “high occupancy vehicles” helps. Now, many advocate offering similar perks to encourage electric vehicles.

Car-free Zones in Central Cities

The COVID-19 pandemic is fueling measures to offer alternatives both to cars and public transport, where crowding increases infection risk. In the spring of 2020, swaths of London were closed to cars and vans, and the city increased by 30 percent its fee imposed on weekdays for drivers headed into central London. Mayor Sadiq Khan celebrated what he called “one of the largest car-free areas in any capital city in the world.”⁸⁴

Photos of happy bicyclists, joggers, and walkers no doubt caused many to wonder whether this change should be continued post-pandemic. Barcelona has had car-free zones for years.⁸⁵

Electrifying Cars

Worldwide, electric-battery powered cars—with the potential to be carbon-free—jumped from a little over 100,000 in 2012 to 4.8 million only seven years later.⁸⁶ And the French love them: During December 2020, about a fifth of French passenger car registrations were for plug-in electrics—up almost six-fold from the same month a year earlier.⁸⁷

In the US, their share of the market is still tiny, but Americans can press our government to accelerate this option via research into better electric-vehicle batteries, investing in electric charging stations, creating incentives for developing electric light trucks and small delivery vans, and—as mentioned—giving perks to electric-car drivers, such as toll-free lanes.⁸⁸ On the supply side, it's already beginning: in early 2021, General Motors surprised a lot of people when it committed to stop producing gas-powered cars, vans and sport utility vehicles by 2035 and to reach net-zero carbon by 2050.⁸⁹

Hydrogen Help

If you haven't already, you are likely soon to hear a lot more about hydrogen fuel cells. They will be a key to making the shift to electricity, as they use the chemical energy of hydrogen to produce electricity without combustion or emissions.

Sounds good to me!

They work like batteries: Oxygen from the air and hydrogen are supplied to the cell—producing only electricity, water, and heat.⁹⁰ Increasingly, they are seen as a source clean energy not only to power cars but also homes, buildings, and industry.⁹¹

Already, Toyota, Honda, and Hyundai have fuel-cell electric batteries in some vehicles. California (no surprise) is in the lead, with 39 public hydrogen-fueling stations and another 25 on the way.⁹²

Fuel cells typically are used as energy back-up for times when power is interrupted in large buildings in industry and universities.⁹³ In the U.S., the only large fuel-cell power plant is a 15-megawatt Fuel Cell Energy unit in Bridgeport, Connecticut. But I was excited to read that there is international collaboration in this area through the International Partnership for Hydrogen and Fuel Cells in the Economy, which aims “to facilitate and accelerate the transition to clean and efficient energy and mobility systems using fuel cells and hydrogen (FCH) technologies.”⁹⁴ The partnership spans continents with the European Commission and 21 countries and on board. Among them are big players—India, China, and Brazil.

Pressing Ahead with Efficiency Standards

A no-brainer in reducing transportation emissions is setting and enforcing car-efficiency standards. Way back in 1966, California was the first to pass legislation setting tailpipe emissions standards, and in 1968 during Lyndon Johnson's administration, the federal government followed suit.

The Federal Clean Air Act has not only allowed California to set higher vehicle air-pollution standards than EPA but permitted other states to follow suit.⁹⁵ The California standards, over time, have led to the manufacturing of highly efficient gas models, hybrid vehicles, and electric cars.

Thirteen states and the District of Columbia have now adopted California's standards—representing roughly a third of all registered vehicles in the United States.⁹⁶

Thank you, California.

Finally, a subset of states has even stricter zero-emissions vehicle regulations.⁹⁷

As a result, air pollution in large sections of the country has noticeably declined—including carbon dioxide emissions.⁹⁸

In 2019, the Trump administration began working hard to dismantle this progress. It challenged California's—and, by extension—the other thirteen state's—authority to establish stricter emission standards. The Trump administration's tactic was to revoke a state's waiver from the laxer federal standard—a waiver that previously had been a mere formality.⁹⁹

The result was a flurry of lawsuits.¹⁰⁰

Interestingly, auto makers with more than a quarter of the national market defied the President, announcing they would adhere to California's higher mileage standards. And to that, the Trump administration threatened federal antitrust laws.¹⁰¹ In all, the Trump administration rolled back more than 125 environmental protections. Now President Biden is reversing this travesty.¹⁰²

And let's not forget air travel.

Of all US transportation emissions, flying contributes 12 percent.¹⁰³ The EPA and other agencies are now working to develop enforceable standards under the Clean Air Act, at least for engines of "certain classes" of aircraft.¹⁰⁴

Implementation of such national standards and reinstating essential protections has become possible with Biden in office—as we citizens push.

Thirteen states and D.C. have adopted California's much higher car-efficiency standards—representing roughly a third of all registered vehicles in the United States.

—NYU School of Law

Shifting Gears

With the climate crisis upon us, our new leadership in Washington can open up innumerable ways for the Department of Transportation to prioritize improved, expanded, low-emissions public transportation, especially helpful to low-income users.

Historically, the federal government has made public transport a low priority. It's been willing to cover 80 to 90 percent of state highway costs but only half of public transit costs.¹⁰⁵ We can reverse that.

The impressive new think tank, Data for Progress, argues the climate emergency justifies raising "annual federal support for public transportation to \$50 billion."¹⁰⁶ Today it's just \$13 billion. Two-fifths of that support should be "operating assistance," the group advocates. That way, transit agencies across the country could "quickly scale up service" in line with the Green New Deal's

vision, creating “networks of frequent routes to underserved urban and suburban destinations.” And it could become a lifeline for nondrivers in rural areas.

Cities, too, can fight the climate crisis as well as our society’s deep inequities by enabling use of public transit. King County, home of Seattle, in 2020 began debating a plan “to offer fully paid bus passes to people who already qualify for Temporary Assistance for Needy Families and Supplemental Security Income.”¹⁰⁷

In 2020, King County, home of Seattle, began debating a plan to offer fully paid bus passes to certain low-income riders.

—Heidi Groover, Seattle Times, 2020

Most of us don’t think of good sidewalks as an investment in reducing carbon emissions, but maybe we should. Pleasant walking can lure us out of our cars. So, Los Angeles is investing \$1.4 billion over 30 years to repair sidewalks and make them accessible to everyone.¹⁰⁸

Encouraging Working from Home

And, let’s not ignore an obvious way to reduce transportation emissions. We are now living it: The COVID-19 pandemic has offered workers and employers a taste of the benefits of enabling more of us to telecommute, with climate-positive impact.

Beyond the pandemic, our government could offer tax incentives to employers to enable this option.

Planning Holistically, an Underused “Tool”

We cast this chapter as highlighting specific policy tools to meet the climate crisis. But, of course, progress comes fastest with a big vision enabling us to reimagine and remake many elements at once.

Perhaps my favorite exemplar of a city transforming its transit with big and varied elements and benefits is Curitiba, Brazil, population just over 2 million.

Back in the 1970s, Curitiba Mayor Jaime Lerner and others in his administration created the first-of-kind Bus Rapid Transit system, which quickly became an international model. Today’s Curitiba’s buses run frequently—some, even every 90 seconds—and its stations are convenient and comfortable; buses have their own lanes and are timed to avoid any congestion.¹⁰⁹

Fare collection—enabling passengers to pay one fee to go any distance—happens before boarding in a covered area, raised to the level of the bus driver. So loading and unloading is quick and easy.¹¹⁰

BRT service resulted in 27 million fewer automobile trips each year and about 27 million fewer liters of fuel annually. Curitiba uses about 30% less fuel per capita because of its heavy transit usage, and its ambient air pollution is one of the lowest in Brazil.

—National Renewable Energy Laboratory, 2013

Plus, the system’s efficiency reduces costs, allowing residents of Curitiba to spend just 10 percent of their income on travel, well under the national average.¹¹¹

Today, roughly 85 percent of Curitiba's commuters use the system, so the city's streets are congestion-free, and pollution has been seriously reduced. Curitiba uses about 30 percent less fuel per person, and the change has resulted in 27 million fewer automobile trips annually. The transit system is also beginning to move to biodiesel fuel—less-greenhouse-gas intensive than fossil but still not clean energy.¹¹²

In all, Curitiba's buses create one of the most heavily used, yet low-cost, transit systems in the world. Former mayor Lerner is clearly proud. "We started BRT in 1974; now 300 cities around the world are using it," he told *The Guardian* in 2016.¹¹³

We include Curitiba's urban transit system because it embodies so many elements of how urban and work life are enhanced as we think holistically and leave cars behind.

Closer to home, the state of Oregon stands out for its participatory, multi-leveled approach.¹¹⁴ Already, more than 50 percent of Oregon's electricity comes from renewable energy sources. A third of Portland's offices are green certified, and its residents recycle and compost more than 60 percent of their trash, almost twice the national average.¹¹⁵

Already, more than 50 percent of Oregon's electricity comes from renewable energy sources.

—Shane Stricker, *The Inertia*, 2017

Salt Lake, Denver, Portland, the Twin Cities, Washington, D.C., and Dallas are "metropolitan areas aggressively pursuing transit-oriented development, yielding transportation, environmental, and economic benefits," says our Federal Transportation Administration.¹¹⁶

In 2010, Salt Lake City residents participating in "Envision Utah" were invited to choose among four growth scenarios.

Their choice?

A plan that could cut ten miles off daily household vehicle miles traveled. To support this goal, the city is building new light rail transit lines and developing housing, jobs, and recreation along this corridor.¹¹⁷ And in the last decade, more than 40 percent of new multi-family housing units have been built within walking distance of a rail station.¹¹⁸

In Minneapolis, city government created the "2040: Transportation Action Plan," or TAP, organized around seven dimensions of city life—walking, biking, transit, technology, freight, street operations, and design.¹¹⁹

Plus, it set six goals related to climate, safety, equity, prosperity, mobility, and active partnerships.¹²⁰ The city is already experiencing great success in mobility options; for example, the bike-share system launched in 2010 has sparked a four-fold growth in annual ridership.¹²¹

The Shape of Our Neighborhoods

These stories help us see that it's possible to create neighborhoods where we can be in easy reach of neighbors, work, shopping, play, and transportation, as well as nature's beauty and bounty. And at the same time, we save vast hours of commuting time while reducing stress and climate-harming emissions.

A pioneer in realizing this vision is the Congress for the New Urbanism, working with cities, planners, and citizens' organizations. Its motto is "building places people love."¹²² Another interesting anti-sprawl and pro-walkability group is Strong Towns.¹²³ Check them both out.

At the same time, some passionate millennials are responsible for the 200,000-member strong Facebook group "New Urbanist Memes for Transit Oriented Teens." Members have dubbed themselves "NUMTOTS" and use a mix of humor and earnestness to discuss topics related to transit and housing policy—dreaming together a better future for cities around the globe.

The group has become so popular it's spawned numerous spinoffs—from one focused on photographing trains to "NUMTinder," which is really a dating app to meet likeminded lovers of new urbanism. Among younger generations, this social media phenomenon facilitates education and stirs passion for improving urban life.¹²⁴

Check them out, for you might just find ideas (or a date?) that would work great in your neighborhood.

Getting Smart—Meters & Grids

A "smart grid" is essential for getting renewable energy into the electrical grid.

Because solar and wind energy is variable, we need a demand-responsive electrical grid to use energy efficiently. Such an electric power grid would be able to integrate a wide range of supply-and-demand information and distribute electricity more efficiently, with lower energy losses.

A smart grid enables "smart meters" in homes and businesses to collect, analyze, and adjust energy use from a range of sources, informed by overall electricity demand and availability across the entire grid.

When consumers have smart meters to track their electricity use, it declines as much as 15 percent.

—Environment and Energy Study Institute, 2009

Ideally, a smart grid can tell customers the best times to use electricity to save money—driving a pricing system that raises and lowers the kilowatt-hour cost of electricity depending on overall demand and availability. When consumers have smart meters tracking their electricity, use declines as much as 15 percent, finds the Environment and Energy Study Institute.¹²⁵

In parts of the US, as well as India and 17 European nations, smart grids provide individual consumers with price signals telling them when it's most economical, for example, to do laundry, run air conditioners, or perform other energy-using tasks.¹²⁶

In the US, by 2019 about 90 million smart meters had been installed nationwide, covering almost 70 percent of households. The goal was 107 million installed smart meters by the end of 2020.¹²⁷ Unfortunately, however, they can only do the work of adjusting electricity use to save energy and money when they are connected in a smart grid.

John Rogers of the Union of Concerned Scientists emphasized to me that we need to keep the bigger picture in mind: "We need to fix and upgrade the electricity grid not just to make renewables work. We need to fix and upgrade the grid, period." And while we're at it, "we might as well make it work for our future, too."

Some Americans understandably worry that “smart grids” could come to mean “smart surveillance,” as well.¹²⁸ It’s a concern—underscoring, as we do throughout, that true sustainability means democratization within both political and economic life so that unaccountable power at the top can’t use this technology against us.

Getting to a National Grid

Our electric grid has been evolving for more than a century and is, let’s face it, a patchwork in dire need of redesign for the digital age, as John Rogers stresses. A fully functional national smart grid could cost as much as \$476 billion over twenty years—an average of \$24 billion a year, the Electric Power Research Institute estimates.

And the benefits?

Even with the lowest estimated savings—\$1.3 trillion—we could more than double our money. And the investment could save us as much as \$2 trillion, along with a 58 percent cut in the electric sector’s CO₂ emissions in 2030 compared to 2005.¹²⁹

Development of a smart grid will help ensure that utilities can meet the significant growth in demand needed to electrify automobiles—with consumers drawing clean power from the grid at night, when it is most abundant and available at least cost.¹³⁰

Smart grid technology exists. The key is making it happen.

And here we have inspiration from afar. Southeast Asia is making an exceptional investment in smart grid and micro-grid technologies—fed by the desire for renewable

Investment in a national grid could save us as much as \$2 trillion *and* cut the electric sector’s emissions by 58 percent in a decade, compared to 2005 levels.

—Michael Kanellos, Greentech Media, 2011

energy and efficiency, as well as the need to reach remote communities and thousands of islands. A recent assessment projected an investment of \$10 billion over the next decade by regional leaders Malaysia and Singapore, as well as through growing commitments from Indonesia, Thailand, the Philippines, and Vietnam.¹³¹

And Who Will Pay?

In Chapter 1, we highlight ways that the American people can pay for a transformative Green New Deal, as we make our tax system fairer and stop losses and waste. Here are other avenues available right now.

Green Investments and Power Purchase Agreements

With the right tool, private investment can be substantial. There is every reason for savvy investors to back the clean-energy endeavors highlighted throughout our book.

Jon Powers, president of Clean Capital—and formerly Chief Sustainability Officer under President Obama—reports that “sustainable investing” has grown to \$12 trillion dollars.¹³²

Individuals, pension funds, and life insurance companies are involved—especially those divesting from fossil fuel under citizen pressure and seeking long-term investments.

Powers argues that investors can be a solid source of capital for green energy. Companies—including Walmart, Apple, and eBay—have installed solar panels on roofs of their warehouses. They have signed “purchasing power agreements” with solar providers and have confidence in a reliable 20-year cash flow.¹³³

“There is phenomenal demand to move into clean energy,” but policy certainty is key, Powers stresses. Surprisingly to me, he harkens back to the better era of George W. Bush.¹³⁴ Then, the Department of Energy did provide investors some security. The Bush Administration put \$67 billion into loans and guarantees for energy projects to cut greenhouse gases and air pollution as well as retool auto plants for more energy-efficient vehicles.¹³⁵

So, private investment is yet another financial tool available to move forward on the Green New Deal in a post-Trump world.

Tax the Bad Stuff

Another tool spreading around the world is putting a price on carbon so that emitters pay a tax or fee on each ton of carbon they emit.¹³⁶

A tax on carbon shouldn’t be a radical idea. It goes back one hundred years to economist Arthur Pigou’s proposal to add a fee to the price of anything that creates harm, with the income used to pay for mending it.¹³⁷

Sounds sensible.

As members of communities, we accept that we all have to pay for dealing with the garbage and sewage we create—even if we’re not yet doing a very good job at it. So why isn’t carbon pollution paid for by those who directly trigger it?

Putting a price on carbon to slash emissions is based on the observation that most of us like to save money. So if we know we’re paying to put carbon into the atmosphere, we’ll cut back.

Carbon pricing schemes come, mainly, in two flavors—a cap-and-trade system or a direct fee on carbon emissions—and they are about equally spread around the world. Although results might be similar, they pose varying challenges. For more on pros and cons, check out “Pricing Carbon: A Carbon Tax or Cap-And-Trade?” from the Brookings Institution.¹³⁸

Interestingly, uses of the revenue gained via the two approaches are quite different: 70 percent of cap-and-trade revenues are earmarked for “green spending,” whereas 72 percent of the much larger revenues collected via the carbon tax are either refunded or go into governmental general funds.¹³⁹

Forty-six countries—with emissions adding up to over a fifth of the world’s total— have passed some type of carbon pricing.

—The World Bank 2020

In the cap-and-trade scheme, government caps total greenhouse gases, with businesses and other emitters buying and trading to stay within the cap. Earlier we described one success—RGGI, the Regional Greenhouse Gas Initiative in the northeastern US.

By 2020, 46 countries had passed some type of carbon pricing, along with 35 states and other sub-national governments; but in many the cap is too high or tax too low to have much impact.¹⁴⁰ About half are emissions-trading systems, mainly subnational, and the rest are carbon taxes.¹⁴¹ Together, their emissions now add up to over a fifth of the world's total.¹⁴²

All told, among Paris Agreement signers, 88 countries have declared their intent to start pricing carbon.¹⁴³

Much of the impact of this strategy depends on what China does, as it is by far the world's leading carbon emitter. In 2017, China announced that it was experimenting with cap and trade approaches.¹⁴⁴ But in 2020, it loosened restrictions on coal, and the country's emissions spiked.¹⁴⁵

This is a disturbing development. China has enormous potential to lead, as it has become the world's biggest investor in renewables, with the most installed green energy capacity. The country's retreat appears irrational financially as well, since 70 percent of China's coal plants cost more to run than the cost of building new onshore wind or utility-scale solar.¹⁴⁶

Lessons from Taxes on Carbon

A current stand-out is the UK: A recent academic study points to its success. In 2013, the country put a price on carbon—now set at about \$25 a ton—and achieved a 93 percent drop in coal-fired electricity in six years—from 40 percent to 3 percent.¹⁴⁷ The study's lead author concluded that if EU countries followed suit, “we would likely see huge carbon emission reductions throughout the Continent.”¹⁴⁸

In the UK, more than half of electricity now comes from low-carbon sources, with 37 percent from renewables.

—Simon Evans, Carbon Brief, 2020

Over three decades Britain has reduced carbon emissions by almost 40 percent—more than any other major industrial country.¹⁴⁹ More than half of UK electricity now comes from low-carbon sources, with 37 percent from renewables.¹⁵⁰ In the US, the comparable number is 17 percent.¹⁵¹

Unfortunately, however, Britain has chosen to replace coal in part with burning biomass—largely imported American and Canadian wood pellets—for energy. As of 2018, nearly 40 percent of what Britain considered its “renewable” and waste energy came from biomass in the form of wood pellets.¹⁵² As we explain in Chapter 3, such wood-pellet burning takes a heavy environmental toll.

The *Financial Times* observes that a key to Britain's (qualified) success has been keeping the pressure on via increasingly higher carbon taxes. In “sectors where environmental taxes have been becoming more onerous—industry, power generation and waste—emissions have been falling fast.”

But where the Britain's carbon tax has been stable—including aviation, transport, and agriculture? There, emission reductions “have been much lower.”¹⁵³

Sweden gets praise for having the world's highest carbon tax—about \$139 per ton; and it's working—at least somewhat. With a lot of public deliberation beforehand, in 1991 Sweden launched carbon pricing that by 2018 was associated with a drop of 25 percent in emissions.

Meanwhile, the country's economy grew 60 percent. Of course, 25 percent is not enough; and carbon prices in other countries are typically still so low—\$10 per ton— as to have little impact.¹⁵⁴

Who Benefits Directly from the Carbon Tax?

Another variant in carbon tax policy is returning taxes collected to the people. In Switzerland, most of the earnings go back to the people, while in Sweden and Denmark, the share returned is about half.¹⁵⁵

British Columbia tried the approach, beginning in 2007. All carbon tax revenues were returned to households and companies, with—not surprisingly—considerable popular support. In the first year, emissions did fall modestly; but as GDP has grown significantly, the carbon decrease has been modest, and recently it's been on the rise again.¹⁵⁶

Of course, a carbon tax, if its revenue is not passed back to consumers, can worsen economic injustice. In the US, the poor pay a disproportionately high share of their incomes for energy, and a carbon tax could worsen the disparity.¹⁵⁷

In France, it was such injustice that in 2018 triggered the Yellow Vest protests that rocked the country. Those imposing the gasoline tax failed to notice that many low-income rural people must drive to work and thus were especially hit. In Australia in 2014, carbon pricing plans were canceled in response to what some called popular opposition.¹⁵⁸ (And, yes, coal-industry lobbying likely played a major role, too.)

For this reason, carbon pricing has succeeded, at least to some degree, more often when all or part of the income from a carbon fee returns to the community—for example, by reducing energy prices for low-income households, or investing in public transportation or renewable energy.¹⁵⁹

Carbon Tax Can Help Carbon Absorbers—Trees

We can't move on without mentioning the countries in which a carbon tax has had unexpected beneficiaries: our trees. Costa Rica and Colombia have successfully enacted what's been called a "tropical carbon tax."

Since 1997, Costa Rica has been taxing fossil fuel and putting the income—now almost \$27 million a year—into forest conservation. From the proceeds, farmers and landowners get funds they use in "rainforest protection or restoration."¹⁶⁰ Those paying the tax said they didn't object "if revenues were directed to forest conservation."¹⁶¹

By one analysis, if twelve more countries roll out a similar tropical carbon tax, they could raise \$1.8 billion each year to protect and enhance natural habitats.¹⁶² Such action could be a great boon for our climate, considering how much forest destruction worsens the crisis: If it were a country, forest destruction would be the world's third-largest greenhouse gas emitter.¹⁶³

Since roughly every six months a new carbon-tax revenue strategy is launching, we can expect growing evidence of what works and what doesn't.¹⁶⁴ But, we already have enough to know that to get us to safety, carbon taxes must not only spread rapidly but be much higher and steadily increased. (Think Sweden at \$139/ton.)

Some analysts argue that other tools, such as the Renewable Portfolio Standard and emissions standards, are even more powerful.

The best news is that some nations seem determined to shut down the worst sources of pollution, including coal plants and gas-guzzling vehicles.¹⁶⁵ Sixteen countries—including China, the UK, France, Germany and India—have announced policies that, if rendered enforceable, would limit or ban internal combustion engines within 10 to 20 years.¹⁶⁶

Sixteen countries—including China, the UK, France, Germany and India—have announced policies that, if rendered enforceable, would limit or ban internal combustion engines within 10 to 20 years.

— Isabella Burch and Jock Gilchrist, Center for Climate Protection, 2018

Polluters Pay? What a Concept

So far we've noted the long-endorsed rule, now spreading, that polluters should be taxed. But are they truly being forced to repair their harm? Not really.

A solution starts with preschool logic: When we make a mess, it's our job to clean it up.

But within our brutal form of capitalism, such basics succumb to magical thinking—the belief that a market's "discipline" is all we need. If a corporate player makes people sick, consumers will just shun its products, and the guilty corporation will either change its ways or go under. Problem solved.

Problem is, the market typically doesn't work this way—for a bunch of reasons.

In the US, burning fossil fuel spews forth emissions that, by one estimate, leads to health costs alone of at least \$360 billion a year and possibly as much as \$887 billion.¹⁶⁷

Yet, the fossil-fuel industry's decade-long strategy of covering up its deadly consequences—combined with industry lobbying to twist our broken political system toward its ends—has worked to kill any possibility of a self-correcting market.

So, four fossil-fuel giants—Exxon, Chevron, BP, Shell— have gained \$2 trillion in profits since 1990, while passing on many costs to the rest of us.¹⁶⁸

But a growing global movement is demanding a just transition to green energy. One key piece is The People's Demands for Climate Justice, which include ending subsidies for fossil fuels and a moratorium on any new fossil fuel development. Over 400 organizations and hundreds of thousands of individuals worldwide are on board.¹⁶⁹

The Boston-based Corporate Accountability has long demanded that fossil fuel corporations be held liable and forced to pay damages. As noted in Chapter 1, the executives leading these companies knew many of the consequences of their actions.

Massachusetts Attorney General Maura Healey gets it, too.

Since 2016, she's been investigating Exxon, and in June 2020 filed an amended complaint against Exxon "for misleading and deceiving Massachusetts consumers and investors...selling investors snake oil scenarios of ever-growing global demand for fossil fuels. Our amended lawsuit seeks to stop Exxon from engaging in deception and penalize them for this misconduct."¹⁷⁰

The Massachusetts Attorney General Maura Healey has filed a lawsuit against Exxon for, she argues, "selling investors snake oil scenarios of ever-growing global demand for fossil fuels."

—Karen Savage, *The Climate Docket*, 2018

In the spring of 2020, in a promising victory for the liability remedy, the Ninth Circuit ruled that San Francisco and other California jurisdictions could sue Big Oil for tens of billions of dollars in state, rather than federal courts.¹⁷¹ "The lawsuits claim Chevron, Exxon Mobil, ConocoPhillips, BP, Royal Dutch Shell and other companies...should pay for damage from climate change," reported the *Los Angeles Times* in 2020. Plus, they should "help build sea walls and other infrastructure to protect against future impact—construction that could cost tens of billions of dollars."¹⁷²

This ruling "could clear the way for climate liability lawsuits around the world," declared Corporate Accountability.¹⁷³ Indeed, Minnesota and the District of Columbia have recently announced their own lawsuits.¹⁷⁴ And in October 2020, Hoboken, New Jersey, announced it will join 19 other cities, states and private organizations suing fossil fuel companies for climate change damages.¹⁷⁵

Also notable is Our Children's Trust's efforts to use our legal system to address the climate emergency. It has filed petitions in dozens of states seeking legal redress for the harm caused by climate chaos. Although, most recently, a lawsuit brought by twenty-one young people against the Trump administration was dismissed by the Ninth Circuit Court of Appeals, this nationwide effort has raised awareness and is helping to galvanize grassroots support for political action.¹⁷⁶

Defund the Climate Culprits, Invest in the Future

Yet another strategy in our solutions toolkit is defunding carbon polluters.

In 2008, Bill McKibben—author of one of the first books to alert us to the climate crisis—and friends launched 350.org to create a global-climate movement. A key part of its strategy has been convincing institutions to shift their wealth from fossil fuel investments. With young people leading the fight, the divestment movement has spread to campuses across the country. Notably, it was a training ground for founders of the Sunrise Movement.¹⁷⁷

The divestment movement's website, gofossilfree.org, defines its big goal: to "break the hold that the fossil fuel industry has on our economy and our governments."¹⁷⁸

And it's working.

The movement's success continues to build—achieving divestment commitments around the world. Starting with Unity College in Maine, 187 colleges and universities have signed on, as well as 394 faith organizations, like the Unitarian Universalist Association. As of early 2021, 1,308 institutions worldwide have divested approximately \$14.5 trillion from fossil fuel.¹⁷⁹ Many municipal and regional governments are on board, too. The Republic of Ireland is the first nation.¹⁸⁰

One sign of impact?

At the outset of the economic impact of the COVID-19 pandemic, some fossil fuel companies cited divestment as one reason they needed financial aid.¹⁸¹

Still, some key educational institutions don't seem to be worried about their fossil fuel stocks sinking. They balk at divestment, even though by definition such institutions' mission is to invest in the future of their students and society. One would think their endowment's investments could serve their core mission.

1,308 institutions worldwide have divested approximately \$14.5 trillion from fossil fuel.

—Fossil Free, 2021

But it's not so simple.

Harvard and Yale, for example, will not pledge full divestment.¹⁸² No doubt they don't want to lose returns or alienate wealthy donors. Harvard's excuse? A university spokesperson argues that the institution "should not use the endowment to achieve political ends."¹⁸³

Apparently, Harvard decision makers fail to grasp that investing in fossil fuel itself "achieves a political end"—fortifying the power of this industry throughout our economy and political life as well, via lobbying and political contributions.

Nonetheless, the movement for divestment continues to build.

The Public Invests in the Public Good

And, finally, in climbing out of the climate danger zone, we can meet a public harm with public power.

Our government can take "a majority stake in privately owned fossil fuel firms, winding down production along a science-based timeline and giving workers a dignified off-ramp into other well-paid work," proposes Democracy Collaborative's Carla Skandier.¹⁸⁴

Sound dreamy, given fossil fuel's power within our government? Sound too "socialist" and anti-market for Americans?

Maybe not.

Capitalism and a market economy are not to be conflated. Imagine how markets could serve to move us quickly beyond fossil fuel if monopolies answering to shareholders—a tiny percent of us—were no longer in control. One percent of Americans own more than half of stocks—and decisions are made by officers answering to the wealthiest among that tiny percent; so, the outcome, no surprise, largely benefits the already wealthy.¹⁸⁵

As I write these words, President Biden calls for an end of the "era of share-holder capitalism" and emphasizing a broader notion of corporate responsibility.¹⁸⁶

To help imagine what that can look like, note that we the people already own electric utilities serving about 50 million Americans, from Nashville to Seattle—and at a lower cost for consumers than investor-owned companies.¹⁸⁷ On average, US public-power customers pay rates about 7 percent lower than those paid by the customers of investor-owned utilities.¹⁸⁸

Nationwide, almost 2,000 publicly owned utilities, along with about 900 that are cooperatively owned, account for 28 percent of all electricity sales.¹⁸⁹ In 47 states, these electric cooperatives supply electric energy to most of America's landmass.¹⁹⁰

Note, too, that almost 90 percent of all local electric co-ops offer power generated from

renewable sources.¹⁹¹ By 2017, for example, Michigan's nine electric cooperatives got more than 20 percent of their energy from renewable resources—roughly twice the share of other utilities.¹⁹²

More than nine hundred electric cooperatives provide electricity to more than half of our nation's landmass in 47 states, and their customers also typically pay less.

—Glenn English, National Rural Electric Corporation

Public utilities are democratic—accountable to those they serve, not distant shareholders—because citizens can have a say in public meetings and through electing local officials responsible for public power. Democratic accountability is more possible because their operations are required to be transparent.¹⁹³

They are also non-partisan: For example, in the red state of Nebraska, all electricity is supplied by cooperatives and public utilities.¹⁹⁴

Using the model of the original New Deal's Rural Electrification Administration, federal and state funds could help communities with much-needed finance to replace investor-owned utilities with community-run, renewable-powered utilities.¹⁹⁵

Citizens Organize for Climate Victories

In this chapter, we've shared a range of tools that, in the hands of bold legislators, governors, city councilors, mayors and educational leaders, are moving us into a greener and more just future. But these victories in most cases would have been impossible without years of dedicated effort by citizens organizing to move leaders to take seriously the threat of climate chaos. So, in our final chapter we return to this core truth as we shine the light on powerful citizen mobilizations now underway and calling us in.

But right here we can't resist offering thrilling examples of citizen bravery.

Pressure Opposing Pipelines—It's Working

To achieve a livable future, in part we start by stopping: halting the fossil fuel damage-machine and starting anew with infrastructure that enables sustainability.

Citizens are doing just that in, for example, leading the attack on fracking—the injection of liquid into the earth at high pressure to create fissures releasing oil or gas.

Take Duke Energy and Dominion Energy's plan to build the Atlantic Coast Pipeline. The project would enable fracking across 600 miles worth of waterways in the Appalachian terrain, posing great environmental risk, including to drinking water.¹⁹⁶

In the beginning, local political leaders were enthusiastic, but much of the public was wary. They felt betrayed: Having bought into the coal industry's earlier promises to them of financial return, they were left instead with widespread sickness, environmental decimation, and jobs that were temporary at best.¹⁹⁷

After six years of legal fights, in 2020 finally the two coal giants won their Supreme Court case, authorizing them to go ahead with construction. But the companies dropped the pipeline projects anyway, blaming the high cost of delays and uncertainty caused by the barrage of environmental lawsuits.¹⁹⁸

Bottom line: Though the Supreme Court failed the people and our earth, citizens' persistent actions over years worked.

Could this become a trend?

Perhaps the most infamous recent fossil fuel boondoggle is the Dakota Access Pipeline. The battle began in 2014 after the federal government approved it, with a route crossing under Lake Oahe, the drinking-water source for the Cheyenne River Sioux and Standing Rock Sioux tribes.¹⁹⁹ The planned pipeline would also likely deface additional land of great historical and cultural importance to both tribes.

In April 2016, as construction continued, opponents created Oceti Sakowin Camp in the pipeline's planned path. At the peak of the resistance, at least 13 makeshift kitchens were feeding thousands of peaceful protestors camped there, even in freezing cold. Many were violently attacked by police and the National Guard and arrested over the following months.²⁰⁰

In August, the Standing Rock Sioux Tribe filed a lawsuit against the Army Corps of Engineers, which was denied by Judge James Boasberg.²⁰¹

The national movement grew, with the hashtag #NODAPL, led by community organizers within the Standing Rock Sioux Tribe. The grassroots social movement also has a strong litigation strategy.

The power of social media has helped people organize across the country. From far away, people have witnessed peaceful protestors being brutally attacked even as they chanted "Water is Life/Mni Wiconi" in communal prayer. From around the world, Indigenous people traveled to Standing Rock in solidarity.

Finally, in January 2017, the Army Corps of Engineers halted construction to prepare an environmental impact statement.²⁰²

However, a week later, within days of his inauguration, Donald Trump—who has financial ties to Energy Transfer Partners, the pipeline company—signed an executive order to reopen the Dakota Access Pipeline, as well as the Keystone XL Pipeline. In response, the Cheyenne River Sioux and Standing Rock Sioux Tribe filed a restraining order to block construction, which a US District Court Judge for the District of Columbia denied.²⁰³

Protests, resistance, and legal battles continued for the next three years, as oil transfers continued down the pipeline. Plans to double the pipeline's capacity posed even starker risk of spills.²⁰⁴

Then, after almost six years of protest and legal battles, in early July 2020 a federal judge ordered the pipeline shut down pending an environmental review and directed all its oil to be emptied in a month.²⁰⁵ While #NODAPL is a story that exemplifies critical climate-protective action, at heart it captures how Indigenous people and others most vulnerable carry the brunt of the fossil fuel burden.

For these many years, even as the Dakota Access Pipeline was transporting oil, the Cheyenne River Sioux and Standing Rock Sioux and their allies never stopped protesting the environmental injustice. Indeed, Indigenous and frontline communities have been leading the struggle for climate justice for decades and owe them gratitude for paving the way. Let us learn from their leadership and wisdom in this struggle for liberation.

“Today is a historic day for the Standing Rock Sioux Tribe and the many people who have supported us in the fight against the pipeline.”

—Chairman Mike Faith, Standing Rock Sioux Tribe, 2020

For members of the communities harmed, giving up was not an option.

Perhaps a recent surprise decision in Oklahoma could end up being a game changer in this struggle. In July 2020 the Supreme Court declared much of Oklahoma to be rightful tribal land. Might such a decision have national

implications, causing federal judges to consider abiding by such treaties and therefore halting the Dakota Access Pipeline for good?

In our final chapter we shine the light on other courageous citizen mobilizations.

In closing, let’s remind ourselves of the sad truth that each American now emits more than three times the world average greenhouse gas emissions. We have a big job ahead. To feed our determination and to pick up speed, we hope this whirlwind tour of a wide range of creative tools opens our eyes to possibilities. Many of these tools have already been surprisingly effective, as you can see, yet few are known to most Americans.

Wherever we are, let’s share these breakthroughs—showing our neighbors and our elected and institutional leaders what’s not only possible but happening.

In Chapter 4, we will turn to more stories of Americans determined to radically speed our progress, but first we will look to Chapter 3 to explain our book’s focus on certain energy options.

Chapter Three: Choosing the Greenest Green

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Chapter Three: Choosing the Greenest Green

Before jumping into our favorite stories of states and cities boldly tackling the climate crisis, we want to explain why our book focuses on the success and potential of wind and solar power and then look briefly at other sources that have less potential or are more problematic.

As noted, the Solutions Project has been helpful in setting our focus on green energy with the greatest potential. The Project created a detailed projection of how nations around the globe—and the world as whole—can reach 100 percent renewable energy. The box here summarizes energy sources best able to get the U.S. to 100 percent green.¹ For in-depth understanding and references to many other studies, turn to the Solutions Project and its 2021 book mentioned earlier, *100% Clean, Renewable Energy and Storage for Everything*.²

Here you see wind and solar chosen as far and away our greatest hope today. If we seize the moment, together they amount to about 94 percent of the total energy needed to get us to 100 percent renewable.

The Power & Potential of Off-Shore Wind

You'll notice that we've chosen to focus on land-based rather than offshore wind power. As you will see why in the box here: The Solutions Project estimates that wind turbines on land can contribute about twice as big an overall share of US green energy. But offshore wind potential is still impressive: Note that is predicted to make up 16.4 percent of total U.S. renewable-energy, and in some places much more.

Looking abroad, some folks are way ahead of us. In the United Kingdom, for example, by 2015 offshore wind already contributed 18 percent of total renewable energy.³ As of 2020, two more large offshore projects were in the works there.⁴ Vietnam is also particularly well-suited to offshore wind turbines.⁵

USA Projected Mix to 100% Green Energy from Solutions Project

WIND = 47.8%

Onshore Wind	31.4%
Offshore wind	16.4

SOLAR = 46.6%

Solar plants	16.4
Commercial & Government Rooftop	14.6
Residential Rooftop	10.9
Concentrating solar plants	4.7

OTHER = 5.5%

Hydroelectric	3.9
Wave devices	1.0
Geothermal	.6
Tidal turbines	0

And here?

Offshore wind offers the “technical potential” to provide more than twice what our nation currently uses in electricity, notes a government report.⁶ But so far, only two offshore installations are operating. The first, launched just five years ago, is the Danish-operated Block Island Wind Farm three miles off the coast of Rhode Island. With five turbines, it produces enough energy to potentially power more than 17,000 homes.⁷ The second, off the coast of Virginia Beach, can supply 3,000 homes.⁸

But offshore wind could be taking off.

In early 2021, President Biden signed an executive order with the goal of doubling offshore wind in just ten years. Sounds “bold,” commented the Wall Street Journal, but added that it is actually a “fairly low bar,” since we now have only two.⁹

What’s underway, however, will far exceed the president’s goal.

Fourteen offshore wind farms are projected by 2026 in eight East Coast states. Advocates note they could create more than 120,000 jobs.¹⁰ New York and New Jersey have set the goal of enough offshore wind power for as many as 9 million homes by 2035 and 2.6 million homes, respectively. Virginia is aiming to power over 5 million homes by 2034.¹¹

Interestingly, after big losses, the fossil fuel giant BT (British Petroleum) announced it was increasing tenfold its investments in renewables, including offshore projects off the coasts of New York and Massachusetts.¹²

New York has its eye on jobs. As part of the state’s \$29 billion green-energy plan, Governor Andrew Cuomo in early 2021 announced plans for the nation’s first wind-tower manufacturing plant soon to be built in Albany, bringing hundreds of good jobs there.¹³

The goal? Producing 150 offshore wind towers yearly. Now, that’s not a “low bar.”¹⁴

Storing the Good Stuff

It will be essential to develop a range of solutions to the limitation of wind and solar power: their “intermittency,” as the sun is not always shining nor the wind always blowing. Clearly, answers involve diversifying local renewable sources—for example, using both wind and solar. So, power gaps only occur when *both* are unavailable.

So, reaching 100 percent green energy requires devoting more resources to improving energy-storage technologies. (Chapter 2 of the book mentioned above addresses the storage challenge.)

Germany is again a leader in addressing the challenge—offering the first large-scale example combining technologies to minimize intermittency. It’s a clever technology uniting wind and hydropower—storing water inside the wind turbine to be used for power when the wind doesn’t blow. The turbines hold a backup “battery” to produce energy even when their blades are still. They pump water inside the turbine and also store around 9 million gallons of extra water around each base. So, when winds die down, water can flow down, generating hydroelectricity. Water then collects in a man-made lake at the base before it is re-pumped up to the turbines.

This setup allows the plant to store excess energy in a reservoir, instead of selling it back to the grid. This expanding project, headed by GE Renewable Energy and German firm Max Boegl Wind AG, is set to produce 13.6 megawatts of power, coupled with another 16 megawatts from the hydroelectric plant, at full capacity and is a significant step towards the country's goal of getting 45 percent of its energy from renewables by 2030 and reaching 100% by 2050.

And to meet the storage challenge, a lot is in the works. At the end of 2020, the U.S. Department of Energy has announced that \$33 million will go toward innovative hydrogen and fuel-cell innovation, with goal addressing the intermittency downside of wind and solar; now in early 2021, phase 1 of that research is already well underway.¹⁵ The Department's project "H2@Scale" that began in 2016 aims for big impact "to advance affordable hydrogen production, transport, storage, and utilization in multiple energy sectors," while creating jobs and "aligning diverse multibillion dollar domestic industries."¹⁶

Since the scholars providing the in-depth analysis we use here anticipate wind and solar providing 94 percent of our energy future with the least downsides, we explore these major pathways in coming chapters.

Nonetheless, it's important to review a few others around which there's real controversy—nuclear, hydro, and biomass. Geothermal energy is important as well.¹⁷

As we remind our readers throughout, leaving behind fossil fuel offers us the opportunity—if we seize it—to distribute decision-making power as well. Note that worldwide, just 100 fossil fuel companies have been responsible for 71 percent of greenhouse gas emissions since 1988.¹⁸

By contrast, developing wind-and-solar power that is smaller-scale—especially that which is community-owned, or cooperatively owned—helps to democratize power. In 2018, such small-scale solar capacity was about 40 percent of total solar capacity connected to the grid, estimates our Energy Information Administration.¹⁹

Freeing us from the grip of Big Oil—with its political power via lobbying and political contributions—our move to dispersed renewables can also help to democratize our society more broadly.

And...without the Nuclear Option?

Some fear that without nuclear power, it will not be possible for the US to get off fossil fuel fast enough. In that view, nuclear power must at least help us as a bridge to renewables. With almost a hundred nuclear reactors across 29 states, nuclear power now provides a fifth of our electricity—making us the world's top producer.²⁰

And globally, where does nuclear stand?

In 32 countries plus Taiwan, about 440 nuclear reactors provide about 10 percent of the world's

Globally, in the mid-90s, nuclear provided almost 18 percent of electricity, but by 2013 its share had shrunk to just 10 percent.

—Mykle Schneider et al., *The World Nuclear Report*, 2014;
World Nuclear Association, 2020

electricity and 29 percent of the low-carbon power.²¹ As of early 2021, 50 more were being built in 16 countries, with China in the lead.²²

In the mid-90s, nuclear provided almost 18 percent of electricity globally, but its share had shrunk to just 10 percent by 2013, where it still stands today.²³ Renewables have been making up the difference.²⁴ By 2019, more than a quarter of the world's electricity came from renewables, largely hydro, then solar and wind.²⁵

Note that America is home to just over 4 percent of the world's people, but produces 30 percent of its nuclear power.²⁶ Our unusual dependence on this power source might make us less aware of the global picture—that worldwide, renewables are fast replacing nuclear. In 2017, the world's largest nuclear power builder in history went bankrupt, and that year the World Nuclear Industry Status Report announced: “Nuclear power has been eclipsed by the sun and the wind.”²⁷

But given nuclear's outsized role here, must we build new plants to avert climate catastrophe as we continue to move toward 100 percent renewables?

Let's weigh the measurable risks and costs of that choice.

First, nuclear accidents.

In the last four decades, humanity has experienced three significant nuclear accidents: in 1979, the Three Mile Island meltdown at a Pennsylvania nuclear power plant; in 1986, a reactor explosion in Chernobyl, Ukraine; and in 2011, the Fukushima disaster caused by an unprecedented tsunami and earthquake in Japan. Beyond the immediate risk of these high-profile nuclear incidents, research is continuing on the long-term effects on local cancer and birth defects and the harm to local ecosystems. Though the damage and suffering are difficult to quantify, we now know nuclear energy can be very, very dangerous.²⁸

Second, note that about a quarter of the world's working nuclear plants are near coastlines, therefore vulnerable to sea-level rise, both from melting ice and because warming water expands.²⁹ But even inland reactors are vulnerable—a recent review found that 93 percent of US nuclear plants “weren't designed to handle the flood risk they face.”³⁰

Third is the essentially permanent risk posed by nuclear waste—of which the US now has 80,000 tons, more than any other country. Nuclear waste is generally stored where it is generated, and no permanent disposal site has yet been licensed for what already exists, much less for that to come.³¹ And even if we agreed on where to put it all, we would only be handing off this hazard to future generations.

Fourth, all forms of nuclear power entail uranium mining, increasing miners' risk of lung cancer as well as other harms.³²

Fifth, producing the material needed for nuclear power increases the risk of the proliferation of nuclear weapons—as the “enrichment and reprocessing of nuclear fuel can also be used to produce... nuclear weapons,” warns the Arms Control Center.³³

Finally, uranium mining also uses a great deal of water, an increasingly scarce resource on our heating planet.³⁴

However, even if we felt compelled to take big risks for climate solutions, do the advantages of the technology itself warrant it? For example, is it more economical?

Hardly.

Compared to other types of energy, nuclear involves vastly higher up-front costs. And, considering combined capital and production expenses over the technology's lifecycle, nuclear costs run roughly three times higher than wind or utility-scale solar per unit of energy produced.

In the US, the cost of nuclear-powered electricity rose 60 percent between 2010 and 2020, soaring to \$155 per megawatt hour—while solar and wind power fell more than 60 percent to almost one-fourth the cost per megawatt hour.

—Douglas Ray, Lazard Company, 2019

It's also getting more expensive. In the US, the cost of nuclear-powered electricity rose 60 percent between 2010 and 2019, soaring to \$155 per megawatt hour—while solar and wind power fell more than 60 percent to almost one-fourth the cost per megawatt hour.³⁵

Utility-scale solar, on-shore wind, and geothermal all cost significantly less than nuclear.³⁶

Over the past decade, the total costs of nuclear energy—both plant construction and the expense of producing energy day-to-day—have become 23 percent more expensive. Over the same time, the comparable cost of utility-scale solar has fallen by 88 percent and the cost of wind by 69 percent, says a 2019 nuclear-industry report.³⁷

The capital cost of building new nuclear capacity is six to twelve times higher than building new solar or wind capacity. (Other renewables are cheaper, too, just not as much.)³⁸

Plus, nuclear-cost overruns are common. In the state of Georgia, a new nuclear plant was

The capital cost of building new nuclear capacity is six to twelve times higher than building new solar or wind capacity.

—Douglas Ray, Lazard Company, 2019

originally projected to cost \$14 billion, but the price tag has now risen to \$23 billion, reports the *Bulletin of the Atomic Scientists*.

Unfortunately, promises of government financial support keep the plant moving forward.³⁹

Because nuclear power here has failed to attract private investment, it's relied heavily on government subsidies. The result, by some estimates, is that the public ends up paying nuclear-power operators more through tax subsidies than it spends for the energy these plants generate.⁴⁰

Note also that a nuclear-versus-wind-or-solar cost comparison doesn't include the expense of "decommissioning" the nuclear plant, nor dealing with hazardous fuel once it shuts down. Decommissioning a US plant can cost anywhere from \$544 to \$821 million, according to the World Nuclear Association.⁴¹ Decommissioning the Yankee Nuclear Power Station in Rowe, Massachusetts, for example, cost \$608 million and took 15 years.⁴²

And from there, imagine the coming cost of decommissioning all the world's existing nuclear plants: Even at the very lowest estimate for each, that bill will come to \$255 billion.

Then, in weighing that cost burden, add the fact that most of our nation’s nuclear power plants are nearing the end of their 40-to-50-year operating licenses, effectively their typical lifespan.⁴³

A 2019 report by staff of the Nuclear Regulatory Commission, responsible for overseeing the safety of the nation’s 59 oldest nuclear power stations, recommends that the commissioners significantly weaken or reduce safety inspections of the plants.⁴⁴ What’s more, nearly all nuclear power operators have received permission to extend the legal lifespan of their reactors by 20 years, with an increasing number seeking another 20—magnifying the risk of corrosion, leakage, and dynamic strain.⁴⁵

The Nuclear Regulatory Commission, responsible for the safety of the nation’s 60 oldest nuclear power stations, recommends that the commissioners significantly weaken or reduce safety inspections.

—Coral Davenport, *New York Times*, 2019; Margaret Doana, US Nuclear Regulatory Commission, 2019

News about pulling back public protections should sound an alarm, especially given our compromised democracy in which private interests increasingly supersede our Constitution’s mandate to “promote the general Welfare.” The risk of taking risks has worsened.

In light of these many downsides and the remarkable rise of cheaper, safer alternatives, now is the time to stop nuclear investing in new nuclear power plants.

In the US, construction of new nuclear units had lain dormant for decades when, in 2006, a reactor in Tennessee that had been on the drawing board since the early 1970s finally started the process of securing a license for operation.⁴⁶ Since then, only two other units have reached the construction stage, both located in eastern Georgia.⁴⁷

On the other side of the ledger, as of 2019, according to the US Energy Information Administration, “there were 17 shut-down commercial nuclear power reactors at 16 sites in various stages of decommissioning.” Even with about 10 percent fewer reactors, however, the nuclear electricity produced in 2019 is comparable to that in 2003.⁴⁸

Here is a new development to consider: The nuclear industry is increasingly turning to what are called Small Modular Reactors that can be built in factories, and thus don’t involve the long, expensive process required for nuclear plants.⁴⁹

However, as we’ve seen, the cost is only one of the many risks to weigh.

Thus, given all the advantages of wind and solar energy documented throughout, and advancing strongly despite the COVID-19 pandemic, I vote against new nuclear plants.⁵⁰ And most of the rest of the world seems headed in this direction.

But Nuclear to Help Our Transition?

Recognizing the enormous cost and time involved in building new nuclear plants, many agree that focusing wind and sun makes sense; yet they make a case for supporting *existing* nuclear facilities as a bridge to a renewable future. Our US Office of Nuclear Energy notes that we

could recycle used nuclear fuel, as does France, for example, and even design reactors specifically to run on used nuclear fuel in the future.⁵¹

Certainly, a plan to close down existing plants would need to be done only as we establish safe alternatives—what we each can push for ever more strongly. Germany—the green energy leader we’ve celebrated—offers a hard lesson on how not to make a transition away from nuclear. In 2011 it shut down nuclear power without having first solved the intermittency challenge of sun and wind. So, Germany relied on coal to fill in the gap—supplying a quarter of the country’s electricity. Total coal phaseout is scheduled for 2038—too late to meet Paris Agreement commitments.⁵²

So, what makes most sense to me is to put public resources not into more nuclear plants or even on the new, modular reactors, but to move as fast as possible to expand wind and solar energy—including, of course, storage—so that we no longer need even the existing nuclear plants, many of which are already nearing the end of their lifecycle.

Why Not More Biomass?

Above in the box listing desirable renewable energy sources, biomass doesn’t make it. Here’s why.

In the U.S., biomass refers primarily to biodiesel, ethanol from corn, as well as wood pellets, with about half the pellets coming from our Southeast, and a quarter from northeast, forests.⁵³ In 2019, biomass provided nearly 5 percent of total primary energy use. Of that, almost half came from wood and wood-derived sources and almost half from biofuels—mainly ethanol from corn. Nine percent relied on municipal wastes.⁵⁴

Woody Biomass

Hailed as a renewable alternative to coal, wood might sound reasonable. After all, it was humanity’s primary fuel for millennia. But cutting trees to cut emissions just doesn’t make sense.

While the wood pellet industry claims to be based on the use of “low value” wood, in truth, more than 90 percent comes from healthy adult trees.⁵⁵ Importantly, discussing wood as a “low-value” commodity as if it were not key to ecosystem health perpetuates the disconnected thinking that’s brought on the climate crisis.

In the U.S., 60 percent of original “bottomland forests” in the southeast have been destroyed, much of it in the name of renewable energy—the vast majority going to the United Kingdom.⁵⁶ In North Carolina, for example, industry logging has led to the loss of 97 percent of longleaf pine—among the most severe losses of any ecosystem on Earth. Longleaf pine remains among the most seriously endangered.⁵⁷

Enviva is the world’s largest supplier of wood-based biomass and is writing itself into initiatives like the Longleaf Pine Alliance’s longstanding work to encourage “private forest owners to sell exclusively to them under the guise of “ecosystem restoration.”⁵⁸ Enviva claims its involvement

facilitates the critical step of restoration by providing a market for the byproducts of traditional forest management techniques like clearing old or overgrown areas.

However, the longleaf pine depends on wildfire for clearing and germination.⁵⁹ Controlled burns are routine in these sandy-soiled areas. So, by laying claim to understory matter for wood pellets, Enviva risks harming the biodiversity and regenerative capacity of the ecosystem.

Most of the wood pellet sector's growth is due to unregulated expansion into privately held forest. Eighty percent of forests in the southeast are privately owned and not required to survey for threatened or endangered species. Few states have legal protections for them, enabling thoughtless clearing in some of the last strongholds of biodiversity in the country.⁶⁰

Also note that we have long relied on the wetland forests now being destroyed to serve as gigantic, natural water filters, keeping our waterways clean and ensuring the health of our estuaries. Not only that, but they have also been carbon sinks, removing massive amounts of carbon from the atmosphere.⁶¹

And Corn as Fuel?

In the U.S., ethanol is the most widely used biofuel. Forty percent of corn—our biggest crop by far—goes to produce ethanol; and corn receives the highest total subsidy of any commodity.⁶²

Tim Wise, author of *Eating Tomorrow: Agribusiness, Family Farmers, and the Battle for the Future of Food*, puts the economic downside this way: "What started as a very reasonable farmer-owned way to add value to their surplus corn crop was turned—by inclusion in the Renewable Fuel Standard and takeover of the ethanol industry by ADM and other agri-giants—into the unsustainable expansion of corn production." In Iowa, he notes, "propping up the ethanol industry with higher required-blending levels, or other means as the US moves toward electric vehicles is a short-sighted, fool's errand as farmers should be moving toward regenerative agriculture."⁶³

In Chapter 5, you'll read more about how destructive our agriculture has become, which ethanol only reinforces. There, we take a look at the costs of incentivizing corn for ethanol. In his article "The Case Against More Ethanol," law professor C. Ford Runge argues that "ethanol-based particles in air can kill people and make them sick," adding that studies link corn for ethanol to the decline in bee populations—devastating for high-value agricultural crops, including almonds and apples, that depend on these insects for pollination.⁶⁴

Water's Got Power ... But?

Humans have used flowing water as a source of green energy for a long time...quite long. Watermills date back to the 3rd century BCE.

And, today, flowing water generates almost 7 percent of all US utility-scale electricity while giving us an impressive 38 percent of our renewable electricity—roughly the same as wind power.⁶⁵

But hydropower is a more complicated story than wind. On one hand, once its infrastructure is built, hydro doesn't pollute the air or release greenhouse gases.

On the other hand, there can be big downsides—including harsh environmental and human impacts, from wholesale ecological disruption to dislocated communities. In this harm, scale matters. Constructing big hydroelectric generators, especially involving dams, can swamp fields and forests, destroying large ecosystems as well as traditional hunting and fishing grounds. Also, the swamped land generates methane—a gas vastly more potent than carbon dioxide.⁶⁶

Unfortunately, most of America’s hydro power comes from big hydro, with many installations built by the federal government decades ago, including such iconic giants as the Grand Coulee and Hoover Dams.⁶⁷

Big dams account for most of our hydro capacity, with half of it in just three states—Washington, California, and Oregon.⁶⁸

Big dams account for almost 90 percent our hydro capacity, with half of it in just three states—Washington, California, and Oregon.

—US Energy Information Administration, 2020

That said, many still pin some hope on “small hydro” to help meet our climate crisis. These small sources now provide a tiny share—just five percent—of hydro’s total energy generation.⁶⁹ Recent studies suggest such small hydro could offer a whopping 80 gigawatts—roughly equivalent to the electricity grid of all of Texas, and all from low-impact streams, non-powered dams, and existing conduits.⁷⁰

Others are less optimistic.⁷¹

Yes, smaller hydro dams generally are less damaging, but they are not totally benign. Even small facilities can obstruct fish migration, alter water temperatures and chemistry, and disrupt the ecology and physical characteristics of a river.⁷²

Nonetheless, American Rivers, the leading national advocacy group for America’s fresh waterways, states that “hydropower—done right—is an important part of our nation’s energy mix.” Its recent policy statement emphasizes that “the key lies in getting it right.”⁷³

Note that in 2019, total US wind power generation for the first time pulled ahead of total US hydropower generation, and it now supplies about 7.6 percent of the nation’s electricity.⁷⁴ So, dear readers, we leave it you to decide. As you now know, we’ve chosen to focus instead on the two energy sources that have fewer downsides and the greatest, quickest potential—wind and solar.

We’ll conclude with brief introductions to two underappreciated sources that can make a difference locally, even though widespread, immediate potential is limited. They’re still well worth keeping an eye on.

Transforming Relationships—Gas Lines Become Renewable Energy?

Sometimes, someone you assume is your enemy can turn out to be your strong ally. In Massachusetts, a gas company became a green energy champion after a community leader reached out to explore what they might accomplish together.

But first a little background.

Geothermal heat pump systems (not to be confused with geothermal power plants in areas with high volcanic activity) use the earth's natural warmth to provide clean, safe ways to heat and cool buildings, and they have a long history. First used in Italy in 1904, geothermal has started to make a name for itself in the US.⁷⁵

With a little ingenuity, a small Boston-area social-benefit organization has gotten one of the biggest gas suppliers in the state to take geothermal seriously—so seriously that in late 2019 the gas company asked Massachusetts regulators for permission to test three different geothermal projects.⁷⁶

The basic idea behind geothermal systems is simple. Drill below the frost line, and you'll come to earth that stays roughly the same temperature year-round, about 50° F to 60° F. Run a pipe down, and you'll get cooler water in the summer and warmer water in the winter to cool and heat buildings—with no carbon footprint.⁷⁷

The challenge with geothermal systems is finding the space for the long pipes required, either in shallow, horizontal trenches or plunging deep into the earth. In urban areas, it can be extremely expensive or simply impossible to install geothermal systems because they take up so much space. The answer is to have multiple properties share a system—networked systems tend to be much more cost-effective. In that way, they become a venture in cooperative democracy. And they can pop up in the most unlikely places.

Here's an example.

Zeyneb Magavi spent a lot of time thinking about geothermal systems as co-executive director of the Cambridge, Massachusetts-based Home Energy Efficiency Team (HEET). One day, she asked herself an obvious question that no one seemed to be asking: "Who already digs holes and puts pipes in the ground, has big money, and is motivated to find a new business model?"

Replacing gas lines with geothermal piping was a no brainer, because geothermal energy is 'renewable, resilient, reliable, kept gas workers in jobs, [was] equal or lower cost than gas, and safe and doable."

—Zeyneb Magavi Home Energy Efficiency Team, 2020

The answer was natural gas companies—in particular, New England's Eversource utility.⁷⁸

Eversource was already busy digging up aging pipes to repair gas leaks. "The idea is that a gas utility takes out its leaky gas pipe and, instead of putting in new gas pipe, we put in an underground hot water loop," Magavi explained. "If we're going to invest in infrastructure, let's invest in infrastructure for the next century. Let's not invest in infrastructure that was hot in 1850."⁷⁹

In Magavi's words, replacing gas lines with geothermal piping was a no-brainer, because geothermal energy is "renewable, resilient, reliable, kept gas workers in jobs, [was] equal or lower cost than gas, and safe and doable." So, she and her HEET colleagues presented their ideas to Eversource... and Eversource loved it.

"This looks a lot like the gas business that we're in except it's totally clean," said Eversource executive Penni Conner. "Eversource can bring the capital and the expertise to this. We know how to build infrastructure."⁸⁰

Pilot projects got under way in 2020.⁸¹ The approach holds the potential to provide 100 percent of the heating and cooling needs for a large portion of Massachusetts, while reducing emissions from the utility's pipes by 60 percent. Reductions of 90 percent would be possible if this plan were combined with switching the state's electricity grid to renewable sources.⁸²

Time and Tides—Preparing for a Sea Change

Tidal power and related energy—together called hydrokinetic energy—could boost carbon-cutting sustainability. But perhaps a reason the Solutions Project ranks it low in global potential is that research finds only 40 sites worldwide with a big-enough difference between rising and falling tides to produce significant electricity.⁸³

That said, the US Energy Information Administration has a different take: It sees the “theoretical” annual energy potential of waves off the coasts of the United States ranging from 1.5 to as much as 2.6 trillion kilowatt hours. The upper end of that range is a staggering amount of energy—almost two-thirds of U.S. electricity generation in 2018.⁸⁴

Still, although wave-power buoys, underwater turbines, and tidal generators are being tested in New York and Oregon, this country has no operating tidal power plants.⁸⁵ Experts note that wave and tidal energy is “arguably the most predictable,” but a range of technical challenges are lie ahead.⁸⁶

Chris Sauer, co-founder and CEO of the company leading the project says that the planned tidal turbine system will have the capacity to supply low-cost electric power to all of Downeast Maine.

—Composite World, 2017

Some see wave energy where wind energy was three decades ago and argue that without significant research and development buy-in from government, this clean source of energy—which flows from the moon, not the sun—will forever lie two decades beyond the horizon.⁸⁷

Several states have proposed tidal power projects—Maine, Oregon, New York, and Florida. But the only existing US commercial-scale project is in Cobscook Bay, Maine, on the border with Canada. There, early settlers used tidal mills to grind grain. And, in 2012, the Maine-based project became America's first grid-tied tidal power generator.

Chris Sauer, co-founder and CEO of the company leading the project, says that the planned tidal turbine system will have the capacity to supply low-cost electric power to all of Downeast Maine. Sauer predicts that within 8 to 10 years, similar systems will be operating not only off the coast of Maine but Alaska, too.⁸⁸ The installation is being monitored for environmental impacts.

So, let's keep our eyes on tidal power and hope that part of the Green New Deal will expand research to better assess the potential of and continue innovation in tidal power.

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In this chapter, we've paused to explain our focus on wind and solar and to look at other green energy strategies with at least modest potential in some locales, plus nuclear, which we think should be off the table. Now, we turn to big steps our fellow citizens are taking in states and cities. Their creative and courageous action both inspires and motivates us.

## Chapter Four: Climate Stories of Possibility

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# Chapter Four: Climate Stories of Possibility

In Chapter 1, we copped to the sorry truth that when it comes to tackling the climate crisis, America as a whole is a laggard on the global stage.

And that might be putting it too kindly.

But our status can change quickly as we citizens embrace our role as the ultimate force in a real democracy.

What will that take? Courage to speak out and to engage with others in new, ever-bolder ways. And for most of us, it's a lot easier to find our backbones if we can see real grounds for hope and—given our deeply social nature—if we see others stepping up courageously.

In Chapter 2, we explored key policy tools for tackling the climate crisis. Now we turn to largely unappreciated stories offering more evidence of creative efforts in states, cities, and towns to shape and bring forth climate solutions. Despite climate deniers' efforts to divide us, here you'll read news of left and right working together to "promote the general Welfare." As I love reminding myself, that purpose is what our Constitution's preamble calls us to.

## States Commit to 100% Renewable Energy

| STATE                 | GOAL                                                                               |
|-----------------------|------------------------------------------------------------------------------------|
| Hawaii<br>2015        | 100% renewable energy<br>by 2045                                                   |
| California<br>2018    | 100% renewable energy<br>by 2045                                                   |
| New<br>Mexico<br>2019 | 80% renewable by 2030<br>& 100% carbon-free by<br>2045                             |
| Nevada<br>2019        | 50% renewable<br>electricity by 2030 &<br>100% clean energy by<br>2050             |
| Washington<br>2019    | 100% clean energy<br>generation by 2045                                            |
| Maine<br>2019         | 80% renewable energy<br>by 2030 & 100% by 2050                                     |
| New York<br>2019      | 100% carbon free<br>electricity & 85%<br>reduction CO <sub>2</sub> (eq) by<br>2050 |
| Virginia<br>2020      | 100% renewable energy<br>no later than 2050                                        |

—Sierra Club, 2020

## Cities and States Stepping Up

We start with evidence of change that might surprise a lot of us: States that are home to more than half of all Americans and release 40 percent of our greenhouse gas emissions have committed to the 2015 Paris Agreement's climate goals.<sup>1</sup>

And many state and local governments are going further. As of late 2020, more than one in four Americans—over 100 million of us—now live in places committed to using 100 percent clean electricity. They include over 170 cities and towns, more than 10 counties, and eight states, Washington, D.C., and Puerto Rico.<sup>2</sup>

Plus, 47 US cities and towns right now draw all of their electricity from green, renewable sources.<sup>3</sup>

Among the eight states already committing to 100 percent clean or carbon-neutral electricity are two of the top nine carbon-emitters, California and New York.<sup>4</sup> They contribute 10 percent of the nation's total CO<sub>2</sub> emissions.<sup>5</sup> Moreover, new clean-electricity bills and initiatives are moving forward in key states—including Massachusetts, New Jersey, and Illinois.<sup>6</sup>

States that are home to more than half of all Americans and release 40 percent of our greenhouse gas emissions have committed to the 2015 Paris Agreement climate goals.

—US Climate Alliance, 2019

Other states, from reddish to bluish, are moving toward totally green electricity. In 2019 and 2020, respectively, the newly elected governors of Wisconsin and Minnesota announced net-zero goals for 2050.<sup>7</sup>

All states with legislation now on the books have set mid-century targets for carbon-neutral electricity. Plus, New York—with the most ambitious transition plan—not only expects to see 100 percent clean electricity by 2040 but has also committed to net-zero emissions for the entire state economy a decade later.<sup>8</sup>

Moreover, the clean-electricity transition is hardly limited to such liberal bastions. Three of the top ten solar states are “red states” and another two might best be described as “purple.”<sup>9</sup>

## Savvy Red States

### *How Oil-Rich Texas Turned to the Wind*

As we now turn to Texas' story of renewable-energy progress, your memories may first jump to the deadly freeze of February 2021, when record-breaking cold triggered power disruption for heating and access to water—harming millions. Please note that state authorities' attempt to pin blame on renewables was misleading, to put it politely. In truth, compared to the states' renewable-energy performance during the crisis, gas-pipeline failures caused five times more lost power.<sup>10</sup>

And before we offer Texas-size kudos to the Lone Star state for its clean-energy leadership, we must acknowledge, sadly, that Texas nonetheless remains a major climate-crisis culprit. It

produces over a third of the nation's crude oil—more than any other state—and is home to one-fourth of the nation's 100 largest oil field reserves.<sup>11</sup>

Producing a lot of dirty energy and feeding the rest of the country's (not to mention the world's) bad habits, in 2018 Texas was the nation's top CO<sub>2</sub> emitter in three major sectors—electricity, transportation, and industry. Overall, that year it was responsible for nearly 15 percent of the total US carbon emissions polluting the atmosphere.<sup>12</sup>

All this is true. Yet at the same time, please take heart in this story of the state's remarkable breakthrough, embracing safe, renewable energy.

Having grown up in Texas, I certainly was astonished when under the governorship of George W. Bush, “a man steeped in oil,” the state cast its lot with wind—big-time. Bush, after all, had once even had his own oil and gas exploration business.<sup>13</sup>

But one day in 1996, Bush said some unexpected words to Public Utility Commission Chairman Pat Wood as he headed out the door of the governor's office. “Oh, Pat, by the way, we like wind,” Bush said. Wood was dumbfounded. “I said, ‘We what?’ ” he recounts. “Go get smart on wind,” Bush replied.<sup>14</sup>

Why the change?

For one, researchers had pegged the state's Panhandle region as one of the nation's prime wind resources. For another, the governor had grown up in a place nicknamed the “Windmill Town” because wind-powered wells had supplied everyone's drinking water for a century. In addition, one of Bush's top campaign contributors, a wealthy Texas energy entrepreneur, had himself come to see wind as a major business opportunity.<sup>15</sup>

Finally, as crafted, the original legislation spurring the state's love affair with spinning turbines would instantly make the Lone Star State the nation's largest wind-power generator.<sup>16</sup> As they say, “everything's bigger in Texas.”

But embracing wind would require a big system change; for throughout most of the 20th century, Texans relied on a single local provider—either a public-power company, a private investor-owned utility, or a rural co-op—to provide all energy-related services. Typically, state or federal regulators set the price.<sup>17</sup>

So, shifting to wind meant breaking the grip of such local utility monopolies, common across the US. In Texas, that meant serious legislative action starting with a bill in the Texas senate.

### *Talk About Change*

But before jumping into wind energy, the Texas legislature wanted to “determine not just public opinion but informed public opinion” regarding the move to renewable energy.<sup>18</sup> So, it turned to then-University of Texas professor James Fishkin—now at Stanford—who had developed what he calls the Deliberative Poll.<sup>19</sup>

The Deliberative Poll enables a group, typically a hundred or more randomly chosen citizens, to deliberate face-to-face on a public challenge. Beforehand, participants review briefing materials collaboratively produced by all interested parties. An in-depth poll then registers

participants' views before discussions begin; and, after a day or more of talking through the question, everyone is polled again. Thus, it's easy for researchers to spot changes triggered by new information and discussion.

The Deliberative Poll harkens back twenty-four centuries to Athens's first use of a council of randomly selected citizens. In the modern era it has been used in widely diverse cultures—from choosing candidates in primaries in Athens itself to weighing policy directions in China.

In the Texas case, between 1996 and 1998, eight utility companies used the Deliberative Poll to explore public understanding and weigh public opinion. Because participants got to learn together and think through options with peers, they brought informed opinions to the discussion.

In this way, the utilities learned that Texans were already generally positive about renewables. But, in a significant shift, after deliberating, they ranked efficiency higher than when they began, and the share of those willing to pay for renewables and conservation increased substantially.<sup>20</sup>

"The results were unanticipated by either the utilities or their regulators," and as a result both upped their "commitment to renewables and efficiency," reported the National Renewable Energy Laboratory.<sup>21</sup>

### *Common Sense Replaces Stereotypes*

When utility commission chair Pat Wood heard of Bush's interest in wind, his first thought was: "That's California, Volvo-driving, Birkenstock-wearing, tree-hugging kind of stuff." But soon, Wood was won over.<sup>22</sup>

In 2002, after much give-and-take, the Texas Legislature enacted Senate Bill 7, amending the state's utility code and allowing for competition in the state's retail electricity market. It put in place a Renewable Portfolio Standard—introduced in the previous chapter.<sup>23</sup> It required that by 2009 electricity providers collectively supply consumers with 2,000 megawatts of renewable power, enough to power about a third of a million homes.<sup>24</sup>

And if you aren't impressed, note that 2,000 megawatts equaled the total wind power installed across the whole country at the time.

When it became clear that this goal would be met three years early, the state legislature more than doubled the requirement to just over 5,000 megawatts by 2015.<sup>25</sup> As before, wind development blew past forecasts.<sup>26</sup>

Leading the nation, Texas today generates almost 30 percent of total US wind-powered electricity.

—US Energy Information Administration, 2020

This achievement was possible because Texas had OK'd construction of transmission lines to route electricity from remote wind farms to large urban markets.<sup>27</sup> By the end of 2019, the state's installed wind capacity had reached over 30,000 megawatts—more than six times the goal mandated just four years earlier.<sup>28</sup>

Leading the nation, Texas today generates more almost 30 percent of US wind powered electricity.<sup>29</sup>

### *The Power of Words*

At first, Governor Bush and fellow Republicans sought a voluntary standard, but push-back from environmentalists with the Sierra Club and the Environmental Defense Fund, and others, managed to secure a mandate—a critical piece of the complex compromises needed for its passage.

The new Texas Renewable Portfolio Standard was, of course, a form of regulation, but officials in GOP-dominated Texas emphasized its flip side—that it would spur competition and make for more robust markets.

The bill's supporters chose to promote it as a form of electricity "deregulation," a term that's music to the ears of many Republicans. And it made sense: the legislation allowed consumers to choose their energy supplier instead of being forced by local officials to rely on a few monopolies. So, big electricity providers were

The Texas wind industry pays farmers and ranchers \$249 million a year to lease space.

—American Clean Power, 2021

"motivated to keep costs low, spurring investment in renewable energy."<sup>30</sup>

As noted, Texas is still a major oil producer. Yet, it is home to more wind power capacity than any other state in the nation—nearly double that of second-place California.<sup>31</sup> Almost all of its wind farms are now located in rural communities and on private property. The Texas wind industry pays farmers and ranchers a total of \$249 million a year to lease space—with average annual payments per farm in the tens of thousands of dollars.<sup>32</sup> In 2020, wind also returned over \$380 million in state and local taxes.<sup>33</sup>

Because wind turbines leave 98 percent of land undisturbed, they're a win-win for farmers. They can continue to harvest crops and raise livestock while their wind leases provide supplemental income. Because the turbines offer more predictable income, they've been dubbed by some "a stable cash-crop that is policy and drought resistant"—and, of course, one that will be even more valuable as our climate heats up.<sup>34</sup>

Texas ranks second in the nation for siting wind turbines and solar panels on farms and ranches. Because wind has been used to pump water for ranching and railroads since the mid-19th century,

If Texas were a country, it would now be the world's sixth-largest wind-energy producer.

—National Wind Watch, 2015

windmills were familiar features of the Texas landscape—closely aligned with the Lone Star ideals of "independence" and "self-sufficiency."<sup>35</sup> In fact, the more we learned about wind and Texas, the less surprising the rise of this resource became.

If Texas were a country, it would now be the world's sixth-largest wind-energy producer.<sup>36</sup> Today three of the world's ten largest wind farms are in Texas.<sup>37</sup> And, here's an astonishing fact: The annual wind energy potential in three states alone—Texas, Kansas, and North Dakota—exceeds



the annual electricity consumption of the entire nation. While the US could not meet all its electricity needs from these sources due to practical considerations of timing and distribution, this fact points to the still-unrealized potential for further, significant clean energy growth.<sup>38</sup>

In more than 40 states, 500 factories build wind-related parts, and the industry already employs more than 100,000, with average annual salaries of \$51,000.

—Brady Dennis, *Washington Post*, 2019; Office of Energy Efficiency and Renewable Energy

Another massive benefit?

The Texas wind energy industry employs more than 25,000 people.<sup>39</sup>

Nationally, “wind turbine service technician” is the second-fastest-growing job.<sup>40</sup> Already over 500 factories build wind-related parts; the industry currently employs more than 100,000, with median annual salaries of \$51,000.<sup>41</sup>

Plus, the wind industry employs veterans at a rate 61 percent higher than the national average.<sup>42</sup>

### *The Sun Shines on Texas*

And Texas isn’t stopping with wind.

The Lone Star state is also looking to the sun. Solar power output there was expected to double in 2020, but it exceeded expectation, growing well more than two and one-half times.<sup>43</sup> Similar growth is expected in 2021, with some projecting that the sun may rise to a fifth of the state’s energy mix by 2025—matching what wind now supplies.<sup>44</sup>

Already, the cost to build and operate new solar plants is cheaper than their coal and gas counterparts, and the price for utility-scale batteries—essential to store solar energy for off-peak or nighttime use—is rapidly decreasing. In 2019 alone, it dropped by more than a third in just one year.<sup>45</sup>

Solar developers are taking advantage of federal renewable-energy tax subsidies, scheduled to drop from 30 percent in 2019 to 10 percent for commercial projects. Unless renewed by 2022, subsidies will soon be gone for rooftop installations. Energy experts note that solar could “disrupt the status quo” as has wind generation, creating downward pressure on prices and profits for coal, natural gas, and nuclear.

Solar, in fact, “may pose an even greater threat” to fossil fuel, they note, “because, unlike wind, it produces the most power when demand is highest — hot, sunny summer afternoons.”<sup>46</sup>

The Lone Star State’s success with renewable energy—even with boots still mired in the oil patch—is a loud and clear reminder of the need for national leadership to meet the climate crisis.

We salute Texas with praise from an unlikely source: “Texas is for us now sort of an inspiration, weird as that may seem,” says V. John White, a leading California renewables advocate.<sup>47</sup>

### *In Georgia, Solar Soars*

Georgia, a solar champion?

Indeed, it is. Although reliably “red” for nearly 20 years, after less than a decade of growth in solar, the state joined the ranks of America’s top ten solar powered states.<sup>48</sup> And from 2018 to 2019, Georgia’s increase in solar jobs outstripped that of any other US jurisdiction, except Florida. By the end of the decade, Georgia’s solar prices were more than a third less than they had been five years earlier. And all the while, its clean energy sector had grown to provide 76,000 jobs.<sup>49</sup>

How did Georgia do it?

The savvy players attracted to solar were determined to stay clear of subsidies or mandates, such as the Renewable Portfolio Standard, that shout “liberal” and “heavy-handed government” to many Georgian ears. Instead, the Sierra Club and the state Tea Party collaborated to make solar an attractive market option. The unusual partnership has been dubbed ... get ready ... the Green Tea Party.

Their solar efforts got a boost when consumers become quite unhappy with the nuclear plant’s over-budget costs, and noticed solar costs continuing to fall.<sup>50</sup>

More than two dozen states allow third-party solar developers and installers to finance solar systems on residential and commercial properties.<sup>51</sup> Georgia joined them in 2015 when it passed the Solar Power Free-Market Financing Act.<sup>52</sup> In this model, homes and businesses can host solar panels owned by a third party and benefit without shouldering upfront costs or responsibility for maintenance.<sup>53</sup>

Interestingly, in Georgia, Republican State Rep. Mike Dudgeon sponsored the legislation—presenting it as a way to strengthen the “right of property owners throughout Georgia” to earn a profit from their personal share of sunlight.<sup>54</sup> Though only about a decade old, the approach has played a major role across the US in the spread of solar technology, lowering carbon dioxide emissions.<sup>55</sup>

As solar grows in Georgia, one unlikely champion deserves a lot of the credit.

His name is Lauren “Bubba” McDonald, Jr., an early Trump supporter and former lawmaker who led Georgia’s Public Service Commission. There, he pushed Georgia Power to invest in clean energy, insisting that renewables be part of the state’s long-term energy strategy. Georgia Power, the largest subsidiary of Southern Company, is a private, investor-owned utility serving 2.6 million customers in nearly every Peach State county.<sup>56</sup>

The Public Service Commission is an elected body responsible for regulating utilities to ensure “service at fair and reasonable rates and to treat all customers equitably.”<sup>57</sup> At the Commission’s summer 2019 meeting, McDonald moved to raise Georgia Power’s solar procurement by 2022—almost doubling the state’s solar-energy supply to enough to power a quarter of a million homes. It would be the largest increase in renewable energy in the state’s history.

The five-member Commission unanimously backed the motion.<sup>58</sup>

To clarify, “procurement” refers here to the amount and type of energy that the state agency, the Public Service Commission, requires the private utility, Georgia Power, to obtain. Unlike the Renewable Portfolio Standard, passed by legislatures in some 30 states and territories—and

described in Chapter 2—Georgia’s Public Utility Commission simply renegotiates every three years the energy mix with Georgia Power.

Why did Georgia Power—a privately owned company with a near-monopoly grip on Georgia’s electricity market—let the Commission tell it how to generate electricity?

Because enough regular citizens had been watching Georgia Power’s political-power grabs and decided that they’d had enough.

Here’s a bit of the story:

In 2008, Georgians watched the state disband the Consumers’ Utility Council, which residential and small-business customers had relied on to advocate for them on the Commission. Its closure was touted as a cost-cutting move, but observers suspected something sinister: that the governor’s chief of staff, who’d worked at Georgia Power, the private utility, for more than 40 years, had been behind the move.<sup>59</sup>

Then, the very next year their suspicions were confirmed.

Georgia Power backed a bill forcing customers to effectively pre-pay for two nuclear power plants, raising electricity bills for the entire state for units that 10 years later still haven’t opened.<sup>60</sup> After it passed, Georgia newspapers revealed lavish gifts Georgia Power had presented to state legislators—from \$500 dinners to choice hockey seats.<sup>61</sup>

And in 2011, Georgia Power lobbyists persuaded the state legislature to reverse a long-standing ban on utilities donating directly to political candidates. And the next six years alone — surprise—Georgia Power lobbyists spent \$200,000 entertaining legislators.<sup>62</sup>

So, across the political divide, Georgians were fed up. In 2014, expressing a common sentiment, Tea Party leader Debbie Dooley declared: “Let’s remove the barriers, remove the shackles that protect the monopolies and allow consumer choice and freedom.”<sup>63</sup> Also influencing the solar surge was Bubba McDonald’s desire that Georgia not remain overly dependent on coal and nuclear.<sup>64</sup>

From 2007 to 2017, Georgia’s annual coal consumption fell almost 60 percent, from 40 million tons to only 17 million.

—U.S. Energy Information Administration, 2020

As a result, from 2007 to 2017, Georgia’s coal consumption has fallen almost 60 percent from 40 million tons annually to only 17 million, and there are no coal mines or reserves currently operating in the state.<sup>65</sup> The percent of its energy coming from coal-fired electricity, 20 percent, is now close to the national average.<sup>66</sup>

Georgia’s solar power is on track to provide, by 2025, as much as two-thirds the capacity of the state’s coal-fired plants and to exceed that of its existing nuclear units—all in all, about a fifth of the state’s capacity mix.<sup>67</sup>

All good. Yet—sadly—in 2018, the Commission told Georgia Power to continue building two new nuclear reactors, despite the cost overruns and safer, less costly alternatives spreading across the Georgia landscape.<sup>68</sup>

### *Idaho Surprise*

Heading north in the US, wind prevails.

And when you reach Idaho, the power of the churning atmosphere enters high gear.

In 2006, the state had almost no wind-power capacity, but just eight years later, turbines delivered nearly 15 percent of the state's electricity.

Also, in Idaho one of the largest wind farms in the world is in the initial stages of development—sited in south-central Idaho's Magic Valley and set to produce 1,000 megawatts.

The surge of wind energy—on top of 60 percent of the state's electricity already supplied by local hydropower—has laid the foundation for a decision by the state's largest utility, Idaho Power, to go 100-percent-clean by 2045. By 2028, it plans significant cutbacks on selling coal-fired kilowatt-hours from three out-of-state generating stations.<sup>69</sup>

## More States Taking Big Steps!

### *New York—A lot of People, But....*

Environmentally friendly New York is now a leader due to its commitment to renewable and green energy—maybe not yet as a share of total electricity use, but certainly as a major generator of carbon-free power over five decades. Recently, the Empire State has greatly improved its green-energy output, now meeting nearly a fifth of its summer capacity with renewables.<sup>70</sup>

New Yorkers consume less energy per person than residents of any other state except Rhode Island.

—US Energy Information Administration, 2020

Beyond this, New York is a hotbed of energy conservation, both by making buildings more energy thrifty and also, importantly, because its commuters rely heavily on public transit. New York has “one of the most energy-efficient economies in the nation, and New Yorkers consume less total energy per capita than the residents of any other state except Rhode Island,” reports the US Energy Information Administration.

Its solid performance counts for a lot, as the fourth most-populous state in the nation with the third-largest economy. New York also earns high marks for empowering local communities with a say over their energy use. Finally, in 2019 the state committed to 100 percent carbon-free electricity and an 85 percent reduction in CO<sub>2</sub> equivalent by 2050.<sup>71</sup>

### *North Carolina, Where the Sun Outshines Coal*

In mid-2020, North Carolina, our ninth-largest state by population, soared to third place nationwide in installed solar, with more than 6,400 megawatts of renewable-energy capacity powering nearly 780,000 homes.<sup>72</sup>

By the end of 2020, jobs in the state's clean energy sector had reached almost 113,000. To put this success in perspective: These jobs numbers were more than double all of the country's pre-pandemic coal mining jobs of just 51,100.<sup>73</sup>

And what has been a driving force in North Carolina's clean energy growth?

One answer is technology companies committed to clean energy. Google, Apple, and Facebook have located energy-intensive data centers in the state and support policies for renewable energy.<sup>74</sup>

But many also credit citizen organizations, such as Appalachian Voices. With fourteen other

In 2020, North Carolina's 113,000 clean-energy job numbers were more than double the whole country's pre-pandemic coal mining jobs.

—N.C. Clean Energy Association, 2020;  
Bureau of Labor Statistics, 2021

organizations, it is pushing hard to make North Carolina 100 percent renewable in electricity. And for these groups, that means breaking the monopoly grip of the state's dominant utility, Duke Energy. It is a big obstacle, they argue, so these citizen organizations are working to open up the economy to renewable companies.<sup>75</sup>

### *Virginia Loves Clean Energy*

Sometimes, good things happen fast.

In less than a decade, Virginia has become a renewable-energy powerhouse. It's on track to produce more than half of its electricity from renewables by 2035, and all of it a decade later.

In March, the 2020 Virginia Clean Economy Act went into effect. And it's got real teeth: mandated benchmarks over 15 years for solar and wind investment and a Renewable Portfolio Standard requiring the state's utilities to provide fully renewable electricity by 2045.

Recall the effectiveness of RGGI, the regional pact with impact we celebrated in Chapter 2? Well, in early 2020, Virginia became the eleventh state to join the cap-and-invest system since agreeing to.<sup>76</sup> In so doing, it became the first southern state to commit to 100 percent carbon free by 2045.<sup>77</sup>

A decade ago, Virginia had less than one megawatt of solar capacity, but by early 2020, it had enough installed solar to power about 124,000 homes.<sup>78</sup> In 2020 Dominion Energy, Virginia's public utility, set a goal of almost 500 additional megawatts, which at peak would double the number of homes powered.<sup>79</sup>

The total would reach just over 9 percent of all households, but it's a start; and, for wind, Virginia has even bigger things in store.

The Clean Economy Act, passed in 2020, requires enough offshore wind by 2034 to generate energy equal to a third of the whole state's current energy production, almost all of which now comes from coal.<sup>80</sup>

In the fall of 2019, Dominion Energy announced plans for an offshore wind farm generating enough energy to power almost 66,000 homes, to be built between 2024 and 2026.<sup>81</sup> It is one of the largest offshore wind projects ever proposed in the US.<sup>82</sup>

Clean energy in Virginia is \$1.5-billion industry employing more than 75,000 Virginians.

—Virginia Energy Efficiency Council, 2017

Already, clean energy in Virginia is already \$1.5-billion industry employing more than 75,000 Virginians.<sup>83</sup>

### *Arizonans Clear their Skies*

Our sixteenth most populous state, Arizona, ranks third in the country for residential solar power, providing juice to nearly 800,000 homes.<sup>84</sup>

In early 2019, the state rejected adding more gas plants in favor of building new solar capacity, with nearly a gigawatt of battery storage and new solar panels, an amount that would make “solar after sunset” possible on a grand scale.<sup>85</sup>

Seems like solar would be a no-brainer in a state with nearly 300 days of sunshine. But it still took a lot of people pressure, including a citizens’ initiative petition—leading to negotiation among stakeholders—finally to move the state’s largest electricity supplier, Arizona Public Service Co., to act. (Having a new, and more receptive, CEO helped as well.)<sup>86</sup>

After years of resistance from coal interests, Arizona Public Service—known for making political contributions to the state’s elected utility commission—pledged in January 2020 to fully decarbonize its system by 2050, which in turn means eliminating its longstanding reliance on coal by the early 2030s.<sup>87</sup>

And the savings? Arizona’s electric utilities could save more than \$3 billion by leaving behind all coal-burning power plants and embracing only renewable energy resources.<sup>88</sup> Sometimes, even no-brainers require citizen pressure to accomplish.

### *Oregon, on the Trail to Sustainability*

On energy efficiency, Oregon consistently lands in the top ten states, as ranked by the American Council for an Energy Efficient Economy.<sup>89</sup> It’s also pushing hard to replace fossil fuel-powered models with zero-emission vehicles and to expand access to infrastructure to service electric vehicles and broaden the market for alternative fuels.<sup>90</sup>

But perhaps Oregon’s most exciting move came in 2016 when Governor Kate Brown signed the Clean Electricity and Coal Transition Plan, an initiative that could make Oregon the nation’s first coal-free state. Oregon committed to eliminating coal from its electricity supply by 2035.<sup>91</sup>

In 2020, the state closed down its only, in-state coal plant twenty years ahead of schedule, and as of 2030 it will prohibit utilities from securing electricity from out-of-state-coal plants.<sup>92</sup> Both the environmental community and the state’s largest electric companies hail the law.<sup>93</sup>

Oregon's investments in energy efficiency and clean energy are already yielding dividends by saving money, creating jobs, and reducing pollution.<sup>94</sup>

The state's goal is to reach net-zero emissions across all sectors—electricity, transportation, industrial—by 2050—in line with what the Intergovernmental Panel on Climate Change has deemed essential to avoid massive loss.

Please note, however, that about half of Oregon's energy is hydro, thanks to the rich water resources of the Pacific Northwest. As noted in the previous chapter, hydro power is not without downsides.

Oregon ranks first in use of renewables, and first overall as the "best state in energy."

—*U.S. News and World Report*

Still, the state shines along a variety of parameters. Renewable sources generate almost two-thirds of its total energy.<sup>95</sup> In fact, Oregon ranks first in use of renewables, and first overall as the "best state in energy."<sup>96</sup>

For engaging citizens democratically, the state also gets high marks. The Institute for Local Self-Reliance ranks Oregon eighth in the nation for policies and programs enabling community control over electricity production. They include net metering, simplified grid interconnection, shared and community-controlled renewable energy, plus access to clean energy financing programs. Oregon also allows localities to set stricter building codes than the state's.<sup>97</sup>

## Cities' Climate Awakening

Amplifying this progress, local governments across America are also leading the way to climate stability.

Cities matter. Globally, they produce three-quarters of the world's carbon emissions, with 100 cities contributing almost a fifth of the total.<sup>98</sup> So their actions on climate can have a remarkable impact. And an international effort praised in Chapter 2, the Global Covenant of Mayors for Climate and Energy, is working to set targets and ensure cities stick with them. The Covenant already includes more than 150 US cities, encompassing nearly a fifth of our population.<sup>99</sup>

Globally, cities produce three-quarters of the world's carbon emissions, with 100 cities contributing almost a fifth of the total.

—Maya Miller, *Scientific American*, 2018;  
Seto KC et al., *Intergovernmental Panel on Climate Change*, 2014

In the US, 170 cities and towns have passed legislation to get to 100 percent carbon-neutral electricity.

—*Sierra Club*, 2021

As of the end of 2020, over 170 US cities and towns have goals to power their communities with 100% clean, renewable energy, reports the Sierra Club. Chicago is the largest.<sup>100</sup>

What's more, a handful of trailblazing cities and towns are already 100 percent powered by carbon-neutral electricity. This group of pioneers includes Aspen, Colorado; Burlington,



Vermont; Georgetown, Texas; Greensburg, Kansas; Rock Port, Missouri; and Kodiak Island off the coast of Alaska.<sup>101</sup>

Note that Republican mayors led two of these six advances.

### *Washington, D.C., a Winner*

Because the District of Columbia gets no representation in Congress, local government is especially critical there. And D.C.'s government has become a national leader on the climate front.

In 2017, Washington, D.C., became the world's first LEED-platinum certified city. We should all be proud. LEED stands for Leadership in Energy and Environmental Design, the globally recognized green-building rating system.<sup>102</sup> Plus, the District ranks second among US cities in the number of Energy Star-certified buildings, signifying it meets the EPA's energy-performance standards in using less energy and emitting fewer greenhouse gas emissions than comparable buildings.<sup>103</sup>

These achievements reflect a lot of determined citizen action. For four years, D.C.'s climate activists fought for the Clean Energy DC Act, which was finally signed in early 2019. It includes, among other things, pushing the District to run on 100 percent renewable energy and reduce carbon emissions by 50 percent by 2032.<sup>104</sup>

To get there, back in 2015, some of the city's leading environmental organizers launched "Put a Price on It DC Campaign," and ultimately spawned a city-wide coalition of more than 20 organizations.<sup>105</sup> The goal? A municipal carbon price—discussed in Chapter 2—to reduce D.C. pollution.<sup>106</sup>

With a push from the People's Climate March, a petition campaign, and a gathering on the steps of D.C. city hall, by 2018 a climate bill was introduced to the D.C. Council's thirteen members

In 2017, Washington, D.C., became the world's first LEED-platinum certified city. LEED is the globally recognized green-building rating system.

—Marissa Long, US Green Building Council, 2017

representing all the city's wards.<sup>107</sup> While the citizen campaign had pushed a carbon tax, the goal in the law ended up focused on renewable energy. So, campaigners changed the name from "Put a Price on It" to the wider "DC Climate Coalition."

With continued pressure, the bill was signed into law by Mayor Muriel Bowser in early 2019, committing the entire city to the goal of 100 percent renewable electricity by 2032—America's most ambitious renewable electricity target.<sup>108</sup> And, it also aims to reduce carbon emissions by 50 percent by the same date.<sup>109</sup>

Returning again to the District's rooftops, in 2017, also ranked as number one in the nation for "green roofs."<sup>110</sup> If you ever fly into Reagan National Airport and peer out the window, you might catch a glimpse of some of the city's three million square feet of vegetative roofs which serve as stormwater management through evaporation and absorption, thereby reducing runoff and

flooding.<sup>111</sup> Additionally, as they support plant growth, they also help our capital city capture carbon.

Before getting too pumped up about this achievement, note that in Stuttgart, Germany, green rooftops are three times more extensive than D.C.'s—offering just a hint of what's possible.<sup>112</sup>

The surge in the city's efforts to help residents install green roofs came through efforts like the District RiverSmart Rooftops Program, which began in 2006.<sup>113</sup> Beyond municipal action, groups such as DC Greenworks have helped residents install green roofs, preserving and restoring their communities. It also hosted a training program for un- and under-employed young adults to work as green-roof managers. Greenworks closed, unfortunately, but its contributions remain, including the installation of over 70 green roofs that helped popularize the practice.<sup>114</sup>

In 2018, D.C. also became the first US city to establish a “green bank,” a lender whose sole purpose is to serve locals, including the city, with financing for projects moving the city to clean energy and improved efficiency.<sup>115</sup> And D.C. isn't alone in this. Six US states have also set up green banks to provide loan guarantees that help convince private banks to embrace climate-positive investments.<sup>116</sup>

Having earned high grades, D.C. isn't resting on its laurels, as it works hard to meet its carbon-cutting goals. Finally, on livable-city measures, D.C. already enables half its residents to get to work by foot or bike, or by jumping on the Metro or bus.

Smaller cities are taking bold action, too.

### *Boulder, Colorado*

Boulder got a jump start on most of us, as it's been taking strong steps since 2002.

In 2006, the city adopted the country's first voter-approved tax to confront the climate crisis. It exempts renewable energy users.<sup>117</sup> Tax revenues have funded creative climate action, helping to make Boulder a national model for energy-efficiency services. It can also boast of perhaps the country's toughest energy code for new buildings.

Boulder credits city-funded programs with cutting the city's emissions by 21 percent from 2005 to 2019.<sup>118</sup>

Its Climate Mobilization Action Plan is remarkable in its holistic approach—including ecosystem stewardship to enhance carbon absorption and a “circular materials economy,” which it describes as “closed loop of goods and services in which nothing goes to waste.”<sup>119</sup> A whole-community-design approach can lessen the need to drive, for example. And Boulder's planned financial-system changes will enable residents to use their investing and purchasing dollars to move toward sustainability.

### *Holyoke, Massachusetts*

Holyoke, Massachusetts—population 40,000—had for 50 long years endured a dirty coal-burning plant. The profitability of coal has long been in decline, and the area was home to asthma rates twice as high as the rest of the state. In 2010, local leaders in the Latinx organization Neighbor to Neighbor partnered with the Toxics Action Center to build a coalition of hundreds including activists, former plant employees, and elected officials.

Working together, they launched a campaign that pushed the coal company to shut its doors in 2014.

Their goal was to ensure that any plant workers losing their jobs would have other opportunities, and that the community, long suffering from the pollution, would benefit.

The answer?

A “bridge” plan to help employees near retirement, retrain workers, and move to a new type of “power plant”—a 5.8-megawatt solar farm of 17,000 solar panels, backed by 3 megawatts of battery storage.<sup>120</sup>

Holyoke’s mayor, Alex Morse, is celebrating this step as a major win. He says, “We have an ambition of being a carbon-neutral community and we get closer and closer with each project like this.”<sup>121</sup>

### *Two Red Towns Go Green*

In Georgetown, Texas—population 74,000, in the center of the largest “red state”—wind and solar provide carbon-neutral electricity, and then some. In 2018, a new solar farm the size of almost 1,000 football fields began electrifying the town.<sup>122</sup>

Interviewed by Frontline, Mayor Dale Ross, who marshalled the renewable transition, explained the city’s motivation to move to 100 percent renewable electricity. It was for “long-term cost certainty,” he stressed. The move was “first and foremost ... a business decision.”<sup>123</sup>

Greensburg, Kansas—another “red town” making a green transition—suffered tornado devastation in 2007, causing roughly half of the city’s 1,600 residents to flee. But amid destruction, Mayor Bob Dixon saw opportunity. The US Department of Energy’s National Renewable Energy Laboratory estimates that “Kansas offers the third highest potential for wind energy in the U.S.”<sup>124</sup> So, Mayor Dixon took action, and by 2013, Greensburg was running on 100% renewable energy.<sup>125</sup>

Kansas offers the third highest potential for wind energy in the U.S.

—US Department of Energy

## Climate Equity

To complete our quick tour of climate leadership in states, cities and farms, we now turn to a critical piece of the solution. Key to the brilliance of the Green New Deal is its vision of tackling climate change while addressing the deep, damaging inequities of our economy.

The events of 2020—COVID-19, protests for justice, and increased climate reckoning—shout out a profound lesson: America can tackle this horrific pandemic as well as meet our vastly bigger climate threat only as we move forward with inclusive solutions.

Seem right?

Obviously so. But solidarity for effective action demands we first take to heart that those most harmed by the virus—poor Americans, especially those of color—have also long suffered disproportionately from other harms, including fossil fuels’ hazards causing climate disruption. Equally true, in meeting the climate crisis, righting these wrongs can speed all Americans toward greater health and safety.

And the great news?

Despite a long lack of federal leadership and being underappreciated by most of us, key states and cities are not only getting it, they’re getting going—plowing ahead with solutions to the climate crisis grounded in social equity and economic justice.

Here’s a taste of how it’s possible to take strong action on climate while righting the wrongs of social exclusion.

### *Illinois—Solar Serious*

Illinois is our sixth-most populous state. There, in 2016, two years of citizen advocacy succeeded in passing “Solar for All” legislation just a month after Trump’s election. (The state already has the sixth-largest wind power capacity in the country.)<sup>126</sup>

The goal of Solar for All? To massively expand solar installations while prioritizing low-cost energy for low-income families. The legislation also funds solar-installation job training, particularly for those formerly incarcerated and foster-care alumni.<sup>127</sup> Plus, the state’s decision to double down on efficiency investments could create more than 7,000 jobs a year, reports the Natural Resources Defense Council.<sup>128</sup>

Already, its existing energy-efficiency programs are the foremost reason Illinois residents have the lowest electricity bills in the Midwest.<sup>129</sup> As Solar for All expands clean energy in low-income communities, residents of Illinois can expect billions more in savings from lower energy costs by 2030.<sup>130</sup>

### *California Collaborates for Climate Justice*

Beginning in 2017, a statewide program began requiring the California Air Resources Board to focus its clean-air efforts on communities most exposed to air pollution. (Hmm ... seem like a no-brainer?)

Plus, in developing its air-quality strategy, the Board must now specifically consult environmental justice groups, among others affected.

Then, in 2018, in a move toward greater economic equity, Governor Gavin Newsom committed \$35 million annually to make sure new clean-energy jobs are “high quality”—commonly

meaning well-paid, safe, and with benefits—and in this case, also include apprenticeships enabling “career ladders.”<sup>131</sup>

Since California’s economy is the world’s sixth-largest, ripples from these bold steps can travel far.

### *New York Targets Those Most Harmed*

In 2019, New York’s Governor Andrew Cuomo also emerged as a leader, signing the Climate Leadership and Community Protection Act backed by NYRENEWS—a coalition of 150 organizations.

Its goal? To reach net-zero emissions by 2050 and to have more than a third of the benefits from its mandates felt in disadvantaged communities—via investments in housing, workforce development, reduced pollution, energy assistance, and more.<sup>132</sup> Specifically, the bill sets the goal of a fossil-free New York State by 2050 and ensures that resources for the state’s green transition are invested in historically disadvantaged communities, potentially producing thousands of new, high-paying jobs for New Yorkers who need them most.<sup>133</sup>

The Act also welcomes community input via a climate-justice working group, representing environmental justice groups, vulnerable industries, and disadvantaged communities. Its mandate is to ensure that climate actions remove harms now disproportionately hurting low-income New Yorkers and those of color.<sup>134</sup>

The same citizens’ coalition is also pursuing additional “Polluters Pay” legislation that would charge carbon-emitting companies a fee to be used to buy more renewables, with revenues also directed to communities harmed by the pollution. With this focus, the return from the tax could help workers move from jobs in coal, oil, and gas, as well as provide rebates to help low-income New Yorkers pay their energy bills.<sup>135</sup>

A second working group will advise on workforce training and other job impacts.

Plus, New York’s new offshore wind projects will provide enough electricity to power roughly 1 million homes, doubling the state’s earlier goal, while generating more than 1,600 jobs offering “well-paying careers, with annual salaries of roughly \$100,000,” asserts the state agency.<sup>136</sup>

Not bad!

And, most recently, to help jump-start the state’s economic recovery from COVID-19, New York passed the Accelerated Renewable Energy Growth and Community Benefit Act to speed up the siting and construction of clean energy projects.<sup>137</sup>

### *Washington Demands Equity*

Looking west, Washington State took a big step in 2019: New legislation pledged the state to ensuring that all retail sales of electricity will be greenhouse-gas-neutral in just ten years and entirely carbon-free by 2045.<sup>138</sup>

And, to get there, the state takes a strong equity stand:

First, Washington must identify the communities most vulnerable to the health impacts of climate destabilization. Then, power utilities are directed to fund a whole range of energy-assistance programs, including help for low-income families in weatherizing their homes.

The law also offers a 50 percent cut in state sales-and-use taxes—all the way to total exemption—for cooperating businesses owned by women, minorities, or veterans, as well as those adhering to specific fair-labor practices and programs, such as apprenticeships, preferred hiring of local residents, and more.

### *Colorado for “Just Transition”*

In May 2019, Colorado Governor Jared Polis signed seven energy- and climate-related bills, including one to reduce pollution in disproportionately hard-hit communities. Another bill creates a new state Just Transition Office. With the support of labor, the new transition office assists communities and workers—including struggling families of former miners as the state moves beyond coal-fired electricity. It provides funds to compensate cities and school districts for tax revenues lost due to coal plant closures.<sup>139</sup>

Now let’s turn to taste what municipalities are doing—simultaneously—for climate stabilization and equity. Recall in Chapter 2 our celebration of the Covenant of Mayors for Climate and Energy now representing more than 10,500 cities with almost a billion people.<sup>140</sup>

Yes!

### *The Buffalo Push*

One city in New York, Buffalo, deserves special attention for its work toward climate equity.

During Buffalo’s frigid winters, energy costs can soar to 30 percent above the nation’s average—an enormous burden on poor households. And deep resource disparities add to the challenge: the poverty rate for African American residents is one and a half times greater than that of white residents.<sup>141</sup>

So, PUSH—People United for Sustainable Housing—Buffalo has worked since 2005 to ensure that all neighborhoods thrive, even in America’s snow capital.<sup>142</sup>

As Sage Green, PUSH Buffalo’s Sustainability Specialist, puts it, “The people we work with ... want long-term structural changes ... a whole new system that works for people and the planet.” Adds PUSH Board President Maxine Murphy: Poor people are just like all people—they “want ways that their houses are using less energy. They want houses where their energy is not going out of windows and doors. But they have to fight for it harder ...”<sup>143</sup>

After a decade, PUSH has a lot to show for its gutsy work.

With its core strategy of actively listening and organizing, PUSH, for example, teamed up with a struggling neighborhood to turn an abandoned school building into 30 apartments for low-income seniors, replete with a roof-top solar array that keeps electricity affordable.

PUSH has also designated a Green Development Zone—a 25-square-block area, where 60 percent of the children live in poverty—with the goal of addressing vacant, run-down properties and high utility bills. There, PUSH has created green spaces, as well as purchased buildings and boosted their energy efficiency, while weatherizing existing homes. Energy savings accrue directly to the participants.<sup>144</sup>

Plus, PUSH’s work has brought living-wage jobs to neighborhood residents, and a PUSH-organized campaign has compelled officials to step up, too.

### *Minneapolis Moves on Climate Justice*

In 2018, Minneapolis committed to “100 percent clean, renewable energy by 2030,” becoming the largest Midwest city to sign on to the Covenant.<sup>145</sup>

To achieve its goals, the city is working with the Minneapolis Clean Energy Partnership to cut residential natural gas use and put city facilities on an energy-efficiency “performance path” as the city field-tests energy-efficiency technology. And for its own fleet, the city is installing electric vehicle charging stations.

City government has made clear its determination to benefit “especially those who have been left out of the benefits of energy programs in the past—communities of color, low-income communities, renters, and communities that have borne the brunt of past environmental racism” and make sure that they “receive equitable benefit from this transition.”<sup>146</sup>

One way that Minneapolis is making good on that commitment is its targeted development of “community solar gardens”—a lovely term for a cluster of solar panels enabling nearby homes to reduce energy bills by as much as 50 percent. In the process, the city aims for more equitable access to clean-energy jobs and financing.

All this work has earned Minneapolis fourth-place status in energy efficiency among US cities, ranked by the American Council for an Energy-Efficient Economy.<sup>147</sup> (I’m proud to say my adopted hometown of Boston places first!)

We’re inspired by these stories of states and cities that are pairing renewable energy progress with job training and other benefits for low-income communities—those hit hardest by fossil fuel pollution and climate impacts, including heat waves and storms. These paired programs move our society toward greater fairness, foundational to our definition of democracy itself. Such states and cities embody a clear truth: Creating a life-serving democracy demands widening inclusion at every step of the way—transforming today’s multiple crises into opportunities to fix what’s been broken ... for way too long.

## Takeaways—Proof of Possibility

As we finish the first edition of this book, we are energized by knowing that we have a new president prioritizing climate solutions. As we push for ever-more energetic action, we hope these stories can motivate work that helps reduce greenhouse gas emissions, as it improves the quality of



our lives. Plus, these state-and-local strategies offer great lessons to be picked up rapidly across the country and enacted at the federal level.

Among the great takeaways for us is that significant progress is being made in states that are hardly liberal bastions, and that in some cases, conservatives and progressives are working side by side. Texas and Georgia illustrate surprising unity. At the national level, climate action, tragically, has become a political litmus test and wedge issue. But let us spread the news that at the state and local level—fortunately—Americans across party lines are acting with courage and commonsense to save money, their health, and our planet.

We thank the millions of gutsy Americans behind these breakthroughs and much more.

They all remind us that it's not possible to know what's possible.

## Chapter Five: The Down to Earth—More Plants, More Peat ... Less Meat

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## Chapter Five: Down to Earth— More Plants, More Peat ... Less Meat

So far, we've focused largely on cutting energy-related carbon emissions—the bad stuff that we're putting out. Now we widen the lens to include the carbon we're taking in—absorbing in plant life and the soil. For what threatens life is of course the gap between the two—producing the net rise in climate-heating emissions.

Because my life's focus has embraced food and farming, in this chapter I emphasize how they key in reducing emissions and increasing sequestration. (In the fall of 2021, I release the 50<sup>th</sup> anniversary edition of my first book, *Diet for a Small Planet!*)

But first, let's look at the big, earth-based piece of solving the climate puzzle: Protecting and restoring forests, other plant life, and soils that we're fast losing.

Worldwide, almost a fifth of the carbon in the earth's biosphere is stored in plants, and 81 percent of that is in the soil.<sup>1</sup> So the positive impact of reversing the loss of plant life and soils can be huge:

"Halting the loss and degradation of natural systems and promoting their restoration have the potential to contribute over one-third of the total climate change mitigation scientists say is required by 2030," reports the International Union for Conservation of Nature.<sup>2</sup>

Halting the loss and degradation of natural systems and promoting their restoration have the potential to contribute over one-third of the total climate change mitigation required by 2030.

—International Union for  
Conservation of Nature, 2017

In 2011, the "Bonn Challenge"—a global initiative led by Germany—spurred commitments by 74 nations to restore degraded land worldwide over an area greater than India. If met, the challenge could sequester up to 1.7 gigatons (billion tons) of carbon dioxide equivalent annually.<sup>3</sup> The reduction would be 4 percent of the 2019 human-caused emissions.<sup>4</sup> May not sound huge, but it counts.

As we appreciate the urgency of restoration, let's be clear that protecting existing forests may be even more critical. "As trees get older, they absorb more carbon every year, and because they are bigger, they store more carbon," notes Tufts University professor William Moomaw, adding that "half of the carbon is stored in the largest one-percent diameter trees."<sup>5</sup>

## Protecting Peat

Next, let's take in the potential of peatland to sequester carbon. Peatland?

Probably most of us (I was one) couldn't define peat, but I've learned. In fact, I've been blown away by its potential...as well as its threat.

Most peat started in lakes that then became marshes, then bogs, and ultimately, spongy peat many feet deep. (Some actually describe peat as having the texture of dense, moist chocolate cake!) So, peat is carbon-rich, partly decayed vegetation that doesn't fully degrade because of the lack of oxygen. It builds up and compresses over millennia.<sup>6</sup>

Worldwide, peatlands are the largest natural, land-based store of carbon. (Later in this chapter we turn to the role of ecological agriculture in storing carbon.) And recently we learned that there are three times as many tropical peatlands on earth as previously estimated.<sup>7</sup>

By one estimate, near-natural peatland covers a global area about the size of Argentina and stores more carbon than all other vegetation types in the world combined.

Near natural peatland covers an area about the size of Argentina and stores more carbon than all other vegetation types in the world combined.

—Jeremy Hance, *The Guardian*, 2017

While no one seems sure of the full extent of peatland, Indonesia is blessed with several areas of peatland that are thriving.

Borneo is home to a particularly large peatland that locals are nurturing by using legume cover crops to “suppress weeds and injecting select bacteria into the soil to decompose organic matter rapidly.” Since palm oil plantations in Indonesia are destroying forests and peatland, environmental leaders are encouraging farmers to reject palm oil and embrace crop diversity instead.<sup>8</sup>

Peatland can help us meet the climate crisis, but there's a dark side: Damaged peatlands are also a big source of greenhouse gas emissions, releasing almost 6 percent of global human-caused carbon emissions, and they could become a much larger source of greenhouse gases as temperatures rise.<sup>9</sup>

So, protecting and restoring peatland obviously needs more attention than it's getting. Many argue that restoring peatland must become part of international agreements, including the Paris Agreement.<sup>10</sup>

## Forests Forever

And now, the potential of forests:

In the past few decades, forests worldwide have absorbed as much as 30 percent of global, human-caused carbon emissions—about the same as what our oceans absorb.<sup>11</sup> But each year we are losing forest worldwide over an area the size of Greece.<sup>12</sup> We may have already lost as much as a fifth of the Amazon rainforest.<sup>13</sup> Worldwide, destruction of rainforests is a huge climate danger.

We also know that when peoples' organizations hold government accountable to set and enforces rules, forests can be saved. In Brazil, over about a decade prior 2014, citizen pressure is exactly how the deforestation rate was cut by 70 percent in the Brazilian Amazon. But since then, under a new government beholden to private interests, forest burning has soared.

In the past few decades, forests worldwide have absorbed as much as 30 percent of global, human-caused carbon emissions—about the same as what our oceans absorb.

—Valentin Bellassen and  
Sebastiaan Luyssaert, *Nature*,  
2014

In the US, we have lost 14 percent of our tree cover just since 2000, says Global Forest Watch.<sup>14</sup> So, Greenpeace USA and many other citizen organizations are fighting deforestation and to save forest communities here and around the world.<sup>15</sup>

With this brief glimpse at the big challenge of peatlands and forests, let's now turn to food and farming. Above, I noted that the path toward healthy farming and eating has been a big focus of my life. And in recent years I've learned a lot about the climate dimensions of feeding ourselves.

## Food, Farming and Climate—the Big Picture

When most of us hear “climate crisis,” our thoughts don't first turn to food. Perhaps researchers at Johns Hopkins University can help us understand why. Analyzing more than four thousand pieces of climate reporting over two years, they discovered that just 2.4 percent of those articles and reports mentioned food systems.<sup>16</sup>

For me, though, it is especially rewarding to get my head around the food piece of the climate puzzle. It is so personal. Multiple times a day, each of us makes specific food choices connecting us to the earth. With more knowledge, we can exercise that personal power as well as our power as citizens, letting the personal and the public feed each other. It is significant that in the guide to climate solutions, *Drawdown*, food-related action ranks high: Among the “top ten solutions” to the climate crisis, reducing food waste and shifting our diets rank third and fourth.<sup>17</sup>

So, to help us make the best choices, here goes.

### *Corporate, Chemical-Driven Farming → Emissions*

In the last half-century, US agriculture has been turned into a climate-heater in a transformation driven by our economy's increasingly narrow logic: Do whatever brings highest return to wealth holders. Period.

Other considerations such as climate or health? Oh, those, well...

Economists dub them “externalities,” and they're too often left out of the equation, though in our interconnected world nothing can be truly “external.” So, from the narrow maxim to do what produces the highest financial return, of course wealth accrues to wealth—whether on Wall Street or on the farm.

As single crops spread over vast acreage, the use of synthetic fertilizers and pesticides took off. As a result, today half of human calories worldwide come from an approach that agronomists call “biologically simplified grain-based agroecosystems.”<sup>18</sup> In the process, livestock moved from being integrated into family farming to becoming mere “factors of production” in huge, largely enclosed feeding units called Concentrated Animal Feed Operations, or CAFOs.

**Globally Livestock Emissions  
= 14.5% of GHG Emissions, of which:**

- Beef cattle 41%
- Milk cows 20%  
(Above excludes manure and cattle used as draught power.)
- Pig meat 9%
- Buffalo milk & meat 8%
- Chicken meat & eggs 8%
- Small ruminant milk & meat 6%

Plus, other “poultry species and non-edible products.”

—Food and Agriculture  
Organization, UN

Today, most of U.S. livestock production involves CAFOs. The biggest cattle CAFO can hold a thousand or more animals. For hogs, make that 10,000 or more, and for chickens other than laying hens, the capacity soars to 125,000 or more.<sup>19</sup>

CAFOs present multiple health and animal welfare horrors, but here we focus on the climate crisis impacts.

Note first that cattle, especially, are a big source of methane, a super-potent greenhouse gas—also released by sheep, goats and buffalo—that accounts for 44 percent of all livestock emissions.<sup>20</sup>

Non-carbon greenhouse gas gases comprise about a third of our climate emissions problem, with methane being the largest piece.<sup>21</sup> In the US, these animals, called “ruminants”—via their burps,

passing gas, and manure—contribute almost 40 percent of methane emissions.<sup>22</sup> And methane packs a climate punch: Pound for pound over a 20-year period—what matters most right now in averting climate catastrophe—it has 86 times the heating impact of CO<sub>2</sub>, reports the EPA.<sup>23</sup>

The profits from this cruel and climate-harming system are highly concentrated.

As of 2015, just four corporations—Tyson, Cargill, JBS USA (subsidiary of a Brazil-based company) and National Beef—controlled 85 percent of the “slaughter.”<sup>24</sup> And in the business of broilers (non-egg-laying poultry), five corporations—Pilgrim’s Pride, Tyson, Perdue, Sanderson Farms and Koch Foods—controlled about 60 percent of the market.<sup>25</sup>

Synthetic fertilizer also releases nitrous oxide that’s 300 times more potent than carbon dioxide.

—US Environmental  
Protection Agency, 2016

For thousands of years, farmers fertilized fields with manure and mulch. But since the 1960s, chemical fertilizer use in the US has skyrocketed, and in its manufacture, methane is released. In fact, we recently learned that producing fertilizer releases 100 times more methane than the fertilizer industry itself has been reporting.<sup>26</sup> The total released just in the production of fertilizer is three times greater than EPA’s estimate of methane emissions by all industrial processes in the US.<sup>27</sup>

"The fact that methane is such a powerful greenhouse gas makes the small leaks very important," warns Joseph Rudek, lead senior scientist at the Environmental Defense Fund.<sup>28</sup>

Synthetic fertilizer also releases another greenhouse gas, nitrous oxide, that's almost 300 times more potent than carbon dioxide and stays around for a century.<sup>29</sup> The "steep ramp-up in atmospheric nitrous oxide coincided" with the revolution in farming dependent on synthetic fertilizers beginning in the 1960s, note scholars at the University of California, Berkeley.<sup>30</sup>

And who is profiting from all this synthetic fertilizer?

I was surprised to find the name Koch. I'd mainly associated that family with Big Oil. But Koch Industries is also big in fertilizer manufacturing, which "is among the worst in toxic air pollution in the entire United States ... and churns out more climate-changing greenhouse gases than oil giants Chevron, Shell and Valero," charged Nevada's Senator Harry Reid (and factchecked by PolitiFact).<sup>31</sup> Koch Industries is America's third-largest producer of nitrogen fertilizer, and once was fined almost \$400,000 for fertilizer-plant emissions violating the Clean Air Act.<sup>32</sup>

Koch Industries "churns out more climate-changing greenhouse gases than oil giants Chevron, Shell and Valero."

—Senator Harry Reid, 2016

The Koch family—no surprise—is also at the top of another heap—that of "climate-change deniers."<sup>33</sup> And do they ever take that role seriously! One of the terrific research assistants for this book, David Snower, told me that at an environmental conference he'd met someone from a Kansas town

where half the adults worked for Koch. He told David that Koch had put significant money into trying to shut down his high school's environmental club.

As noted in the beginning of this chapter, few of us think of farming as a climate hazard, and it does not have to be. We later focus on its contribution to the climate cure. Our point here is that this positive turn depends on our quickly reversing the increasingly corporate- and chemical-dependent farming hurting animals, people, and the planet.

Now let's dig into the specifics of livestock and greenhouse gas emissions.

### *Taking Stock—Livestock & the Climate Crisis*

Within the dominant, narrow business calculus—bringing highest return to existing wealth—over the last half century we've converted livestock into environmental and health hazards. As emitters of greenhouse gases, livestock account for 14.5 percent of the world's total, reports the UN Food and Agriculture Organization.<sup>34</sup>

And, in that significant chunk, cattle do more than their share of the damage. In the US, it's our cattle, roughly 94 million of them—counting both dairy and beef—or almost one for every American adult male—that cause much of the harm from livestock.<sup>35</sup>

They can't help it.

For one, via their burps and flatulence, cows emit the greenhouse gas

In the US, "red meat and dairy account for nearly half the GHG production from food supply chain."

—Johns Hopkins Center for a Livable Future, Accessed Aug. 2020



methane that, as noted, is 25 times more potent than CO<sub>2</sub> in trapping heat.<sup>36</sup> Sheep and goats also release methane. Plus, the manure of all farm animals emits methane, as well as nitrous oxide that, as noted, is 300 times more potent than carbon dioxide.<sup>37</sup>

So, it shouldn't surprise us that in the US, "red meat and dairy account for nearly half the GHG production from our food supply chain."<sup>38</sup>

Note first the scope of the global methane challenge: Because of the potency of this gas emitted, especially by cows, if all the world's cows constituted their own country, such a cow-country would rank as the sixth biggest greenhouse-gas emitter.<sup>39</sup>

A second key to grasping livestock's contribution to the climate crisis is appreciating just how vast is the acreage we sow to feed them. About two-thirds of US cropped land goes to just two crops, corn and soy, largely grown to go into the mouths of livestock.<sup>40</sup> So that means of our cropped acres, almost half is devoted to producing livestock.

Why is that a problem?

#### **Built-in Waste**

**Percent of feed calories**  
livestock eat that end up as  
calories we eat:

Dairy = 40%  
Eggs = 22%  
Chicken = 12%  
Pork = 10%  
Beef = 3%

—Cassidy et al.

Pause a moment to imagine all the greenhouse gas-releasing energy required in manufacturing and applying pesticides and fertilizers and manufacturing and fueling farm equipment, as well as transporting supplies and harvests.

Add also the energy used in processing these crops to turn them into feed, and the energy required to maintain vast animal feedlots, operate slaughterhouses, and distribute and refrigerate the meat. On this final energy user—keeping meat cold—did you know that climate-action-pioneer Paul Hawken in *Drawdown* rates "refrigerant management" as the top strategy for addressing the climate crisis? The refrigerant chemicals, hydrofluorocarbons, have the climate-warming impact that

1,000 to 9,000 times greater than carbon dioxide.<sup>41</sup>

And with all that in mind, guess what?

In the case of beef, after the vast amount of land used and energy burned to produce it, we get in food energy only 3 percent of the calories a cow has eaten in feed. For hogs, it is 10 percent.<sup>42</sup>

No wonder a bite of beef come to us with 20 times the greenhouse gas cost of the same-size bite of a plant food like beans.<sup>43</sup> Other animal products offer a better return. See the comparisons in the "Eaters' Guide" Box below.

Between 1961 and 2010, "global GHG emissions from livestock increased by 51 percent," note scholars in *Climatic Science*, with beef and dairy contributing three-fourths of global livestock emissions.<sup>44</sup>

Worldwide, each of our 1.4 billion cattle emit the equivalent of 1.5 to 2.5 metric tons of carbon-dioxide equivalents per year—about half the output of an average American car.<sup>45</sup> Cows—both for beef and dairy—contribute about 65 percent of livestock's greenhouse gas emissions.<sup>46</sup>

Given its outsized role in worsening the climate crisis, we hear a lot about beef. Thus, some relatively good news is that in per-person consumption, beef-eating globally has been almost flat since the mid-sixties.<sup>47</sup>

But what has been soaring?

Poultry consumption—especially chicken. Since the mid-sixties, it is up four-fold per person.<sup>48</sup> Fortunately, poultry is a more efficient converter of feed to human food. But its scale still relies on cultivation of vast acreage in feed crops, with fertilizers emitting nitrous oxide, and the cruelty of cramped CAFOs, as noted earlier.

A study in *Science* reports that expanding livestock production is the “single greatest threat to overall biodiversity,” as it is causing the extinction of plant and animal species worldwide through the destruction of natural habitat for feed and grazing.

Before heading on, we want to underscore one more critical point.

We are not in this book taking a stand against livestock or eating meat, per se. In many parts of the world, family survival can depend on integrating livestock into farming. Our goal here is to focus readers on the climate challenge—a product of an economic logic that fails to incorporate real human and ecological costs. The problem we’re highlighting is the system producing livestock in a manner and at a scale that is destroying life.

**Eaters’ Guide to Greenhouse  
Gases kg of CO<sup>2</sup>-equivalent  
per kg of food**

Vegetable protein food: 1.2  
Eggs: 3  
Poultry: 3  
Pork: 6  
Beef: 24 to 58

—Drawn from Ripple et al.,  
Nature Climate Change, 2014

*Grazing, the Answer?*

Many driving by massive, smelly, crowded CAFOs—the giant, enclosed feedlots that are the hallmark of corporate-controlled beef production—have probably wondered, Isn’t there a better way? Wouldn’t a shift from feedlots to more grazing both enhance animal welfare and reduce beef’s carbon hoofprint?

Considering only the climate impact, the answer will surprise many. It did me. Greenhouse gas emissions per unit of meat produced from grazed dairy beef is three to four times that of feedlot-produced beef, reports a paper in *Food Policy*.<sup>49</sup> A reason given is that grazing animals move around more and are thus less efficient. I am still exploring this surprising finding, given all the greenhouse gases involved in producing feed.

Moreover, a 2018 peer-reviewed study modeled the impact on supply of a shift from grain to grass-finished beef.<sup>50</sup> Here, “finishing” refers to the final stage of fattening the animal—in a CAFO for three to four months before slaughter.<sup>51</sup> It turns out that even if “grass-fed systems also include cropland-raised forage,” the total production would add up to just 61 percent of today’s beef supply.

The study concludes flatly: “Only reductions in beef consumption can guarantee reductions in the environmental impact of US food systems.”<sup>52</sup> The World Resources Institute offers this more general warning: Because farming is so critical in the climate crisis, without changing our diets, agriculture alone could make it impossible to stay within the greenhouse gas essential limit of 1.5 degrees Celsius.<sup>53</sup>

Without changing our diets agriculture alone could make it impossible to stay within the greenhouse gas essential limit of 1.5°C.

—Richard Waite and Daniel Vennard,  
World Resources Institute, 2018

### *The “Efficiency” Myth*

In getting a grip on food’s role in the climate crisis, a big obstacle lies in a big myth: that we in America have a modern, efficient, and therefore superior system of farming.

Actually, no.

For every seven units of energy used to produce food in our current system, we create just one unit of food energy. And the scientists who arrived at this ratio observe that “most of the

Eighty-three percent of agricultural land goes into livestock products, but they provide us only 18 percent of our calories.

— J. Poore and T. Nemecek, *Science*,

energy inputs are from nonrenewable sources such as fossil fuels, making the current system ... unsustainable.”<sup>54</sup>

The “Built-in Waste” box on an earlier page captures this extreme inefficiency. So, while we think of our system of farming as

superior, its built-in, extreme inefficiency means that US agriculture feeds fewer people per acre than do Chinese or Indian systems.<sup>55</sup>

Perhaps the best measure of the inefficiency of the meat-centered diet is captured in this simple fact: Worldwide, about 83 percent of agricultural land goes into livestock products, but they provide us only 18 percent of our calories.<sup>56</sup>

### *And, the Literal Waste*

Inefficiency is, of course, a form of waste; but direct food waste is a huge problem, too, both for people who lack enough food and for the climate crisis.

Worldwide, about a third of our food supply never makes it into our mouths. So much is wasted—due to the vast greenhouse gases emitted to produce it combined with the gases, especially methane, directly emitted by rotting waste. Here is a staggering estimate of the result: If the world’s food waste were a country, it would be the third highest GHG emitter, after China and the U.S.<sup>57</sup> Of greenhouse gas emissions tied to food waste, animal foods account for roughly one-fifth.<sup>58</sup>

If the world’s food waste were a country, it would be the third highest GHG emitter, after China and the U.S.

—Food and Agriculture Organization, UN, 2014

In the US, food waste may be as high as 40 percent of the food supply, and it is the single largest category of material placed in municipal landfills.<sup>59</sup>

One positive item to note: New Jersey recently passed a law requiring large generators of food waste—hospitals, prisons, grocery stores etc.—located within range of a plant turning it into energy to send it there. And the state classified the energy thus produced as a form of “renewable energy,” so energy suppliers can use it to meet renewable-energy portfolio requirements.<sup>60</sup>

It’s important to understand that a lot of food waste does not happen in the kitchen.

Much happens because poor farmers around the world lack the political power to ensure their crops get to market, so they rot in the fields. In industrialized countries, some farmers end up plowing crops under because they lack power in a food chain dominated by industrial monopolies.<sup>61</sup> Moreover, twenty billion pounds of produce are wasted every year in the United States alone, partly for mere cosmetic imperfections.<sup>62</sup>

In Europe, especially, public campaigns celebrating “ugly” produce and alerting consumers to the absurdity of such waste are changing habits.<sup>63</sup>

It’s true that scientists warn that our heating climate is bringing more frequent and more severe flooding, droughts, and temperature variations—all harming crop yields—and climate-related declines in pollinators also threaten our food supply.<sup>64</sup> Plus, we hear that increased atmospheric CO<sub>2</sub> is reducing nutrients in certain crops and harming harvests, especially in Africa.

But given the vast diversion of crops into livestock feed and the enormous literal waste of food, let’s not be terrified by fear of scarcity.<sup>65</sup> Instead, let’s become even more energized to attack the systemic roots of our multiple crises of hunger, health, and climate.

### *As Agriculture Fells Forests*

Deforestation can be blamed for 10 percent of the gases triggering our climate crisis; and in the Amazon region, “cattle ranching” accounts for 80 percent of it, reports the Yale School of Forestry and Environmental Studies.<sup>66</sup> Another major contributor to deforestation is palm oil production.<sup>67</sup> Deforestation in “tropical rainforests adds more carbon dioxide to the atmosphere than the sum total of cars and trucks on the world’s roads,” notes *Scientific American*.<sup>68</sup>

The felling of “tropical rainforests adds more carbon dioxide to the atmosphere than the sum total of cars and trucks on the world’s roads.”

—*Scientific American*, 2012

In 2020, suddenly the world awakened to a less-well known hazard in deforestation—its link to infectious disease, including COVID-19. Scientists say it is “likely that the coronavirus responsible for the ongoing pandemic first infected wildlife and then infected people.”<sup>69</sup> Deforestation is implicated: When people live near forests and are involved in collecting “small trees for construction, and foraging and hunting for food in forested habitat,” they “significantly increase the likelihood” of human and nonhuman-primate contact.<sup>70</sup>

For a sobering overview of the threat, please turn to “Forests and Emerging Infectious Diseases of Humans” from the UN’s Food and Agriculture Organization. We should all be aware that

the very “first plague-causing pathogens such as smallpox are believed to have originated in tropical Asia early in the history of animal husbandry and largescale forest clearing,” note their scientists.<sup>71</sup>

So, we should not have been blindsided by COVID-19. Many have been the warnings that we’ve failed to heed. Twenty-two years ago, Marc Lappé sounded an alarm in *Evolutionary Medicine: Rethinking the Origins of Disease*.

### *Corporate, Processed Foods Also Worsen the Crisis*

All that we’ve said about the hazards of global dietary trends driven by a corporate calculus also show up in the declining nutrition of our diets. Calories and nutrition inevitably part ways when they follow the narrow logic of highest return to wealth-holder. And more processing with the cheapest food sources means bad news for our health.

Here’s a sad story from India that captures what this crisis means in people’s lives.

Delicious fruit drinks using local mango, lychee fruit, and more have long been favorite, cooling drinks. But, driving along a country road in rural India in 2000, I saw huge Pepsi ads painted down tree trunks along the roadside. US soft drinks were taking over. Later, a doctor treating poor rural, Indian families described the huge change he’d observed: Two decades ago, many of my patients suffered from insufficient calories, he said. Now, most have enough calories, but 60 percent suffer diabetes and heart disease.

Their diets had changed radically, he bemoaned.

Corporate profits may have been soaring, but the lives of his patients were shortening. This same dietary shift worsens the climate crisis: “[A] global dietary transition [is underway] in which traditional diets are replaced by diets higher in refined sugars, refined fats, oils and meats,” warn David Tillman and Michael Clark in *Nature*. They continue: “By 2050, these dietary trends, if unchecked, would be a major contributor to an estimated 80 percent increase in global agricultural greenhouse gas emissions from food production and to global land clearing.”<sup>72</sup>

## Who’s Got the Power?

Before moving to more questions of our health and then to solutions, let’s dig a bit deeper into the threats just outlined.

To grasp how best to confront them, we first must identify the structures of power these problems reflect. While hundreds of millions of small-farm families throughout the world depend on a few head of livestock, control of meat and dairy sales is extremely concentrated in a few corporate giants, as noted earlier.

The combined greenhouse gas emissions of the top five meat and dairy corporations equal that of ExxonMobil.

—Institute for Agriculture & Trade Policy and GRAIN, 2018

So, when it comes to the climate crisis, the combined greenhouse gas emissions of the top five meat and dairy corporations are equal to that of ExxonMobil, and they’re greater than those of either Shell or BP, concludes a 2018 report from the Institute for Agriculture and Trade Policy and GRAIN.<sup>73</sup>

Also alarming, the report warns that these huge meat and dairy producers are not scaling back to help address the climate crisis. Just the opposite, in fact: They are ramping up production and exports. Taken together, the top 20 meat and dairy industry emitters already produce more emissions than many OECD countries.”<sup>74</sup>

Monopoly control like that within the livestock sector is mirrored across agriculture. In pesticides, fertilizer, seeds and trade, a handful of corporations dominate. Such concentrated economic power—tightening greatly in recent decades—can only be met with organized political power. We turn to that critical topic in our next and final chapter.

But to tackle any challenge, we first must have a vision of where we want to go.

## Healthy Food, Healthy Environment—the Ultimate “Win-Win”

Fortunately, in shaping that vision we discover some really great news: As we become better stewards of our Earth, we are simultaneously doing our own bodies a big favor.

When I wrote *Diet for a Small Planet* 50 years ago, Americans’ love affair with beef was in full bloom. Growing up in Texas as I did, no “special occasion” was complete without it. And after McDonald’s opened its first outlet in Illinois in 1955 and other chains competed for the best burgers, beef seemed quintessentially American.

So, imagine this girl from “Cowtown”—Fort Worth, Texas—discovering the profound waste in its production, triggering the impulse to write my first book. I just had to tell the world.

And how much do we eat now?

Above, I noted that globally, beef and buffalo consumption per person has been fairly flat for decades.<sup>75</sup>

Nonetheless, in overall meat consumption per person, the US is almost “off the charts”—surpassed only by Hong Kong.<sup>76</sup> And in beef, specifically, even though our per-person meat intake has gone down somewhat from the 1960s, in 2016 Americans still ranked fourth in the world.<sup>77</sup>

From my earliest “wake-up” to the enormous waste built into the standard American diet, I was also struck by our fixation on protein, and the assumption that it’s difficult to get enough without eating meat. How liberating to learn that typically, Americans eat more protein than is recommended. An eight-ounce steak, for example, has as much protein as that recommended for an adult male or female in a whole day.<sup>78</sup>

Plus, I loved discovering that most plant foods contain some protein. Thirty percent of the calories from broccoli, for example, come from protein. The percent of protein in veggies is low—less than 3 percent in broccoli—but because it’s low in calories, you can eat a lot.<sup>79</sup> And some plant foods—including nuts, seeds, and peas, beans, and lentils—have a lot.<sup>80</sup> And all these non-meat protein sources add up in the eater’s diet.

Worldwide, noncommunicable diseases cause more than 70 percent of all deaths, and diet is a risk factor for most.

—World Health Organization, 2018

The big point here is that most people in the US can leave protein worries behind.

What are some of the health negatives of the meat-centric diet that carries such a climate-cost?

Worldwide, noncommunicable diseases cause more than 70 percent of all deaths, and diet is a risk factor for most of these, including cancer, heart disease, and diabetes.<sup>81</sup> Red meat is one of those dietary risks. A “suboptimal diet [including meat] is responsible for more deaths than any other risks globally, including tobacco smoking,” finds a *Lancet* report discussed below.<sup>82</sup>

The American diet now costs us an additional \$50 billion yearly in health care.

—National Heart, Lung & Blood Institute, 2019

The potential increase in human wellbeing from embracing climate-friendly, plant-centered diets is truly remarkable.

As noted, our diet-related climate challenge is tied not only to the enormous resources needed to produce animal foods but also to the worldwide, corporate-driven shift to processed “food products.”

“Unhealthy diets now pose a greater risk to morbidity and mortality than unsafe sex, alcohol, drug and tobacco use combined,” concludes the *Lancet* report.<sup>83</sup>

Here in the US, this diet is expensive, in more ways than one. It now costs us \$50 billion yearly in added health care alone.<sup>84</sup>

## Plant Foods, Real Foods to the Rescue

In 2019, the prestigious medical journal *Lancet* opened eyes when it turned to a positive formulation—identifying food as the “single strongest lever to optimize human health and environmental sustainability on Earth.

Its special *Eat-Lancet* report entitled *Food, Planet, Health* went on to specify how a “diet rich in plant-based foods and with fewer animal source foods confers both improved health and environmental benefits.”<sup>85</sup>

With a global shift to vegetarian, vegan, Mediterranean, and Pescatarian diets, scholars report that we could stay within our planetary boundaries and reduce agricultural greenhouse gas emissions by about two-thirds.<sup>86</sup> “Studies concur that plant-based foods cause fewer adverse environmental effects ... than do animal source foods across various environmental indicators,” the *Lancet* confirms.<sup>87</sup>

Food is the “single strongest lever to optimize human health and environmental sustainability on Earth.”

—*Eat-Lancet* report, 2019

If Americans just swapped beef for beans, this shift alone could move the U.S. as much as three-quarters of the way to the greenhouse-gas target laid out in the Paris Agreement, according to a 2017 study in *Climate Change*.<sup>88</sup> David Tilman, professor at the University of Minnesota, and Michael Clark, resident fellow at the Institute on the Environment, put it this way: Moving to a plant-centered diet could “prevent the destruction of an area of tropical forests and savannahs as large as half of the United States.”<sup>89</sup> Much of that loss was caused in the first place by expanding livestock production.



Another way that a shift from meat-centered diets could pack a positive punch is by cutting methane emissions. Recall that super-potent greenhouse gas that ruminants, including cows and sheep, expel? Methane accounts for about one-quarter of greenhouse gas warming. Reducing methane offers the “fastest way” to reduce their impact, some argue: If “we lower methane emissions, it will pay off quickly because the half-life of methane in the atmosphere is about a decade,” argue Princeton’s Mark Zondo and colleagues.<sup>90</sup>

Professor Tilman and his team examined what would happen if we all relied on any of three common, low or non-meat diets—the traditional Mediterranean cuisine rich in vegetables with relatively modest portions of meat and dairy, the vegetarian diet, and the pescatarian diet (i.e., vegetarian plus seafood).

“[T]he same dietary changes that can add about a decade to our lives can also prevent massive environmental damage,” they wrote.<sup>91</sup> They calculate that if the world moved to these popular diets, the drop in global greenhouse gas emissions could be as great as the total now from “all cars, trucks, planes, trains and ships.”

Moving to a plant-centered diet could “prevent the destruction of an area of tropical forests and savannahs as large as half of the United States.”

—David Tilman, University of Minnesota, and Michael Clark, Institute on the Environment

Other scholars estimate that dietary change could bring up to 70 or even 80 percent reduction in greenhouse gas emissions from food production—with the median at 20 to 30 percent.<sup>92</sup>

Tilman and Clark also found that, relative to a meat-centered diet, the three alternative diets could lower the incidence of type II diabetes by 16 to 41 percent, cancer by 7 percent to 13 percent, and mortality rates from coronary heart disease by 20 to 26 percent.<sup>93</sup>

Looking 30 years ahead, the *Lancet* report concludes that reducing global consumption of unhealthy foods—such as red meat and sugar—by more than half and doubling our consumption of healthy foods—such as nuts, fruits, vegetables, and legumes—could avert one-fifth of annual global deaths. Of course, the report notes, the changes needed “would differ greatly by region.”<sup>94</sup>

Another study, published in the *Journal of the American Medical Association*, compared deaths rates of tens of thousands of meat and non-meat eaters and found that the non-meat diets “are associated with lower all-cause mortality and with some reductions in cause-specific mortality,” especially for men.<sup>95</sup>

Many other scholars echo similar good news.

## Yet, Hunger Continues Amid Plenty

Before moving on, we want to be clear.

None of what’s emphasized in this chapter about the health benefits of moving away from grain-fed, meat centered diets and eating more fruits and vegetables—already a trend in many industrialized countries—should divert attention from our world’s even larger, immediate food-health crisis: the ongoing tragedy of undernutrition among those living in poverty worldwide.

Rather, our hope is the opposite: that the reality of abundance alongside vast waste—as laid out in this chapter—stirs even more outrage and passion for action to address the reality that almost 700 million people worldwide still lack sufficient calories, and almost one in three of us don't get enough iron, often with grave consequences.<sup>96</sup> These fellow humans cannot afford the diverse and healthy diet, including fresh fruits and vegetables, that we now know best sustains us. Such a diet would consume the per capita income of half the world's people who try to get by on less than \$5.50 a day.<sup>97</sup>

Worldwide, our food supply comes to 2,900 calories per person every day, revealing that hunger anywhere is needless.<sup>98</sup> Access to food is denied by the same economic dogma concentrating wealth, undermining democracy, and worsening the climate crisis.

## Rigged Rules of Our Economic Life

For Americans, the first step toward positive change is to wake up to the ways in which our economic system—and in particular our farming system, supported by public dollars—has long been harmful for the earth and those who depend on it for livelihood.

To take one key example, the racial bias in US farming system runs deep.

In 1920 there were almost a million Black farmers in America. To put this number in perspective, that's about half the total number of farms today. Now, a century later, the number of Black-owned farms is just 45,500—a mere 1.3 percent of all farms. And Black farmers control only one-half of one percent of our farmland.<sup>99</sup> Almost 80 percent of Black farmers earn less than \$10,000 in annual sales.<sup>100</sup>

What's worse, "ownership is declining faster for Black farmers, down about 3 percent since 2012, compared with 0.3 percent for white growers," reports Bloomberg News.<sup>101</sup> Black farmers who have managed to hold on to their farms eke out a living today with an average acreage about one-quarter that of white farmers. Black farmers average less than \$40,000 annually, compared with the total US median of around \$75,000—almost twice that of Black farmers.<sup>102</sup>

In 1920, there were almost a million Black farmers in America. Now, 45,500—a mere 1.3 percent of all—control one-half of one percent of our farmland.

—Summer Sewell, *The Guardian*, 2019

In the US, farming disproportionately benefits a minority of farmers. Overall return is skewed to the top: Large-scale family farms make up less than 3 percent of all US farms but account for almost half the value of production.<sup>103</sup> Immediately after World War II, we had about 6 million farms, with the top 10 percent controlling about 20 percent of farm income. By 2019, only about two million remained.<sup>104</sup> Given all this, it may not surprise you that more than half of US farms report negative income from their farming operations alone.<sup>105</sup>

All this bad news about the struggle of most farmers is made worse by the fact that our public dollars reward farming practices that undermine soil and human health while contributing to the climate crisis.

In considering this dangerous process, here is taste of the untenable status quo:

In the decade after 2008, according to *Forbes*, “the top 10 farm subsidy recipients each received an average of ... \$1.8 million annually, [or] \$150,000 each month.”<sup>106</sup> Overall, 10 percent of subsidized farms—the largest and wealthiest—collected three-quarters of federal “commodity payments” from 1995 to 2010, while 60 percent of family farms got no federal subsidies over this period, reported the Environmental Working Group.

Stretched to the max, many farmers feel driven to practices that deplete and erode precious soil. Soil is eroding from 10 to 40 times faster than nature can replenish it, costing Americans \$37.6 billion annually.<sup>107</sup> And as climate change brings more flooding, erosion will worsen.<sup>108</sup>

Note that by one estimate, worldwide soil degradation is progressing so fast that a mere sixty years of healthy soil remain.<sup>109</sup>

Once alerted that our public dollars are encouraging racist and dangerous practices, we can get serious about making essential, deep system changes.

## The Shift Is Happening

More and more American eaters are choosing to align their diets with what’s proven to contribute to good health for us and the earth. Two-thirds of Americans “say they are eating less of at least one meat,” while “a third of Britons claim to have either stopped eating meat or reduced it.” reports the BBC.<sup>110</sup>

Wow. That’s a huge shift.

We turn now to a key lever in changing what we eat—institutional purchases—and then look at the quiet revolution in food-growing that is arising in fields and forests the world over. It even involves a blending of the two.

### *Food Choices Made for Us—and How We Can Change Them*

Every day, nearly 100,000 schools and other institutions serve lunch to about 30 million students, which comes to almost 5 billion meals a year.<sup>111</sup>

Have you ever imagined that such institutional purchasing could be a powerful tool in shifting our entire food system in a positive direction, sustaining the earth and our bodies?

Growing up, I know my family never questioned my school’s cafeteria food. It never occurred to us that we could make it better on all counts. Though it’s not the first organization to do so, since 2012, the Good Food Purchasing Program has been doing just that—helping institutions make the shift away from processed, pre-packaged food, shipped long distances and instead moving them toward locally produced, wholesome food—grown and transported using fair labor practices, and with a reduced carbon footprint and other environmental benefits.<sup>112</sup>

As of early 2020, the Good Food Purchasing Program had already transformed food procurement in 43 institutions and twelve jurisdictions across the United States, including cities,

counties, and school districts.<sup>113</sup> Their combined purchasing choices are now shifting almost \$1 billion toward healthier, fairer, most sustainable food. That's huge market power.<sup>114</sup>

In addition to enhancing physical wellbeing, the Program has led some schools to reintroduce or expand infrastructure for scratch cooking, enriching children's lunch experience and enhancing the labor of cafeteria work beyond thawing frozen meals. The children get to deepen their relationships with the adults who prepare their food, and that trust is the foundation for introducing kids to new, healthier, and more diverse foods. Adults can learn directly what healthy dishes the kids prefer and which foods are appropriate and reflective of their cultural backgrounds.

The potential impact is enormous.

Beyond K-12 schools, universities, correctional facilities, senior care residences, numerous public agencies, and other institutions spend approximately \$120 billion each year on food.<sup>115</sup> As these institutions increasingly use a wider metric—health, climate, fairness, and more—in their buying choices, farming is changed as well. This purchasing power holds vast potential to promote a more environmentally friendly agriculture, while also supporting the livelihoods of small farmers and farmers of color who have historically faced barriers in accessing resources and institutional markets.

Finally, another positive sign enabling healthy consumer choices is the rise of local markets—lessening food's travel time and enabling more whole-food eating over processed food.<sup>116</sup>

## Carbon Keepers

Refocusing more tightly on the climate challenge now, we want to explore the flip side of agriculture's carbon story—a powerfully positive one.

The world over, people are learning to appreciate and thus enhance all the ways we can enable vegetation to draw carbon into plant life and into the soil—what's called “sequestration.” Soils already remove about a quarter of the world's fossil fuel emissions each year.<sup>117</sup>

So how can we greatly improve on that? Here are four estimates of the potential:

- ❖ Restoring degraded farm, forest, and pasture lands—along with other earth-centered mitigation—could capture enough additional carbon by 2050 to offset carbon equal to more than half of 2018-level carbon emissions, reports the Global Evergreening Alliance.<sup>118</sup>
- ❖ Spreading ecological farming, including cover crops and agroforestry—trees and crops in the same field—throughout the EU holds the “technical potential” to sequester 37 percent of 2007 EU carbon emissions, estimated a 2013 study.<sup>119</sup>
- ❖ If even half of all the land used for ruminant livestock were converted to growing natural vegetation, it's estimated that the carbon sequestered could amount to at least

Worldwide, soil degradation is progressing so fast that, by one estimate, a mere sixty years of healthy soil remain.

—Chris Arsenault,  
*Scientific American*, 2014

- 15 percent of emissions from food production and potentially several times greater—that is, dealing with a huge share of total emissions.<sup>120</sup>
- ❖ In the US, a wide range of earth-enhancing actions—from growing taller trees to improving soil health and protecting grasslands—could sequester one-fifth of our annual greenhouse gas pollution, equal to eliminating all emissions from US cars and trucks.<sup>121</sup>
  - ❖ Worldwide, soil sequestration alone over the next 25 years could lock up 10 percent of human-caused emissions, the UN reports.<sup>122</sup>

## Regenerative Farming, Good for Farmers and Our Climate

Before turning to stories of those transforming our own destructive farming system, let's take in some inspiration from abroad. The world over, a quiet revolution is underway in fields and forests, and it even includes the blending of the two, as we soon explore.

An emerging term to capture this healthy direction for feeding ourselves is “regenerative farming.” I like it because it reminds us that “sustainable” isn't enough when in so many places we're starting in negative territory. Regenerative farming focuses on enhancing soil quality. Healthy soil is not lifeless “dirt” but full of busy microorganisms that help transfer nutrients to plants and create soil structure able to retain moisture.

One key to healthy soil is never leaving it bare. So, “cover crops” and mulch replenish nutrients and keep soil rooted and covered. Greater diversity is also at the heart of regenerative farming—growing a range of crops with differing needs and contributions, rather than single crops grown over vast acres.

These practices are also associated with storing more carbon in the soil.<sup>123</sup>

An underappreciated leader in regenerative farming is India—particularly the southeastern state of Andhra Pradesh. The transition there began with a grassroots social movement that was so successful the state government recently announced a roll-out to all the state's 6 million farmers by 2024. It is called “zero budget, natural farming,” or ZBNF.<sup>124</sup>

The strategy doesn't mean zero costs. Rather, by being freed from having to buy corporate-supplied fertilizer or pesticide—thus taking on debt—the farmers don't become dependent and at risk of bankruptcy. (Farmer suicides from economic distress had become a national tragedy.) Zero budget means any costs can be offset by diversified sources of income.

How?

By doing as they've done for centuries. Farmers create their own potions for controlling pests, as done historically using the neem tree, chili, garlic, and tobacco. Farmers also plant “live fences” using a range of plants, and create trenches for water harvesting. Their fields use a “five-

The Indian state of Andhra Pradesh recently announced its goal of helping all the state's 6 million farmers achieve climate-friendly “zero budget natural farming” by 2024.

—Zareen Pervez Bharucha et al.,  
*International Journal of Environmental Sustainability*, 2020

layer” multi-cropping model, in which trees are integrated with crops to create a canopy in which each plant can access needed the right balance of sunlight and shade. Seed saving and sharing also reduce costs.<sup>125</sup>

For some, switching the stable crop is also part of the solution.

While rice seems basic to Indian cuisine, some farmers are reviving millet, for example, which can reduce the need for irrigation water by a third and simultaneously improve protein, iron, and zinc in the diet.<sup>126</sup> Some years ago, I visited a women-farmers organization in this state, where members proudly walked with me through their diverse fields of at least a dozen crops, including millet. Since then, they’ve succeeded in convincing the state government to replace the less-nutritious white rice with their nutritious millet in school lunches.<sup>127</sup>

I’d long wondered why integrating legume cover crops with grain crops works to store carbon in the soil.

Then I learned of the work of G. Philip Robertson, a professor at Michigan State University’s Kellogg Biological Station. His explanation?

The key is “a chemical group called phenolics that protects plants from disease and pests.” They “enter the soil when farmers plant cover crops like beans and legumes (a common practice among organic and regenerative growers), and they enrich the soil with nitrogen before planting” the main crop. It turns out that “these compounds create a barrier around the carbon in the soil, protecting it from microbes that would process it into carbon dioxide gas.”<sup>128</sup>

### *Redesigning for Earth Friendly Farming*

Such courageous trailblazers give us a lot to build on. As our economy recovers from an historic pandemic, we can use this learning to redesign an earth-and-people-friendly farm economy as we rebuild.

Now is the moment for deep change.<sup>129</sup>

Even before the shuttering of the wider economy began in response to the pandemic, farm debt has been a big issue. In 2018 alone, farm bankruptcies in the Midwest jumped 19 percent.<sup>130</sup>

Climate impacts are contributing to farmers’ challenges. In 2019, for example, Ohio’s record rainfall and the flooding that followed made it impossible for farmers to plant 15 percent of their acreage.<sup>131</sup>

So, what will it take to redesign as we recover?

Reforms and investments in climate-friendly family farming can become a centerpiece of a Green New Deal, as they directly address systemic racism, poverty, and the climate crisis.

## **What Tools Best Encourage Earth Friendly Farming?**

We have two main tools:

First, as citizens, we can elect leaders and press for reforms to create accountable democracy and thus stop creating the problem.

That includes finally ending policies rewarding farmers for growing a handful of crops heavily reliant on synthetic fertilizers and pesticides and overtaxing our soil and water. Such policies encourage overproduction and discourage the very practices, such as agroforestry and cover crops, which enrich the earth.

Most public subsidies go to two feed crops—corn and soy. In 2019, total subsidies came to \$22 billion, the biggest payout ever. While the US sugar industry produced \$2.4 billion worth of sugar in 2016, it received \$1.5 billion in subsidies in 2016—about two-thirds of the value of production.<sup>132</sup>

Simultaneously, we must stop rewarding the wealthiest operators.

A bit of history is helpful here. As federal agriculture policy from the Great Depression era onward, our government has sought to ensure “parity”—fairness for farmers compared to nonfarmers—via price supports and “supply management,” i.e., preventing overworking of the land and oversupply and sinking prices from ruining farmers’ incomes and the land.

But in the sixties and seventies, agribusiness became more powerful than farmer groups and took over the “farm lobby.” By the 1980s, with the election of Ronald Reagan and rise of market fundamentalism, “supply management”—which was good for farmers and the earth—started eroding. Then, the 1996 Farm Bill officially banned it.

Priorities changed from assuring decent prices for farmers to agribusiness’s interest in unrestrained production, assuring low prices—mainly to turn crops into processed, less-healthy food. As noted earlier, today’s farm subsidies are skewed to the top, with almost 80 percent of the \$20 billion allocated each year going to the top 10 percent of farms.<sup>133</sup>

Moreover, with no price supports, of course, farmers are pressed to increase output however they can, even at the risk of personal health from chemical exposure and of the ecological health of soil and water.

## A New Direction

Beyond stopping the harm, our second task is to demand and support a new direction. In its 2020 report, “Regenerative Farming and the Green New Deal,” the organization Data for Progress makes the case for a simple-to-grasp but profound re-orientation of public incentives for farmers.

A start, it notes, is reducing the pressure to over-use the land by shifting public-farm insurance to protect farmers’ fair net income—not gross—relative to median nonfarm income.

Plus, it advocates that our public dollars reward farm practices that enrich the soil, biodiversity, and health. Here we already have something to build on: the USDA’s Conservation Stewardship Program. It encourages farmers to keep soils covered, avoid run-off into waterways, protect and reestablish wildlife habitat, and much more.

The Stewardship Program’s budget has grown over the last decade, but it’s still only about \$1.4 billion.<sup>134</sup> For perspective, recall the \$22 billion paid in farm subsidies—including trade-related relief—in 2019, the highest level in 14 years.<sup>135</sup>



Nevertheless, with a new administration, we can push for greatly expanding the helpful “stewardship” approach. At the state level, too, we can re-imagine farm incentives.

The new incentives would support the spread of proven successes in the stories we’ve shared here, and so many more. Other leading movers and shakers worth listening to and learning from as we redesign our dead-end agriculture include The Practical Farmers of Iowa, the Sustainable Iowa Land Trust, the Women, Food and Agriculture Network, and Family Farm Defenders.

## Trees with Crops, No Contest

I had always assumed, of course, that trees on farmed land would compete with crops for soil nutrients and sunlight. How wrong I was. As in India, in many other places, some of the world’s poorest farmers are showing the rest of us that trees and crops don’t compete. They are—or certainly can be—great partners.

In fact, already more than a billion people depend on this mix—called agroforestry—for their food.<sup>136</sup>

All this I first learned from a part of the world I had long associated with famine—the African Sahel, just south of the Sahara Desert. From the late 1960s to the early 1980s, this region and famine were conjoined in my mind. During that time, many died of starvation, and Niger, now the world’s poorest country, was hard hit.<sup>137</sup>

### *Poor Farmers Show the Way*

Soon, however, many of Niger’s farmers discovered another way of working with the earth. And as a result, since that tragic time, the country’s farmers have rehabilitated 17 million acres by carefully managing the natural regeneration of 200 million trees—sequestering carbon and improving soil fertility.<sup>138</sup>

The change has increased crop yields, while providing livestock fodder and firewood; and by 2009 had ensured food security for 2.5 million people.<sup>139</sup> Niger’s progress—led by small farmers working together to make and enforce rules—has been celebrated as perhaps the largest greening transformation in all of Africa.

First, though, a change in perception was required.

That “change in mindset began in 1984,” reports Tony Rinaudo, whose work helped trigger the shift, earning him the nickname “forest maker.”<sup>140</sup> Widely heard radio news of deforestation was followed by severe famine in Niger’s Maradi region—creating a link in farmers’ minds between drought (and hence hunger) and the loss of trees. At the same time, the international organization Serving in Mission began working with an approach that has come to be called Farmer Managed Natural Regeneration.<sup>141</sup>

Farmers discovered that their crops did better when growing among the trees.

Trees reduce wind damage, encourage rainwater filtration, and cool the soil, lessening evaporation. Plus, trees provide wood for cooking and building, as well as a commodity. For village women burdened with having to walk miles to find enough wood, this handy supply was a huge boon.

In just two decades, small farmers in Niger nurtured the natural regeneration of 200 million trees that now sequester carbon and improve soil fertility, crop yields, nutrition and income.

—John Carey, *Proceedings of the National Academy of Sciences*, 2020

The favorite tree turned out to be the gao (*Faidherbia albida*), which has particularly advantageous traits: Its vast root system stabilizes the soil, reducing erosion and helping draw nitrogen from the air, fertilizing the soil.

Handily, the gao also drops its leaves during the rainy season—just when crops need more sunlight—while it casts a low but beneficial shade in the searing heat of the African Sahel. Gao-nourished soil also holds water better, particularly helpful in drought years.<sup>142</sup> And in the dry season when there's little fodder for livestock, gaos provide nourishing seedpods.

Farmer-led greening is also taking off in Chad, Burkina Faso, Mali, and Senegal.<sup>143</sup> Helping the process, the new vegetation sequesters vastly more carbon and helps millions of villagers achieve food security.

Beyond Africa, agroforestry is also taking root in several Asian countries.<sup>144</sup> Now, let's look at agroforestry progressing south of our border, and here at home, too.

### *Mexico Makes Agroforestry a Priority*

In early 2019, Mexico's government allocated \$786 million to an agroforestry jump-start, the Planting Life Program.<sup>145</sup> Placed, interestingly, within the Secretariat of Well-Being (instead of agriculture), Planting Life is designed for regions rich in biodiversity but where family incomes fall "below the line of rural well-being."<sup>146</sup>

Mexico's government is investing in agroforestry, assisting a quarter million farmers on small plots to plant 2.5 million acres of fruit and timber trees, while maintaining the tradition of growing a variety of field crops in the same field.

—USDA Foreign Agricultural Service, 2019

The program is enabling a quarter million farmers on small plots to plant 2.5 million acres of fruit and timber trees while also maintaining the traditional "milpa" practice of growing a variety of crops in the same field. Its first phase is ambitious: The government is investing in farms covering 1.4 million acres, each to receive \$262 monthly, as well as plants, supplies, tools, technical support and training.<sup>147</sup>

And north of the border?

### *Agroforestry Budding Here*

For more than two decades, the University of Missouri has housed one of the world's leading centers contributing to the science underlying agroforestry, the Center for Agroforestry.<sup>148</sup>

My farmer friend in Missouri, Molly Rockamann, founding director of EarthDance Organic Farm School in Ferguson, has gained a lot from the Center's research. Her farm uses an approach to agroforestry called "alley cropping" (i.e., crops growing between rows of trees).<sup>149</sup>

"When we bought the farm," Molly told me, "the first thing we were excited to do was plant a ton of fruit trees on it." Today, after only seven years, more than two hundred trees now enrich this fourteen-acre farm in a St. Louis suburb. The Earth Dance farm has become my US model for how agroforestry can work on a small scale.

"Alley cropping"—one variant of agroforestry—is taking off far, far beyond my friend's farm in Missouri.

A leader in its rise in the US is the Savanna Institute, based in Madison, Wisconsin. Since 2013, it's been working to help farmers and farmland managers adopt alley cropping in Illinois, Iowa, Minnesota and Wisconsin.

With widely spaced rows of trees growing among companion crops, alley cropping helps store carbon, and it can increase what's produced from each acre by 40 to 200 percent. Plus, alley cropping diversifies farm income, prevents soil erosion, and provides wildlife habitat, co-executive director Keefe Keeley explained to me.

"If we gradually expand alley cropping in the Midwest to hit that target acreage—about 50 million acres—over the next 30 years, farmers will take 1.07 gigatons of carbon dioxide out of the atmosphere."

—Keefe Keelev. Savanna Institute.

Almost a quarter of "all Midwestern farmland would be more profitable with rows of trees in it, compared to corn and soybean monocultures," observes Keeley. "If we gradually expand alley cropping to hit that target acreage—about 50 million acres—over the next 30 years, farmers will take 1.07 gigatons of carbon dioxide out of the atmosphere." (For comparison, the US is now emitting about 4.8 gigatons a year.<sup>150</sup>)

Plus, "they'll be putting that carbon to productive use in growing tree crops and building soil health. And farmers can do it, while becoming more profitable through alley cropping," he stresses.<sup>151</sup>

Yet another exemplar is Mark Shepard's New Forest Farm in Wisconsin. His family transformed a 140-acre row-crop dairy farm into a perennial, agricultural ecosystem with oak savannah, successional brushland and Eastern woodlands, shrubs, vines, canes, perennial plants and fungi—all cooperating to produce food for both humans and animals—along with fuel, medicines, and, of course, beauty.

When my daughter Anna Lappé interviewed Mark for her book *Diet for a Hot Planet*, he explained how synergies among this great diversity changed his job. He "likes to call himself not a farmer but a population manager," she writes, whose work is "to make sure the inhabitants of his land get along."<sup>152</sup>

Perennials are so important because unlike annual crops, they put out extensive root systems allowing them to access water and nutrients that annual plants can't reach. They also create a permanent network of roots helping to prevent erosion. And that's no small victory, as across the US we're now losing topsoil ten times faster than nature can rebuild it.<sup>153</sup>

Also, New Forest is powered entirely by solar and wind energy.<sup>154</sup>

Most Americans have never even heard of agroforestry, and, like me, had never imagined trees and crops as natural partners. So, each of us can help spread the word of its remarkable potential.

## Farming with Nature, Rejecting Hazardous Chemicals

Many Americans are familiar with organic farming, which promotes successful farming by aligning practices with nature's rhythms, free of the hazards of synthetic pesticides and fertilizers. For many decades, it has led the way to healthier, climate-friendly farming.

Arkansas had 10 organic farms in 2011 and 64 in 2016, a six-fold jump in five years.

—Sara Clarke, US News and World Report, 2019

We can appreciate the urgency of moving in this direction as we take in this shocking finding: US agriculture over the last 25 years has become 48 times more toxic to insects.<sup>155</sup> And for humans? One sad sign of the costs of our chemical path is that, today, 100,000 farmers filed lawsuits against Bayer (which owns the

former Monsanto) because they've been stricken by cancer that many link to the company's pesticide, glyphosate.<sup>156</sup> Evidently they made a convincing case: Bayer/Monsanto offered a settlement of almost \$11 billion (yes, with a "b").

To appreciate the urgency of action, note that worldwide each year almost half of farmers suffer pesticide poisoning linked to harms from birth defects to diabetes.<sup>157</sup>

Increasingly, farmers are recognizing the many dangers of this path and finding ways to achieve good yields with no health harms by foregoing use of synthetic fertilizer and pesticides.

The growth of organic farming is stunning. In just over four years, 2011 to 2016, the number of organic farms in the US grew by over half.<sup>158</sup>

California continues to boast the greatest number of organic farms and the most certified-organic acreage, but other states have also experienced significant growth in the past five years. Arkansas, for example, had 10 organic farms in 2011 and 64 in 2016, a six-fold jump in five years.<sup>159</sup>

Our culture's assumption might be that organic is strictly "elitist" and "coastal." But that's not the case. For example, five southern states—Alabama, Mississippi, North and South Carolina and Tennessee—more than doubled their organic farm numbers during the same time period.<sup>160</sup>

## Farmers of Color in the Lead

Earlier, we lamented the shameful undercutting of Black farmers. But we also want to alert readers to the work of groups helping to reverse this historic wrong.

### *Farmers Confront Racism, Showing the Way to Healthy Farming*

Founded in 2006, the Atlanta-based Southeastern African American Farmers' Organic Network, SAAFON, is creating a new story. Through its network of Black farmers, it's working to create "culturally relevant, ancestrally guided, and ecologically sustainable agricultural-based living," proclaims the group's website.

SAAFON represents farmers across 10 southern states and the U.S. Virgin Islands, with many members having farms that have been in the same Black family for over 100 years. Even beyond growing food, the group is "incorporating innovative programs that speak to the broad-based and integrated needs of their communities. We have a legacy of successful Black farmers," says SAAFON.<sup>161</sup>

### *Soul-Fired Farming*

In 2011, Leah Penniman, a Black educator, farmer, and author, co-founded Soul Fire Farm in Grafton, New York, just north of Albany. Her goal? To help end "racism in the food system and reclaim our ancestral connection to land" and to "raise and distribute life-giving food as a means to end food apartheid."

86 percent of folks who graduated from our [immersion] program have continued the work, so they're growing food, or they're organizing for food justice.

—Leah Penniman on *Living Earth*, 2019

Since then, Soul Fire has involved almost 8,000 learners in exploring all aspects of farming, determined to help reverse the racist record that has robbed Black people of farms for the last 100 years. What makes Leah happy is that a "86 percent of folks who graduated from our [immersion] program have continued the work, so they're growing food, or they're organizing for food justice."<sup>162</sup>

Soul Fire focuses especially on crops largely ignored in American agriculture but that are indigenous to Africa. In a truly holistic approach, participants learn seed-saving and storytelling, as well as medicinal and nutritional aspects of their crops.

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In these five chapters, we've made the case that tackling the climate crisis is not a lost cause, though the losses are already horrific and mounting fast. To focus our minds and keep our hearts motivated, we've laid out the many underappreciated, creative, bold steps that Americans are taking, and thrown in some international stories to inspire us further.

Still, we're aware of perhaps the highest barrier to effective climate action: that today in America's public sphere, private interests overwhelm the public good. Certainly, the health-environment-climate threats we've painted in this chapter are sketched with the brush of corporate power.

One sign of how that power has worked to get us to this sad place? Agribusiness now spends more on lobbying than does the defense industry.¹⁶³

So, in our next and final chapter, we turn to this foundational challenge: reclaiming our democracy to “promote the general Welfare,” as our Constitution’s preamble calls us to do.

Little could its drafters have imagined that our general Welfare would come to depend today on whether we can together face the climate crisis.

Chapter Six: And from Here? Trusting the Power of Courageous Action

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Chapter Six: And from Here? Trusting the Power of Courageous Action

In this chapter, we first celebrate the growing citizens' climate movement and then dig to the democracy roots of the climate crisis and solutions. Following this chapter, you'll find our guide to next-steps that we call "moving into action."

We're finishing this book's initial "for review only" edition in early 2021, a time that may well go down in history as America's great turning.

Yes, it could happen.

But in the midst of such complex crises, predictions feel imprudent. Fear and suffering are everywhere as the COVID-19 death toll climbs daily, while the pain of forced isolation reminds us just how much we need each other. Despite the pandemic, Americans turned out to protest the horrific police murder of George Floyd in what some scholars see as the largest movement in our country's history.¹ Supported by two-thirds of Americans, the protests triggered public dialogue about systemic racism.² Simultaneously, the pandemic's massive income losses have called forth billions in public aid, underscoring just how much we need accountable government.³

And after four years of President Trump's violations of democratic norms, our nation is grappling with the meaning and consequences of his role in fomenting America's first, and deadly, insurrectionist assault on our Capitol.

Certainly, more of us are paying attention ... struggling to find new footing. On this new ground, might we come together realize our connected fate and discover our power to confront the climate crisis' threat to life itself? In this biggest challenge facing our species, we are all contributors and therefore can all become solvers—as we've shown throughout this book.

Now, in our final chapter and the "into-action" guide that follows it, we try to explore the roots of our crises as well as to offer irresistible opportunities for each of us to seize this moment of transformation.

The Movement Moves

I'll never forget the thrill of that night at the Strand Theater. It was April 18, 2019.

I found myself jumping out of my seat and cheering more than I ever had as a kid at a baseball game. And this was no stadium. The Strand is a stately, magnificently renovated, one-

hundred-year-old theater in the Boston neighborhood of Dorchester—known for its racial and cultural diversity. The only other time I’d been in the Strand was in 2008, when the city invited all Bostonians to watch Obama’s inauguration on a big screen.

Eleven years later, in 2019, my experience that night with the Sunrise Movement also opened in me a new world of hope. I saw it in the eyes of young people who’d created the night’s program, energizing a crowd 1,400 strong.

But I also took in the pain of the youth of color who, via film, shared stories revealing just how much fossil-fuel pollution has harmed them. And I appreciated the rally’s embrace of older generations, too, as, for example, when septuagenarian Massachusetts Senator Edward Markey was invited to the stage.

“There’s a lot of suffering that happens in the world that you can’t stop. But there’s a lot that you can. ... The fact that we are steeped in painful topics means you actually have to create your own joy.”

—Varshini Prakash, Sunrise Movement Executive Director, 2019

And who were these young people, able to pull off such a night?

They are the Sunrise Movement, born in 2017.⁴ From its beginning, the Sunrise Movement’s goal has been to help elect champions of renewable energy and other climate solutions—first in the 2018 midterm elections, and then in the 2020 election.⁵ It’s focused on building support for the Green New Deal, introduced in Chapter 1.

Sunrise understands that there is no climate solution without governments accountable to citizens. So, in early 2019, Sunrise organized a group of young people—preteens to early twenties—to confront long-time California Senator Dianne Feinstein with the demand that she support the Green New Deal. Two other youth organizations—Youth vs. Apocalypse and Bay Area Earth Guardians—joined them.

Her response to their passion? A scolding. “You didn’t vote for me...I’ve been doing this for 30 years. I know what I’m doing,” she said.

Big mistake, Dianne.

A Twitter clip of the exchange scored more than 9 million views.⁶

During its Green New Deal Tour that followed, Sunrise hosted over 200 town halls, and in June 2019 led a 3-day sit-in at the Democratic National Committee headquarters in D.C. Participants agreed to leave only when the DNC scheduled a vote for a climate debate at its August meeting. The DNC agreed to bring the issue forward, but ultimately voted not to allow Democratic presidential candidates to hold a climate debate.⁷ The candidates themselves went ahead anyway with a “town hall” on climate hosted by CNN.

We strive to bring positivity and hope to everything we do. Changing the world is a fulfilling and joyful process, and we let that show.

—A Sunrise Movement Principle

Then in September 2019, Sunrise helped organize the Global Climate strike, the largest day of action for climate justice in world history, involving over 3 million people in over 4,000 events in 150 countries.

Over the same period, a similar global call to action, the “Extinction Rebellion” (XR), has been gaining strength. By 2019, there were 1,000 XR groups in 75 nations.⁸ Proudly leaderless, decentralized, and apolitical, this network uses nonviolent direct action and civil disobedience to ignite government action on the climate and ecological emergency.

The demands of Extinction Rebellion are fourfold—that government tell the climate-crisis truth; act now to get to net zero emissions by 2025; create and be led by the decisions of a Citizens’ Assembly on “climate and ecological justice,” with members selected by lottery; and that there be a just transition prioritizing Black and Indigenous people, people of color and people in poor communities.⁹ It should be noted that Citizens’ Assemblies have been used in numerous countries to strengthen citizen voices and increase transparency.¹⁰

Extinction Rebellion’s bold beginnings?

In October 2018, activists in London’s Parliament Square—addressing the queen directly—announced “a Declaration of Rebellion against the UK government.”¹¹ With artistic street theater and tree planting, their movement took off, spreading not only throughout Europe and the US but the world over. In November, they held a Global Hunger Strike in solidarity with the hundreds of millions who go hungry today and suffer the most from the climate crisis’ impact.¹²

The following spring, within weeks after XR’s first two-week London mass mobilization, “the U.K. government declared a climate emergency and announced a legally binding target for net-zero carbon emissions by 2050,” as *Time* reported.¹³ More positive responses came from government officials throughout Europe.¹⁴

As we complete this limited-edition book for your feedback, we applaud the Extinction Rebellion’s street action proclaiming to the UK government that there is “no going back” on its commitment to fight climate chaos. During the COVID-19 pandemic, its activists “painted bike lanes onto streets and launched mass bike rides as part of a weekend of socially distanced protests.”

“This is the time to re-imagine our streets,” said Louise, a cycling activist. “The increase in air quality is tangible. We can’t go back to the pollution we had before, where cars are king.” The UK government has pledged to spend the equivalent of \$300 million on temporary pop-up bike lanes.

Extinction Rebellion also placed 2,000 children’s shoes in London’s Trafalgar Square to draw attention to the fact that climate chaos most puts our youngest generations in danger.¹⁵

Since my night at the Strand with Sunrise, and my later encounters with friends deeply engaged in the Extinction Rebellion, both movements have stoked my energy and determination.

But it could be such inspiring, recent actions would not have been possible without decades of teaching and action by environmental pioneers such as Bill McKibben. He didn’t just write the first book on the climate crisis for a wide-audience, *The End of Nature*, ringing the alarm in 1989, but he and a small group of passionate university students also went on to orchestrate the first-ever planet-wide climate actions.¹⁶ Since 2008, 350.org has centered its work around both personal choices and collective action for science-based public policies, along with stigmatizing those destroying the planet for profit.¹⁷

Within a year of its founding, 350.org had organized the most widespread day of political action in the planet's history, with more than 4,000 events in 170 countries.¹⁸ It followed that feat with the world's largest art project: organizing crowds tens of thousands strong that created messages photographed from space—an astounding accomplishment.¹⁹ In 2014, 350.org helped oversee the People's Climate March, which in New York City alone engaged 400,000 people—including my daughter, Anna, and me.²⁰

The 350.org imperative of keeping fossil fuels in the ground and creating a green energy revolution—the fruits of which are shared equitably and leveraged as a tool of broader change—jibes with that of the Green New Deal. One of its architects, Rep. Alexandria Ocasio-Cortez, calls it “the moon shot, the civil rights movement of [her] generation”—invoking John F. Kennedy's unifying call for the country to do the impossible.²¹ The Green New Deal reframes environmentalism—sometimes reduced to a prerogative of the well-off—as a way to good jobs and solutions to multiple, interacting crises.

With energy mounting via these movements, we fervently hope the stories in previous chapters reinforce readers' commitment to act. Now, we can press President Biden to follow through on the promises made on the campaign trail to enact climate policy powerful enough to meet our climate emergency, and we can encourage all our fellow citizens to step out beyond our comfort zones to work on behalf of life itself.

As noted, to make it even easier for you to jump in, we follow this chapter with “Into Action,” introducing key organizations for immediate involvement.

Since wise action, however, must touch root causes, I now dive into the roots that our actions must remake.

Yes, We Can...If

We've loved preparing this book because all we've learned has stirred in us a deeper sense of possibility that, indeed, it's not too late to avoid the most catastrophic loss and suffering from the climate crisis.

But, of course, there must be an “if” at the end of that sentence.

And here it is: All the bold, creative acts we've shared—and so many more—can only have the needed impact *if* our actions reshape the decision-making power on which solutions depend. Remaking power demands a very deep dive. It means committing ourselves to live democracy.

“Live democracy?”

Yes.

By “live democracy,” I don't mean arriving at an ideal democracy. Democracy is not a destination. It is “a process, not a static condition,” as William Hastie reminded us when he served in the 1950s and 1960s as the first African American judge on the U.S. Court of Appeals. His famous quote continues: Democracy “is becoming, rather than being. It can be easily lost, but is never fully won.”²²

So “living democracy” means to me that we are heading in its direction, embracing democracy’s principles and preconditions, and actively striving to bring them alive. In other words, we are working toward government being ever-more accountable to all citizens, not to private wealth.

First, though, we must register how far we have to go; for solutions—whether public or private—depend on realistic self-assessment.

Tackling the climate crisis depends upon our courage to step up for democracy.

Privately Held Government is Not Democracy

First, wealth in the hands of a few continues to turn into political clout, bending the rules in favor of the privileged few. Recall the huge political donations from Big Oil mentioned earlier.

Spending in our federal elections, adjusted for inflation, rose from the already shocking sum of roughly \$4.6 billion in 2000 to over \$7 billion in 2016.²³ Then, in 2020, presidential-election donors doubled that huge sum—reaching \$14 billion.²⁴

And the sources of these enormous funds are grossly concentrated. In 2018, over 70 percent of political contributions of at least \$200 come from only one-half of one percent donors.²⁵ Over the last decade, the ten largest donors and their spouses put \$1.2 billion into federal elections.²⁶

So, Trump’s ascendancy was predictable: Among the super-wealthy with enormous political power is Robert (Bob) Mercer, who has called civil rights legislation a mistake. He began supporting Trump seven years ago, reports award-winning writer Jane Mayer in *The New Yorker*. She notes that one of Mercer’s senior employees observed that “Trump wouldn’t be President if not for Bob.”²⁷

After two Supreme Court decisions, *Citizens United* in 2010 and *McCutcheon* in 2014, unleashed corporate spending in politics, both super PACs and “dark money” (i.e., untraceable to a specific donor) grew massively. Moreover, election-related spending by non-party, unaccountable independent groups jumped six-fold to \$4.5 billion over the last decade, from the \$750 million total of such spending over the two prior decades.²⁸ And, the Koch-sponsored network now rivals the Republican Party in its reach.²⁹

We’ve been duly warned.

More than 100 years ago, Teddy Roosevelt noted that the Constitution “does not give the right of suffrage to any corporation ... There can be no effective control of corporations while their political activity remains.”³⁰

But we didn’t listen, so private power over public affairs—exerted via corporate and individual wealth— remains a primary reason why we’ve witnessed ongoing voter suppression. This includes such tactics as pointedly limiting the voices of those likely to resist the agenda of the super-wealthy, which, of course, means low-income people and people of color in particular.³¹

The effect of voter suppression can change the course of history.

Consider what happened in 2016 in Wisconsin, where Donald Trump won by fewer than 23,000 votes. There, according to Ari Berman, author of *Give Us the Ballot*, voter turnout was the

lowest it had been since 2000, though in the two previous presidential elections Wisconsin had ranked second nationally in voter participation.³²

So, what had changed?

More than half the state's decline in turnout occurred in Milwaukee, which Clinton carried by a 17-18 percent margin, but voter suppression created a plunge in black voters. So almost 41,000 fewer people in the city voted in 2016 than in 2012.³³

Then, add to voter suppression the gerrymandering of districts for partisan advantage, as we explain in *Daring Democracy*, my book co-authored with Adam Eichen. In 2012, for example, Democrats won almost 1.6 million more votes than Republicans in House races, but they still lost the majority of seats.³⁴ In Pennsylvania, despite Democratic candidates receiving about half of the votes statewide, Republicans won 72 percent of available House seats.³⁵ In all, partisan gerrymandering "has never been worse in modern American history than it is today," according to the Campaign Legal Center.³⁶

Little wonder trust in government has fallen off the proverbial cliff, from 77 percent in 1964 to 17 percent in 2019.³⁷ Given these grim realities, widespread feelings of powerlessness are understandable, and perhaps the greatest barrier to progress on all fronts, including climate.

The influence of private interests is especially lethal when it comes to facing the climate crisis.

Way back in 2001, Vice President Dick Cheney's Energy Task Force, then designing our energy policy, met with executives from large oil companies. And environmentalists? They were denied access.³⁸ In 2020, fossil fuel corporations made nearly \$122 million in political contributions to influence races, almost all going to Republicans. The industry put nearly another \$111 million into lobbying.³⁹ Climate-denying Koch Industries was the second largest funder.⁴⁰

Over the past couple of decades, fossil fuel corporations have made \$5 billion in political contributions, an amount that seems massive but is dwarfed by the \$20 billion funneled from our government to fossil fuel companies through subsidies.⁴¹ And that estimate doesn't count indirect public subsidies.

The corruption doesn't stop with fossil fuel corporations. It trickles down to powerful utility companies.⁴²

In 2016 in Ohio, for example, the FirstEnergy utility company gave former state House Speaker Larry Householder over \$60 million for a new legislative campaign, funneled through a shell

The liberty of democracy is not safe if the people tolerate the growth of private power to the point where it becomes stronger than their democratic state itself. That, in its essence, is fascism ...

—Franklin Delano Roosevelt, 1938 Address to Congress

“nonprofit” to evade campaign finance laws. The sum was big enough not only for him to win a seat but also to help allied candidates—who soon voted him Speaker of the House yet again.

Householder, a Republican, was thus able to push through his top priority—a bailout of two nuclear plants and several unprofitable coal plants. The bailout law upped charges on ratepayers by \$150 million a year and rolled back environmental protections.⁴³

In July of 2020, Householder was arrested for “likely the largest bribery, money-laundering scheme ever perpetrated against the people of the state of Ohio,” but he has yet to resign.⁴⁴ He pleaded not guilty and as of early 2021 remains free, awaiting his criminal trial.⁴⁵

Householder’s arrest came just a week after ComEd, a large Illinois-based utility company, was forced to pay a \$200 million fine for bribing political figures.

Elsewhere, utility companies have hired actors to participate in staged pro-gas power plant protests and interfere with petition drives against pro-industry policy.

In 2018, Arizona Public Service—a utility company, despite its name—spent \$38 million to defeat new renewable energy targets but has since changed its tune and is now committed to weaning itself from fossil fuel.⁴⁶

The power of private wealth also hurts international action on climate. The international organization Corporate Accountability has played a key role in the fight to end the fossil fuel industry’s insinuation into international forums addressing the climate emergency—first and foremost, the United Nations Framework Convention on Climate Change. The “very industries this process seeks to rein in—Big Polluters—have launched a full-fledged campaign to infiltrate, undermine and co-opt this treaty,” reports Sriram Madhusoodanan, Corporate Accountability’s U.S. Campaign Director.⁴⁷

Increasingly, however, Americans are getting it.

We grasp that, as we emphasize here, our country can make breakthroughs on any of the essential challenges of our time, including the climate crisis, only as we also fix our derailed democracy.

Democracy and Climate Solutions—Inseparable

Of twenty US states scoring high in “electoral integrity,” seventeen are also contributing to climate solutions featured in this book.

Consider that of twenty US states ranked highest in “electoral integrity” by the Electoral Integrity Project—based at Harvard and the University of Sydney—seventeen are also states that this book features for actions addressing the climate crisis.^{48C}

^C These 17 states are Vermont, Maine, Minnesota, Iowa, Nevada, Massachusetts, New Mexico, Colorado, Maryland, Louisiana, Oregon, Delaware, Illinois, California, Utah, Rhode Island, and Hawaii.

Limiting warming to 1.5 Celsius requires democratic accountability at every level of government; and, of course, that means federal leadership, too. Yet, even in 2014, well before Trump, political scientists found that the views of the average American have “near-zero” correlation with policies enacted by Washington, while policies favored by the elite strongly correlate with the policies adopted.⁴⁹

Another measure of our damaged democracy comes from international comparisons. The Electoral Integrity Project uses teams of knowledgeable observers around the world to rank nations by the

To save the democracy we thought we had, we must take democracy to where it’s never been.

integrity of their elections. In its 2019 report, the United States ranked behind 55 other countries.⁵⁰

So, protecting life depends on our undertaking a radical redirection to continue the journey of democracy. We can be guided by a primary purpose of our nation, captured in our Constitution’s preamble: to “promote the general Welfare.”

In 1776, John Adams elaborated on this founding purpose, writing: “Government is instituted for the common good; for the protection, safety, and happiness of the people; and not for the profit, honor or private interest of any one man, family, or class of men.”⁵¹ Of course, Adams couldn’t have guessed that almost 250 years later our patriotic duty to protect the “common good” would come to require immediate, sweeping steps to protect the basis of life itself.

In other words, in this moment, to save the democracy we thought we had, we must take democracy to where it’s never been.

Roots of the Crisis and Hope

Supporting our case for the necessity of democracy, we must start with the basics, asking what humans need to thrive. Beyond our physical requirements, in order to fully thrive—or, for some, to thrive at all—I believe humans need at least three other elements in our lives.

One is a sense of agency—personal power. We evolved not as couch potatoes but as doers, as problem solvers, for which a sense of personal power is required. Social philosopher Erich Fromm calls this aspect of human character our need to “make a dent.”⁵²

Autocratic governments, by definition, deny citizens opportunity to experience such power—that is, to create our own futures.

Two, humans need meaning—to feel that our lives count for something beyond our own survival. Autocracy—as well as cults and gangs—can offer limited meaning through, for example, identifying with a “strong man”; but only democracy enables citizens to create their own, positive meaning within communities they choose.

Three, we need to feel connected to others. Yet in our deeply compromised democracy, the plague of loneliness has become a greater threat to our health than obesity.⁵³ Real democracy—unlike autocracy—encourages

Only democracy can meet three deep human needs beyond the physical: our need for power, meaning, and connection.

citizens' coming together in community, including for the purpose of challenging and improving their democracy.

Bottom line: Only democracy— both as a form of governance and an unending journey toward its realization—enables us to experience power, meaning, and connection in constructive ways that no other system of governance can. (Note that, if humans lack a positive way to meet this need, even a terrorist group can meet them—negatively.)

Because democracy creates essential conditions for thriving, the work of democracy is a “we can!”—not a dull chore. So, we can ditch any sense that democracy is about forcing ourselves to swallow the blah spinach of citizenship—or to endure nasty partisan warfare—in order to earn what we really want: our yummy dessert of personal freedoms. No. Engaging in quickening the path of real democracy can be thrilling. We discover deeper meaning in our lives and connection with others ... and come to know that our voice counts.

In other words, we experience human dignity. Yet, much in America today denies dignity, as so many struggle economically.

The Crisis in Our Economic Lives Undermining Democracy

In measures of economic inequality, the US ranks poorly: as more extreme than in over 100 countries, reveals a World Bank ranking.⁵⁴

Economic inequality here is more extreme than in over 100 countries.

—World Bank, Accessed 2020

But perhaps most shocking is how quickly inequality has deepened. In 1989, CEO pay in the top 350 corporations was 58 times higher than a typical worker earned. Thirty years later, it was 221 times higher.⁵⁵

And here are numbers that capture the economic hardship that follows: In 2019, even before the pandemic, 53 million adult Americans—roughly 44 percent of the workforce—earned a median hourly wage of \$10.22, earning just \$18,000 annually.⁵⁶ The average cost of health care alone would eat up \$5,000 of that amount.⁵⁷ That's twice as much for health care, adjusted for inflation, as we paid in the 1980s.⁵⁸

The premise of democracy is the protection and enhancement of human dignity. Such gross unfairness assaults dignity, and thus democracy. Thus, many of our founders worried about the power of concentrating wealth to undermine what Adams called the “common good”—the very purpose of democracy.

And rightfully so. As monopolies arose, in 1907 Teddy Roosevelt called out the “malefactors of great wealth” as “equally careless of the working men, whom they oppress, and of the State, whose existence they imperil.”⁵⁹

From our current pain we can see the necessity of going beyond our brutal, even deadly, form of capitalism driving extreme economic concentration. It flows from the myth, identified earlier, that a market can serve life if driven essentially by one rule: Do only what brings highest return to existing wealth. With that logic, wealth accrues to wealth until we end up where we are

today, with the top one percent controlling about 30 percent of America's wealth—more than the entire middle class combined.⁶⁰ And without a redirection, it will only get worse.

Thus, to succeed in this critical moment for our planet, democracy must become a set of key conditions—reflecting the three “guideposts” below—that apply in economic life as well as in political governance. So not only at the polls but in our work lives and more broadly. We have real choice—the heart of freedom. Real voice and choice require a floor of security, enabling all to have opportunity.

So, what would economic democracy look like? Let us promote a national conversation on that question.

Too many Americans likely assume in a market economy we have no choice but to accept extreme inequality. Most probably don't know, for example, that from the 1940s to the 1970s, all income levels in America doubled their real family income, with the poorest gaining the most. Since then, income has raced to the top.⁶¹ In the early 1950s, corporations paid about a third of all taxes, and now it's down to less than 10 percent.

We can spread the word of lessons in our history, underscoring that there is nothing inevitable about today's misery.⁶²

Moreover, even amid today's economic unfairness, we can also see democratic principles showing up in some economic forms—for example, in accountable publicly or cooperatively owned services. Right now, publicly owned electric utilities serve about 50 million Americans, from Nashville to Seattle, and at a lower cost than investor-owned companies.⁶³ Electricity cooperatives provide energy for another 20 million American homes, businesses, farms and schools.⁶⁴

Plus, government could take “a majority stake in privately owned fossil fuel firms, winding down production along a science-based timeline and giving workers a dignified off-ramp into other well-paid work,” proposes Carla Skandier of the Democracy Collaborative.⁶⁵

These effective models enable participants to meet the deep human need for agency that I mentioned above.

But Are Human Beings Even Capable of Democracy?

As I make the case that democracy is our only pathway to meet the climate crisis, I still worry whether, given the state of our world, many could wonder whether humans come equipped for democracy.

In a word, yes. We're wired for its key requirements. And what are they? Our capacity for empathy, cooperation, and sensitivity to fairness seem like great places to start.

Empathy? Yep. It shows up early. By age 1 we begin to comfort those in distress.⁶⁶ In experiments, toddlers as young as 18 months almost universally act to help when they see an adult who needs it.⁶⁷

Cooperation? Our brain's reward system lights up when we cooperate in ways similar to what happens when we eat chocolate and experience other indulgences!⁶⁸ What great evidence that evolutionary selection has long rewarded this virtue. It helps us survive.

And fairness?

The eighteenth-century philosopher Adam Smith—often used to convince us that self-interest drives all—in fact wrote poignantly that we humans “love ourselves only as we love our neighbor,” and we are “in a peculiar manner tied, bound and obliged to the observation of justice.”⁶⁹

We humans are “in a peculiar manner tied, bound and obliged to the observation of justice.”

—Adam Smith, *The Theory of Moral Sentiments*, 1759

Even Capuchin monkeys are sensitive to fairness. Yes. In one experiment the monkeys happily accepted a snack of cucumbers as long as their nearby Capuchin buddies were getting the same. But on seeing a neighbor monkey offered grapes while they still got only cucumbers, some said, in effect, “Hell, no,” throwing their inferior treat right back at their caretaker.

They didn't just toss the cucumbers back; they went into a rage. Fairness runs deep through our genetic roots.⁷⁰

All right, so we come equipped with good stuff, but where's proof that we can put our empathy, cooperation, and sensitivity to fairness to work for democracy?

I'd argue that they show up every time any society steps up to hear all voices in creating fair rules governing the creation of wealth and opportunity. Here in America, from 1933 to 1938—even as elite groups resisted—President Roosevelt's administration, with wide public support, established Social Security, the right of workers to organize, and the setting of a minimum wage. A dramatic narrowing of inequality followed over the following three decades. Surely, our sense of fairness and empathy helped make all that possible.

Other evidence of our capacity for fairness?

Many countries have made significant progress in creating electoral systems much fairer than ours.⁷¹

The experience of Nordic countries speaks volumes about what's possible when we trust these positive human sensibilities: A century ago, Nordic countries were among Europe's most unequal. Then, citizen movements challenged a thousand years of oppression and built thriving political and economic democracies.⁷² Today, voter turnout in the region is 77 percent, way higher than in the US. In Norway, the ratio between what CEOs and workers earn is 16 to 1, while in the US that gap is 278 to 1.⁷³

Greater fairness seems to make us happy, too. Among the top ten happiest countries in the world, five are Nordic.⁷⁴

And beyond its correlation with happiness, economic equity—country comparisons show—also correlates with better outcomes across the board, from better physical and mental health to less crime.⁷⁵

Countries ranking high for electoral integrity, voter engagement, and more income equity also rank highest in happiness. Could this be evidence that democracy make us happy?

My takeaway? Not only do humans come equipped with key emotional requirements for democracy, but when we have the courage to act on those instincts, it really works.

Thus, above all, democracy requires the cultivation of courage—first and foremost, the courage to acknowledge what history proves: our huge liability ... our tendency to blame or “to other.” Thus, we have what it takes for democracy, but to reverse our downward slide and push ahead on democracy’s journey requires acknowledging that humans—*virtually all of us*—evolved with both positive as well as evil capacities.

Bottom line: We can’t blame “bad people,” for what shows up largely depends on the conditions we as a society together create. Do they bring forth the best or the worst in us?

Democracy’s Guideposts

History suggests that three such guideposts may be essential—that democracy is a journey away from three conditions now proven over humanity’s long social evolution to bring forth the worst in us, and moving toward their opposites.

Let’s take each in turn.

First: Democracy is a journey away from concentrated power and toward dispersed, inclusive power. We now know—from Hitler and Mao to Big Oil or Amazon—that tightly held power leads humans to justify narrow self-seeking ... and even atrocities. Thus, the journey of democracy is toward widely shared power, so no one is voiceless.

Current examples can serve as our lighthouses on the journey.

Maine and Connecticut have chosen to vastly cut the role of private wealth in elections. They offer candidates for state office the option of using public money to run their campaigns once they establish themselves as viable. (Arizona’s similar effort has, sadly, been hampered by an unfortunate Supreme Court decision.⁷⁶)

Democracy requires three ingredients shown to bring out our best: distributed power, transparency in public affairs, and a culture of “mutual accountability,” not blaming.

Seattle is another trailblazer. In 2015, the city passed a new approach to public financing that not only reduces candidate dependency on wealthy donors but engages citizens directly. The city introduced Democracy Vouchers in key city elections: Voters receive four \$25 vouchers they can donate to their preferred candidates.⁷⁷

Second: Democracy is a journey away from secrecy and toward transparency because humans too often don’t do as well when we know no one is watching. Case in point? Before the big

crash of 2008, Wall Street bankers pushing risky investments on the unsuspecting had a secret industry code, IBG YBG: “I’ll be gone. You’ll be gone.”⁷⁸ In other words, they knew they were operating free of public scrutiny and could get out—undetected—with their big bucks before the crash, leaving the rest of us to pick up the tab. And they did. The crash reduced the wealth of eight out of ten American households by almost 40 percent.⁷⁹ White median wealth dropped by one fifth, while for Blacks it dropped 61 percent.⁸⁰

So, democracy is a journey toward the opposite—transparency.

Example? In 2017, California passed the DISCLOSE ACT, so now residents at least know which deep pockets are paying for political ads.⁸¹

Here’s an amusing story about the power of transparency—or even a reminder of it. At a UK university, too many faculty were not paying for their “honor system” coffee. So a clever psychology professor hung a photo of human eyes looking down on the coffee station, and soon the professors were paying nearly three times as much for their coffee! ⁸² Even the thought of someone watching seems to make us behave better.

Third: Democracy is a journey away from today’s culture of blame and toward accepting the truth that, since we are all connected, we are all implicated.

For while our species has evolved democracy-enabling traits, we do have a tragic vulnerability. As noted, it is our tendency to blame, especially those we perceive as different. “Othering” shows up even in babies.⁸³ Yikes.

So, we’re easy prey for those who seek to use blame to divide us—using racism and fear other cultures.

The journey of democracy is therefore toward its opposite. That means actively creating cultures of mutual accountability. As Rabbi Abraham Joshua Heschel puts it, “Some are guilty, but all are responsible.”⁸⁴

Fortunately, we humans have also proven we can learn from experience.

We must acknowledge our weakness for “othering”; then we must create rules that help protect us against it, as we have done with legally enforceable civil rights laws and other forms of progress toward racial justice. In 2020 the brutal police murder of the unarmed Black man George Floyd is forcing a reckoning, as many whites begin to acknowledge how painfully unfinished is America’s struggle to end racism.

I have been moved in learning how German schools teach the tragic history of the Holocaust to their children. They refuse to let themselves forget: Germany also places plaques near former homes of many Jews killed, both to honor their lives and so that Germans will never forget this human vulnerability to target others.⁸⁵ Compensation for horrific harm from weakness of “othering” is needed, as well. Note that Germany paid reparations to victims of the Holocaust.

Of course, democracy demands constant vigilance—as today we’re experiencing eruptions of this deadly scapegoating rather than take responsibility for our roles in enabling systemic oppression.

Uniting for Democracy

In facing the climate and the democracy crisis, consider that part of our widespread feelings of powerlessness may in part reflect our lack of awareness of the widespread common ground and progress that our fellow Americans are making toward putting citizens in democracy's drivers' seat.

First, where is that common ground? We can fight the widespread, paralyzing perception that "We are a divided nation," as Trump tweeted in 2016, successfully fostering fear and more "othering."⁸⁶ We can challenge this false notion and instead celebrate how much we agree on.

Let's start with Americans' views of democracy itself.

Many of us, if not most, recognize its brokenness. One measure of our damaged democracy is international comparison. The Electoral Integrity Project uses teams of knowledgeable observers around the world to rank nations by the integrity of their elections. In its 2019 report, the United States ranked behind 55 countries.⁸⁷

More than two-thirds of Americans believe that large corporations and a few rich people wield excessive and unfair power in this country.⁸⁸ Fully 84 percent agree that "money has too much influence" on elections.⁸⁹ And, 78 percent of Americans, including 80 percent of Republicans, oppose the Supreme Court's Citizens United ruling.⁹⁰

And we agree there are solutions:

- ❖ On elections. A majority of those polled want either fundamental changes or a complete restructuring of the system for financing campaigns. Nearly eight in ten favor limits on both raising and spending money in Congressional campaigns.⁹¹
- ❖ On the economy. Polls taken in 2019 and 2020 show that seven in ten American adults agree that our economic system unfairly favors powerful interests. 84 percent favor paid family leave, and two-thirds support a \$15 federal minimum wage.⁹²
- ❖ On gun control. As of 2019, a majority of Americans—including 82 percent of Republicans and 93 percent of Democrats—favor closing gun-sale loopholes by enforcing background checks for private gun sales and at gun shows.⁹³
- ❖ On our federal tax system. Six in ten of us believe that upper-income Americans do not pay enough in taxes, while 82 percent are bothered—either "some" or "a lot"—that corporations are not paying their fair tax share.⁹⁴
- ❖ On energy and climate. Seventy-seven percent of Americans now believe the US should prioritize the development of renewable energy over expanding fossil fuel production.⁹⁵ In the 2020 presidential primary, Democratic voters for the first time ever listed climate change as a top-tier voting issue, if not the top-tier issue.⁹⁶

So we can bury the discouraging and false notion that we're hopelessly divided, and with confidence embrace our foundational task as citizens: building a citizens' "movement of movements" for democracy that does not quit until all voices are heard.

A Movement of Movements for Democracy

In what may be a historic first, Americans are coming together across “issue passions” to tackle core democracy “system reforms.” No, not wonky stuff ... it’s oh so real.

Americans who primarily identify with, say, the food, racial justice, labor, or environmental movements are joining forces on the “mother of all issues”—democracy itself. And, I believe, this citizens’ “movement of movements” is on the march toward precisely the three essentials of democracy and dignity defined above—dispersed power, transparency, and a culture of mutual accountability.

For me, personally, 2016 was the year of discovery.

I’d spent my adult life weaving between the food-and-hunger challenge and the underlying question of democracy, but in the fall of 2015 at the world’s first global conference on money in politics, I made a personal vow not only to write but to act more forcefully on behalf of democracy itself.

The next spring, that vow led me on a long march for big democracy reforms—from protection of voting rights to ending gerrymandering to removing the power of big money in public decision making. In Democracy Spring, about one hundred of us marched roughly 130 miles, starting at the Liberty Bell in Philadelphia and ending on the steps of the Capitol. There we joined with another collaborative action, Democracy Awakening; and ultimately, 1,400 of us were arrested in what was the biggest sit-in there in living memory.

For me, the inner shift was palpable.

For the first time—at least since I was an organizer in the 1960s’ War on Poverty—I knew I was part of something much bigger than myself. And, while walking, literally, in step with people I’d likely never have met otherwise—a former banker, a veteran, a teenager from California—our differences convinced me that belief in democracy comes from many life experiences. I felt less like an oddball. Less alone.

So how to make this movement unstoppable?

Well, I came to see that one can “fall in love” with democracy.

Yes, that claim could sound ridiculous. But for me, expressing myself with others and pushing forward fair rules within the rising Democracy Movement is exhilarating. And it is worthy of the word “love.”

Congressman and civil rights hero John Lewis died as we were working on this book. Enraptured by his funeral service and a new film about his life, I was struck over and over by Lewis’ talk of “love.” Love is what motivated him. I began absorbing the notion that democracy is for me an expression of “love of humankind”—because only democracy allows humans to flourish, and thus the rest of creation that is now in our hands.

The seed of that realization happened as I marched.

In the five years since, a new coalition—Democracy Initiative—has emerged, uniting more than 70 organizations and representing 45 million Americans. The democracy-reform, labor, environment, racial justice movements, and more, are all engaged. They are learning that it’s

possible to “love two children at once”—meaning, as a friend told me: We can stay true to an issue passion and at the same time pay critical attention, as needed, to furthering democracy.

And the rising Democracy Movement is achieving victories.

In the 2018 midterm election, and again in state and local elections in 2019, democracy was a big winner. In the 2018 mid-terms, seventeen states and cities and one county passed democracy reforms. Then, in 2019 “more states advance[d] more election reforms than at any time since the progressive era of the early 20th century,” declared George Pillsbury and Miles Rapoport in *The American Prospect*.⁹⁷

Spread the word!

A Democracy Movement Meeting Place

To enable all Americans to connect easily to fight for our democracy, the Democracy Initiative and our Small Planet Institute have teamed up to create an online meeting place: www.DemocracyMovement.US. There, you can quickly grasp the scope of this dynamic movement, seeing federal, state and local reforms. You can quickly jump to your own state to support democracy-reform campaigns—be they to further voting rights, money-out-of-politics, or an end to partisan gerrymandering. You’ll also find inspiring resources.

My experience has convinced me that with dramatic common action through the Climate Crisis Movement, the Racial Justice Movement, and the Democracy Movement, enough Americans can be moved to step up to tackle the problems at their intertwined roots before it is too late.

One City’s Lessons for Living Democracy

Throughout, we’ve emphasized how those most harmed by our anti-democratic political system and by the climate crisis are low-income Americans, and especially people of color. One compelling feature of the Green New Deal is that it builds from the awareness that in strategies which address climate and poverty simultaneously, we can work consciously to uproot our economy’s systemic racism.

Here is one story tying these threads together.

Few cities in America know the brutal damage of fossil fuel—both to health and to democracy—as acutely as Richmond, California.

Across the bay from San Francisco, the people of Richmond—63 percent of whom are people of color—had lived for more than a century under the heel of Standard Oil/Chevron, notorious for denying citizens a real voice by stacking the city council.⁹⁸ The health consequences have been deadly: “The population in closest proximity to the refinery,” reported *The Guardian* in 2019, “has disproportionately high rates of cardiovascular disease and cancer.” And “data from the California Environmental Protection Agency ranks every community bordering the Chevron in the 99th centile for asthma.”⁹⁹

But in 2004 things began to change.

In a local “movement of movements,” the Richmond Progressive Alliance—the RPA—drew together some local labor unions with immigrant-rights, police-accountability and environmental-justice activists, and by 2004 the Alliance was strong enough to win its first City Council seat. In 2014, after a massive Chevron fire and ten years of running its own slates for council seats, the RPA slate swept the election by winning all four open seats despite being outspent 20-to-1 by Chevron-supported opponents.¹⁰⁰

Community leader and former planning commission member Andres Soto told me that the Alliance has proven that “once you get people engaged in the governmental process and they start learning how things work, they will then see that there’s a role for them, and maybe they could be on the Planning Commission ... maybe they could run for City Council.”

Soto—whose grandparents immigrated from Mexico—is a working musician and grandfather of four who has seen and helped spur big, systemic change.

By crafting unity among diverse citizen interests, the Council lifted Richmond’s minimum wage to among the nation’s highest and enacted the first rent control measure in thirty years in California. Plus, to reduce the power of big money in elections, the city has passed public financing for races for Council seats.

Most recently, in 2020, the Richmond City Council adopted an ordinance to phase out shipping and handling of coal and petroleum coke at its port—currently endangering residents with harmful pollution.¹⁰¹

And when the COVID pandemic hit, still more evidence of Richmond’s resourcefulness became evident: Urban farmers associated with the social benefit organization Urban Tilth became a “saving grace,” the local news reported, upping their fresh-produce output six-fold with help from a USDA initiative called Farmers to Families.¹⁰²

“Frontline stories inform communities everywhere that there is hope,” said Soto, “when the community organizes itself to take control of the reins of power in its own backyard.” This is living democracy—able to confront both the climate crisis and equity crises.

And here’s a final story weaving together many elements of the unique possibilities of this historic time.

Courage & Human Connection: One Young Woman’s Story

Chloe Maxmin, 29, grew up on her parents’ farm in Nobleboro, a Maine town of about 1,600. Describing herself as an activist since age 12, she earned a degree at Harvard in 2015 while making time to co-found Divest Harvard, a campaign to push the university’s divestment from fossil fuels described in Chapter 2.

She loved her hometown and wanted to return, she told us.

So, hey, she thought, why not run for the state legislature?

In 2018, she entered the Democratic primary to represent District 88, and won with almost 80 percent of the vote. Then, taking on a local businessman and retired pilot, she won the seat—even though her district had never chosen a Democrat.

Given her youth, it's striking that Maxmin now represents a district where the share of the population over 65 greatly exceeds the national average.

And how did she win against all odds?

First, she can thank Maine's 1996 first-in-the-nation "Clean Elections" law mentioned above. It entitles candidates for the state legislature to receive public financing if they collect a certain number of small contributions from voters in their district. For a seat in Maine's House, that's sixty \$5 contributions. For the Senate, each contribution can't be more than \$75 and for governor, \$3,200. The candidate also must agree not to raise or spend any private money.¹⁰³

Maine's "Clean Elections" law levels the campaign-playing field, making running for office accessible to anyone regardless of income or background. It helps to hold candidates accountable to the voters, not to their funders.

While 14 states offer some kind of public campaign financing for some offices, aside from Maine only two other states, Connecticut and Arizona, offer full public funding for state legislative offices. (And, as noted, Arizona's program has been undermined by a 2011 Supreme Court decision.)¹⁰⁴

While Clean Elections helped to make Maxmin's campaign possible, her success also reflects her deep engagement with voters. "Whenever people ask me how we won, and how we did it, my answer, quite frankly, is 'just listen to people, pay attention.'" She stressed that "once you get through differing opinions on policy issues, below that ... we all share an incredibly deep frustration with our government."

She sees the state level as offering "opportunity to really rebuild our humanity and rebuild our faith in each other and politics."

One encounter with a man living in a trailer home at the end of a narrow dirt road seemed to capture her point. "He was surprised to see me," she said, as "I was the first political candidate to come to his door and listen." At the end of their talk, he told Maxmin, "You're the first person to listen to me. Everyone judges what my house looks like. They don't bother to knock. I'm grateful that you came. I'm going to vote for you. Thank you."

In all, her campaign team knocked on at least 10,000 doors ... and listened.

Once in office, Maxmin quickly moved on her commitment to helping her district by passing Green New Deal legislation.

"From the beginning, I was very clear in our messaging that my [Green New Deal] bill was by and for Maine, by and for my community, that it was specific and targeted legislation to lift up the voices of rural and working Maine. I called it the Green New Deal so everyone would pay attention to it and see it was a different way of talking about climate change.

Fortunately, five colleagues—including two Republicans—in the state's House and Senate shared Chloe's values enough to introduce their own complementary legislation. "We had to make up for eight years" of Republican governor and climate-change denier Paul LePage, she said. He had blocked every climate initiative.

Despite finding allies, it wasn't easy. When, after only six months in office, Maxmin stood at the chamber podium to introduce her Green New Deal for Maine Act, Republican colleagues immediately interrupted her, not once, but four times in quick succession.¹⁰⁵

Maxmin remained undeterred, and ultimately her Green New Deal bill passed the Maine House by a hefty margin: 84 to 55.¹⁰⁶ In all, seven green bills passed between February and June, 2019, including a state "renewable energy portfolio standard" and a goal of 80 percent renewable energy by 2030 and 100 percent by 2050. Maine also set the goal of reducing the state's greenhouse gas emissions by 80 percent by 2050.

With this success, Maine became the third state after California and New Mexico to pass a Green New Deal and commit to a carbon-reduction goal.

Maxmin is especially pleased that her bill was endorsed by a state AFL-CIO affiliate, the first such bill at the state level to receive labor's support. Why? Her bill specifically mandates that a share—beginning with 10 percent and rising to 25 percent by 2027—of jobs in major solar installations have to be filled by those in apprentice programs registered with the Department of Labor.

Maxmin's strong positions on climate and economic justice impress me; but what also makes her a leader for our time is her commitment to democracy itself. "Everything in our lives depends on our political system, and we need to figure out different ways of running campaigns with respect and dignity for everybody," she told the *Maine Times Record*.

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We release this book for feedback amid the COVID-19 pandemic, economic hardship, and an awakening to racism within our policing and far beyond, and following a shocking betrayal of democracy by citizens violently storming our Capitol.

Simultaneously, many Americans have come to see that the election of Donald Trump was not an aberration but grew in large part from anti-democracy rules and practices, which we know how to correct. So, *It's Not Too Late!* is dedicated to a simple proposition: We can't wait, and we don't have to wait. We have the public support and the tools to confront the climate crisis, and in the process, address our nation's deep systemic ills of economic inequity, racism, and a damaged democracy.

Our commitment to democracy, therefore, will ultimately determine whether life as we know it survives.

With a new administration in Washington, 2021 can be a new beginning, both for tackling both our climate and our democracy root crises. We hope our book can offer inspiration and evidence of workable initiatives that quickly can be taken to scale. Fortunately, millions of Americans—fed up with so-called democracy that answers to private power—are awakening to their own power, the power of citizens in action.

We thank you for reading our book and eagerly look forward to your suggestions about how to strengthen it for this historic moment.

# Into Action ]

So, we leave you with this final thought:

Of course, we know that it is too late to prevent massive losses, and accurately predicting the speed and magnitude of greater losses is not possible. We do know, however, that all the work chronicled in these pages by citizens and their elected bodies is the real work of democracy—work that is essential in building the trust and skills to address problems together.

How well we learn to do democracy will ultimately determine how we weather the rougher times ahead. Developing our capacities in the arts of democracy will determine whether we are entering an era of human growth fed by feelings of solidarity or an era of human brutality fired by deepening distrust. Our commitment to democracy, therefore, will ultimately determine whether life as we know it survives.

The only way, however, any of us can believe in the possibility that humanity will rise to this challenge is to jump in ourselves. In taking action for the America we want, we will also be discovering the power, meaning, and connection that is our birthright.

## And Now...Joining with Others in Courageous Action Before It Is Too Late

**350.Org** (<https://350.org>): Since 2008. “An international movement of ordinary people working to end the age of fossil fuels and build a world of community-led renewable energy for all.”<sup>1</sup> Has hundreds of local groups and regional hubs across the world.

**Recent Action:** In 2016 it turned out 30,000 people on 6 continents to 20 escalated actions with the call: “Keep it in the ground.”<sup>2</sup>

**Recent Victory:** In 2017 with First Nations partners, 350.org helped defeat Canada’s Energy East pipeline.<sup>3</sup>

**How to Take Action:** Get newsletter from <https://350.org/get-involved/>, Get training climate about the crisis and how to campaign effectively: <https://trainings.350.org/> Start or join a 350.org grassroots campaign: <https://campaigns.350.org/>

**Amnesty International** (<https://www.amnesty.org/en/>): Since 1961. “Amnesty International is a global movement of more than 7 million people who take injustice personally. We are campaigning for a world where human rights are enjoyed by all.”<sup>4</sup>

**Recent Action:** The organization released an in-depth report of legal violations and improper behavior by law enforcement against Black Lives Matter supporters during recent protests.<sup>5</sup>

**Recent Victory:** Through aiding lobbying and legal efforts, Amnesty International succeeded in securing the release of another political prisoner, this time an opposition leader in Guinea named Oumar Sylla.<sup>6</sup>

**How to Take Action:** Act now on current Amnesty International campaigns:  
<https://www.amnesty.org/en/get-involved/take-action/>

**BlueGreen Alliance** (<https://www.bluegreenalliance.org>): Since 2006. The BlueGreen Alliance “unites America’s largest labor unions and its most influential environmental organizations to solve today’s environmental challenges in ways that create and maintain quality jobs and build a stronger, fairer economy”.<sup>7</sup>

**Recent Action:** in late August, Alliance announced its first ever presidential endorsement—for Joe Biden. “Biden has put forward ambitious and achievable plans to tackle the pressing issues our nation faces—including the health and economic disaster caused by the coronavirus, climate emergency, and profound racial and economic inequalities,” Executive Director Jason Walsh wrote.<sup>8</sup>

**Recent Victory:** During the heightening Covid-19 pandemic BlueGreen Alliance launched an online tool to help “American workers understand their rights, give access to critical safety information, and anonymously report unsafe working conditions”.<sup>9</sup>

**How to Take Action:** Get information about to make your workplace safer, or get involved to help others <https://www.bluegreenalliance.org/take-action/>; join the alliance <https://www.bluegreenalliance.org/take-action/actions/join/>

**Center for Biological Diversity** (<https://www.biologicaldiversity.org>): Since 1989. CBD uses biological data, legal expertise, and the power of the Endangered Species Act to protect land and wildlife, “because diversity has intrinsic value, and because its loss impoverishes society, we work to secure a future for all species, great and small, hovering on the brink of extinction”.<sup>10</sup>

**Recent Action:** The Center for Biological Diversity, along with partnering organizations and Alaska Natives, sued the Trump administration in August for their plan to allow drilling in the Arctic National Wildlife Refuge, a massive 19 million-acre wilderness area.<sup>11</sup>

**Recent Victory:** In a lawsuit pushed by the CBD, “the 9th Circuit Court of Appeals on Wednesday upheld a 2018 federal ruling that the Trump administration violated the Endangered Species Act” in removing protections for grizzly bears.<sup>12</sup>

**How to Take Action:** Sign up to volunteer!  
<https://www.biologicaldiversity.org/action/forms/volunteer/application>; find nearby events <https://map.biologicaldiversity.org>



**Ceres** (<https://www.ceres.org>): Since 1989. Founded in response to the Exxon Valdez spill, “Ceres is a sustainability nonprofit organization working with the most influential investors and companies to build leadership and drive solutions throughout the economy.”<sup>13</sup>

**Recent Action:** This summer, “the Ceres Accelerator for Sustainable Capital Markets issued a report, Addressing Climate Change as a Systemic Financial Risk: A Call to Action for U.S. Regulators, recommending more than 50 specific actions financial regulators should take to incorporate climate change across their mandates”.<sup>14</sup>

**Recent Victory:** Ceres works with major companies to produce the financial case for climate action. This year the organization led “the largest-ever business-led advocacy day for climate action in which 330 business representatives met with more than 80 congressional offices”.<sup>15</sup>

**How to Take Action:** Get involved in Ceres’ investor and company networks <https://www.ceres.org/get-involved>, attend a Ceres event <https://www.ceres.org/events>

**Citizen’s Climate Lobby** (<https://citizensclimatelobby.org/>): Since 2007. CCL builds relationships with community leaders and with policymakers focused on what experts say is a crucial policy to reduce carbon emissions: a carbon price.”<sup>16</sup>

**Recent Action:** In 2020, generated 18,620 calls to congressional offices, 26,326 personal letters, and held 833 virtual lobby meetings during our June and December lobbying efforts.<sup>17</sup>

**Recent Victory:** Built support for the bipartisan Energy Innovation and Carbon Dividend Act in the 116th Congress, helping grow the cosponsor list to 86 representatives.<sup>18</sup>

**How to Take Action:** find your local chapter <https://citizensclimatelobby.org/about-ccl/chapters/>; attend a climate advocate training <https://citizensclimatelobby.org/climate-advocate-training/>; contact congress <https://citizensclimatelobby.org/call-your-representative-about-the-energy-innovation-and-carbon-dividend-act/#/54/>

**Corporate Accountability International** (<https://www.corporateaccountability.org/>): Since 1977. CAI is “committed to changing the fundamental imbalance of power in our society by holding transnational corporations accountable for creating and perpetuating systemic inequality and economic injustice”.<sup>19</sup>

**Recent Action:** Representatives of Corporate Accountability and allies showed up at Coca-Cola and PepsiCo’s virtual shareholder meetings and called out the companies’ labor, human rights, and environmental abuses.<sup>20</sup>

**Recent Victory:** When local groups reached out to CAI to help prevent Providence’s water from being privatized, they “provided strategic...shared advice on running site fights, and

translated canvassing documents into Spanish to ensure that more Providence residents were informed”, an effort instrumental in the privation plan’s rejection<sup>21</sup>.

**How to Take Action:** Join CAI to organize against transnational corporate overreach, <https://www.corporateaccountability.org/get-involved/>, to sign up for other opportunities: <https://www.corporateaccountability.org/turning-point-join-corporate-accountability-action-league/>

**Data for Progress** (<https://www.dataforprogress.org>): Since 2018. Data for Progress is a “multidisciplinary group of experts using state-of-the-art techniques in data science to support progressive activists and causes”. Their output includes polling on progressive policy, voter profile analysis, message guidance and more.<sup>22</sup>

**Recent Action:** DFP has recently collaborated with partners inside and outside of government to push for the new Democratic trifecta's policy agenda to be as progressive as possible. On its blog, DFP regularly runs pieces by leaders in the government and advocacy sphere making the case for progressive policy, such as Senate Majority Leader Chuck Schumer, Senator Elizabeth Warren, and Senator Bernie Sanders.<sup>23</sup> In the summer of 2020, DFP collaborated with the Movement For Black Lives on a groundbreaking memo outlining Black Americans' call for the government to divest from policing and invest in communities instead.<sup>24</sup>

**Recent Victory:** DFP's advocacy and polling, led by Vice President of Policy and Strategy Julian Brave NoiseCat, was integral to the progressive movement's successful push for President Biden to nominate Congresswoman Deb Haaland for Interior Secretary, and for her to be successfully confirmed by the Senate on a bipartisan basis.<sup>25</sup>

**How to Take Action:** Read DFP's blogs at [www.dataforprogress.org/blog](http://www.dataforprogress.org/blog) and their policy memos at [www.dataforprogress.org/memos](http://www.dataforprogress.org/memos), and follow them on Twitter @DataProgress.

**Democracy Initiative** (<http://www.democracyinitiative.org>): Since 2012. DI works to coordinate messaging and campaigns between 72 environmental, labor, civil rights, and progressive organizations, with a combined 45 million total members, to fix problems with democracy. They are “United by a shared vision for a political process that counts every voice and every vote equally”.<sup>26</sup>

**Recent Action:** DI has been spearheading the campaign to pass Proposal 3 in Michigan, which would automatically register all citizens to vote and not require an excuse for requesting an absentee ballot.<sup>27</sup>

**Recent Victory:** Democracy Initiative helped win over the support of the majority of the D.C. City Council for passing legislation offering limited public matching funds for qualified candidates.<sup>28</sup>

**How to Take Action:** Sign up for a Democracy Initiative campaign here: <http://www.democracyinitiative.org/take-action>

**Dēmos (<https://www.demos.org>):** Since 2000. Dēmos is “a dynamic think-and-do tank that powers the movement for a just, inclusive, multiracial democracy. Through cutting-edge policy research, inspiring litigation, and deep relationships with grassroots organizations, Dēmos champions solutions that will create a democracy and economy rooted in racial equity”<sup>29</sup>

**Recent Action:** Dēmos released a policy brief proposing “a set of actions the executive branch can take to equitably address the climate crisis without new legislation, major new appropriations, or other Congressional authority”.<sup>30</sup>

**Recent Victory:** During the 2020 primaries, Dēmos sued Florida governor DeSantis to provide voters with safe alternatives to casting a ballot at their polling place on Election Day. Although the U.S. District Court for the Northern District of Florida denied to immediately alter the election, the ruling suggests that future elections could be remedied through the lawsuit.<sup>31</sup>

**How to Take Action:** See current projects and petitions here at <https://www.demos.org/ways-support-demos>, sign up to see volunteer opportunities: <https://www.demos.org/join-our-email-list>

**Environmental Voter Project (<https://www.environmentalvoter.org>):** Since 2015. “The Environmental Voter Project aims to significantly increase voter demand for environmental leadership by identifying inactive environmentalists and then turning them into consistent activists and voters.”<sup>32</sup>

**Recent Action:** EVP is hoping to bring out 5 million new voters for the 2020 election cycle, and to establish a large environmental voter block. Included in this 5 million, the organization is “targeting 2 million environment-first voters who’ve never voted in a single election before”.<sup>33</sup>

**Recent Victory:** In the 2018 midterms the Environmental Voter Project “persuaded 58,961 eco-conscious voters in six states — Colorado, Florida, Georgia, Massachusetts, Nevada and Pennsylvania — to cast ballots for the first-time last year”.<sup>34</sup>

**How to Take Action:** Sign up to volunteer <https://www.environmentalvoter.org/get-involved>, or attend an event or training <https://www.environmentalvoter.org/events>

**Extinction Rebellion (<https://rebellion.earth/>):** “Extinction Rebellion is an international movement that uses non-violent civil disobedience in an attempt to halt mass extinction and minimize the risk of social collapse.”<sup>35</sup>

**Recent Action:** In 2020, “Climate activists placed more than 2,000 pairs of children’s shoes in neat rows across London’s Trafalgar Square on Monday to demand the British government stop bailing out carbon-intensive industries that pollute the environment.”<sup>36</sup>

**Recent Victory:** “Extinction Rebellion are calling on the government to act on the climate crisis during the coronavirus recovery so children and young people aren’t left to suffer a deeper crisis,” the group said.<sup>37</sup>

**How to Get Involved:** Join a local chapter: <https://extinctionrebellion.us/local-chapters>;  
Find an action event occurring soon near you, including ‘shoe protests’ and open houses: <https://extinctionrebellion.us/upcoming-actions>

**Food and Water Watch (<https://www.foodandwaterwatch.org>):** Since 2005, FWW “mobilizes regular people to build political power to move bold & uncompromised solutions to the most pressing food, water, and climate problems of our time. We work to protect people’s health, communities, and democracy from the growing destructive power of the most powerful economic interests”.<sup>38</sup>

**Recent Action:** FWW helped spur outcry about Former Michigan Governor Rick Snyder’s upcoming fellowship at Harvard.<sup>39</sup> It has been reported that Snyder lied about, and tried to cover up, Flint’s water crisis. Snyder later withdrew himself from the fellowship offer.

**Recent Victory:** After years of grassroots campaigning for local bans of hydraulic fracturing, which has been successful in nearly 60 cities and towns, FWW finally won a statewide victory, with Connecticut’s resolution to ban fracking statewide.<sup>40</sup>

**How to Take Action:** Get involved <https://www.foodandwaterwatch.org/about/get-active-where-you-live>; learn how your family and friends can live responsibly <https://www.foodandwaterwatch.org/live-healthy>

**Friends of the Earth (<https://foe.org/>):** “Together we speak truth to power and expose those who endanger the health of people and the planet for corporate profit. We organize to build long-term political power and campaign to change the rules of our economic and political systems that create injustice and destroy nature.”<sup>41</sup>

**Recent Action:** “Since 2016, Friends of the Earth’s members have submitted roughly 35,000 public comments in support of turning Puget Sounds into a NDZ, advocating for clean water and public health.”<sup>42</sup>

**Recent Victory:** “More than 156,000 Friends of the Earth activists spoke out to Congress” and helped stop the Atlantic Coast Pipeline.<sup>43</sup>

**How to Get Involved:** Show your support by signing petitions <https://foe.org/take-action/>; find ways to donate to the organization <https://foe.org/other-ways-to-give/>

**Greenpeace (<https://www.greenpeace.org/usa/>):** “Greenpeace is a global, independent campaigning organization that uses peaceful protest and creative communication to expose global

environmental problems and promote solutions that are essential to a green and peaceful future.”<sup>44</sup>

**Recent Action:** Greenpeace embarked upon a campaign to defend Brazilian coral reefs from drilling by French company Total. They succeeded.<sup>45</sup>

**Recent Victory:** Greenpeace helps convince Trader Joes to cut down on single-use plastic use.<sup>46</sup>

**How to Get Involved:** Greenpeace engages in various campaigns and events where one can participate based upon how much free time they have to contribute

<https://www.greenpeace.org/usa/volunteer-platform/>; find an event to join

<https://www.greenpeace.org/usa/volunteer-call-calendar/>

**Indigenous Environmental Network (<https://www.ienearth.org>):** Since 1990. “IEN was formed by grassroots Indigenous peoples and individuals to address environmental and economic justice issues (EJ). IEN’s activities include building the capacity of Indigenous communities and tribal governments to develop mechanisms to protect our sacred sites, land, water, air, natural resources, and the health of our people and all living things”.<sup>47</sup>

**Recent Action:** Along with partners, IEN developed a fundraising and mask donation effort that “has collected and organized the donation of 38,000 masks to Indigenous communities and aims to secure \$200,000 in funding to enable the donation of tens of thousands of additional masks”.<sup>48</sup>

**Recent Victory:** In July, 400 protestors blocked the entrance to Fort Sill military post in Lawton, O.K, which served also as a detention center for immigrants being held by the Trump administration. Less than a week later it was announced the center would no longer serve this purpose.<sup>49</sup>

**How to Take Action:** Learn more and support their work <https://www.ienearth.org>

**Indivisible (<https://indivisible.org>):** Since 2016. Beginning with the publication of a widely shared google doc on how to resist Donald Trump’s administration, Indivisible skyrocketed into a fully-fledged organization with thousands of local chapters within weeks<sup>50</sup>. Indivisible hopes to “build a democracy that reflects a broad, multiracial ‘we the people,’ one that works for all of us and is sustained by all of us”.<sup>51</sup>

**Recent Action:** Indivisible “recently paired up with Stand Up America and [28+] other progressive organizations to form Protect the Results, which will strive to get millions of people into the streets in the case of a disputed outcome”.<sup>52</sup>

**Recent Victory:** Indivisible Action released a plan to conduct 20 million voter contact attempts through “recruiting and mobilizing 30,000 individual volunteers and supporting over 3,000 group-led virtual electoral events across the country”. Indivisible’s outreach was

crucial for 2018's "Blue Wave" of incoming democrats, and they are now planning to quadruple their outreach efforts.<sup>53</sup>

**How to Take Action:** Get involved in canvassing, phone-banking, and text-banking, <https://indivisible.org/group-leader-resources>; find a local group or event <https://indivisible.org/events>

**League of Conservation Voters (<https://www.lcv.org>):** Since 1970. LCV "advocates for sound environmental laws and policies, holds elected officials accountable for their votes and actions, and elects pro-environment candidates," they also maintain the National Environmental Scorecard<sup>54</sup>, "the gold standard for the public to evaluate the environmental records of members of Congress".<sup>55</sup>

**Recent Action:** "LCV Victory Fund and affiliated entities invested a historic more than \$115 million to help elect pro-environment leaders in the 2019/2020 election cycle."<sup>56</sup>

**Recent Victory:** Chispa, LCV's Latino Organizing Program, campaign successfully pressured state and local officials to transition polluting diesel school buses to zero-emission, electric models in AZ, CA, MD, NV, and NY through its Clean Buses for Healthy Niños campaign.<sup>57</sup>

**How to Take Action:** See current projects and petitions here at <https://www.lcv.org/take-action/>, sign up to see volunteer opportunities: <https://p2a.co/kJAR5bX?p2asource=C4ORWBVOLU01>

**League of Women Voters (<https://www.lwv.org>):** Since 1920. "The League of Women Voters of the United States encourages informed and active participation in government, works to increase understanding of major public policy issues, and influences public policy through education and advocacy."<sup>58</sup>

**Recent Action:** LWV has announced a five-tiered campaign for achieving fair redistricting across the country, which includes passing ballot initiatives, lobbying and protesting state legislatures, as well as engaging with the public.<sup>59</sup>

**Recent Victory:** The organization recently launched a Spanish-language version of their website, Vote411, which includes absentee ballot information, polling place locations, and factual data on candidates.<sup>60</sup>

**How to Take Action:** Join your local league <https://www.lwv.org/about-us/membership-local-leagues>; visit their action page: [https://www.lwv.org/take-action? ga=2.112449476.1331788088.1599578559-1820519643.1599578559](https://www.lwv.org/take-action?ga=2.112449476.1331788088.1599578559-1820519643.1599578559)

**March for Our Lives (<https://marchforourlives.com>):** Since 2018. MFOL was founded by student activists in the aftermath of the Marjory Stoneman Douglas School shooting to rapidly change gun control laws. The activists quickly organized a march of between 1.2 to 2 million and have continued

to “harness the power of young people to fight for sensible gun violence prevention policies that save lives”.<sup>61</sup>

**Recent Action:** The documentary “Us Kids”, directed by Kim A. Snyder, which premiered at Sundance in 2020, follows “the March for Our Lives revolution as it stormed the country in the summer of 2018”. The documentary will be released across other platforms later this year.<sup>62</sup>

**Recent Victory:** In 2018 MFOL submitted a letter to the New York Attorney General highlighting corruption at the NRA; in August 2020 the AG filed a lawsuit calling for the dissolution of the NRA.<sup>63</sup>

**How to Take Action:** Join a local chapter <https://marchforourlives.com/chapters/>; take part in their campaign to register new voters <https://marchforourlives.com/host-your-own-voter-registration-toolkits/>

**MoveOn (<https://front.moveon.org>):** Since 1998, MoveOn was a pioneer in internet activism and created the first breakout digital intervention in American politics with their petition on the Clinton Impeachment. Today, “members are building progressive power through advocacy and elections and have been on the front lines of resistance to Trump and the GOP’s toxic agenda”.<sup>64</sup>

**Recent Action:** For the 2020 election, MoveOn members, “who live in each of the country’s 3,000+ counties, will...contact voters in key battleground states, drive creative and cultural interventions that inspire voter turnout, and work to protect the right to vote for those targeted by digital voter suppression online”.<sup>65</sup>

**Recent Victory:** When the Trump administration unlawfully declared a “national emergency” to use government funds for border wall construction, MoveOn “launched a major national mobilization opposing the #TrumpFakeEmergency and more than 50,000 of us marched for immigrants and refugees”<sup>66</sup>.

**How to Take Action:** Join a texting outreach or mobilizer team here at <https://front.moveon.org/volunteer-with-moveon/>, to sign up for other opportunities: <https://front.moveon.org/#join>

**Nature Conservancy (<https://www.nature.org/en-us/>):** Since 1951. “Our mission is to conserve the lands and waters on which all life depends. Our vision is a world where the diversity of life thrives, and people act to conserve nature for its own sake and its ability to fulfill our needs and enrich our lives.”<sup>67</sup>

**Recent Action:** The Nature Conservancy is currently working with McDonalds and Cargill to reduce greenhouse gases emitted from beef suppliers in Nebraska, which “could sequester 150,000 metric tons of carbon dioxide over the course of the project, or the equivalent to removing 32,000 cars from the road during the year”.<sup>68</sup>



**Recent Victory:** The Nature Conservancy is working with partner organizations and sports teams to “offset at least 50 percent of the carbon footprint associated with professional sports team travel by 2025”; they recently added the Milwaukee Brewers as a new partner.<sup>69</sup>

**How to Take Action:** Become a member of the Nature Conservancy

<https://www.nature.org/en-us/membership-and-giving/donate-to-our-mission/become-a-member/>;

Or find a local volunteer program <https://www.nature.org/en-us/get-involved/how-to-help/volunteer-and-attend-events/>

**Our Revolution** (<https://www.ourrevolution.com>): Since 2016. Founded by Bernie Sanders, Our Revolution is “building a national grassroots movement of local groups powerful enough to win progressive issue fights, elect progressive champions, transform the Democratic Party, and get big money out of politics”.<sup>70</sup>

**Recent Action:** Our Revolution has worked extensively to reform DNC operations and rules; Over 300 party activists helped pressure the DNC Rules & Bylaws Committee to “extend key party reforms — including limiting the power of Superdelegates in picking the nominee—to 2024”.<sup>71</sup>

**Recent Victory:** “Our Revolution Minnesota mobilized to help Squad member Ilhan Omar beat back an establishment challenger and proved that progressive power in Congress is here to stay! At the state level, we also helped political newcomers Omar Fateh and Jen McEwen claim victory against two incumbent state senators”.

**How to Take Action:** Find your local chapter <https://www.mobilize.us/ourrevolution/>; donate <https://secure.actblue.com/contribute/page/ourrevolution?refcode=main-nav-upper&amount=27.00>

**Public Citizen** (<https://www.citizen.org>): Since 1971. Public Citizen “is a nonprofit consumer advocacy organization that champions the public interest in the halls of power. We defend democracy, resist corporate power and work to ensure that government works for the people – not for big corporations”<sup>72</sup>

**Recent Action:** to prevent election tampering, the organization filed a lawsuit arguing “that recent changes by USPS were implemented in violation of federal law and have led to widespread disruptions in mail delivery that risk delaying the delivery of mail-in ballots”<sup>73</sup>

**Recent Victory:** Public Citizen lobbied successfully to prevent a roll-back of the revolving-door policies banning recently retired Pentagon officials from working as lobbyists and “us[ing] their connections to appeal to their former colleagues on behalf of their new corporate employers”.<sup>74</sup>

**How to Take Action:** See current projects and petitions here at <https://www.citizen.org/act/>, sign up to see volunteer opportunities: <https://publiccitizen.salsalabs.org/takeactionwithpc/index.html>

**Run for Something (<https://runforsomething.net>):** Since 2017. RFS nominates and provides a “safety net for new and exciting progressive candidates — at all stages of their journey — to help them run efficient, grassroots & voter-contact driven campaigns and not feel alone in the process”.<sup>75</sup>

**Recent Action:** “In March 2020 and through the rest of the year, the RFS team has built out a new system of support for candidates in the wake of COVID-19. This includes more intense one-on-one support from our regional team on methods and tactics candidates can utilize to make sure they are on the ballot, that they have the funding they need, and that they are able to mobilize supporters from home”.<sup>76</sup>

**Recent Victory:** “In barely four years, 75,000 young diverse progressives have told us they want to run for office. We have already elected nearly 500 of them to local office in 45 states”.<sup>77</sup>

**How to Take Action:** Nominate a friend or run for office yourself, <https://runforsomething.net/run/>; sign-up to help others run: <https://runforsomething.net/help/>

**Sierra Club (<https://www.sierraclub.org/>):** “The Sierra Club is the most enduring and influential grassroots environmental organization in the United States. We amplify the power of our 3.8 million members and supporters to defend everyone’s right to a healthy world”.<sup>78</sup>

**Recent Action:** (2013) The Sierra Club has worked diligently to contribute to the retiring of 150 coal-fired power plants and have campaigned extensively to prevent the construction of further coal plants. This campaign has been fueled by participants reaching out to decision-makers and creating awareness on social media.<sup>79</sup>

**Recent Victory:** (2017) “Membership and support surged with the election of Donald Trump. The Sierra Club helped organize the Peoples Climate March, which is attended by hundreds of thousands.”<sup>80</sup>

**How to Get Involved:** Join an ongoing campaign <https://www.sierraclub.org/take-action> ; find more ways to [volunteer https://www.sierraclub.org/volunteer](https://www.sierraclub.org/volunteer)

**Sunrise Movement (<https://www.sunrisemovement.org>):** Since 2017. “Sunrise is...building an army of young people to make climate change an urgent priority across America, end the corrupting influence of fossil fuels, and elect leaders who stand up for the health and wellbeing of all people.”<sup>81</sup>

**Recent Action:** In 2020, “150 middle and high school students from almost all 50 states held a teach-in at the U.S. Capitol to demand Senators back the Green New Deal. 20 teens, one as young as 13, were arrested” <sup>82</sup>

**Recent Victory:** Sunrise just launched an online ‘School’ with courses on “everything from the intricacies of the landmark policy proposal to graphic design for activists during the pandemic.” <sup>83</sup>

**How to Take Action:** Find a local hub, where you can find ways to participate and elevate the issues of climate change: <https://www.sunrisemovement.org/hubs> or join the Sunrise School: <https://www.sunrisemovement.org/sunrise-school>

# About the Author



Photo: [Michael Piazza](#)

Frances Moore Lappé is the author or co-author of 20 books about world hunger, living democracy, and the environment, beginning with the three-million copy *Diet for a Small Planet* in 1971 (the 50<sup>th</sup> Anniversary Edition is scheduled for release fall 2021). Her most recent book is *Daring Democracy: Igniting Power, Meaning, and Connection for the America We Want*, co-authored with Adam Eichen in 2017. *The New York Times Magazine* featured her work in an article entitled: “She Changed The Way We Eat. She Wants To Fix Our Democracy, Too.”

About *Daring Democracy*, Booklist (the American Library Association's book review magazine) writes, “Countering what they call a well-entrenched ‘Anti-Democracy Movement,’ the authors offer numerous solutions for its antithesis, a democracy-proud confluence of grassroots efforts... With specific plans of action and encouraging words of support, Lappé and Eichen extend concrete hope to those who feel politically helpless.”

Other recent works include *World Hunger: 10 Myths* and *EcoMind*. The Smithsonian's National Museum of American History describes *Diet for a Small Planet* as “one of the most influential political tracts of the times.” In 2008, it was selected as one of 75 Books by Women Whose Words Have Changed the World by members of the Women's National Book Association. Frances was also named by *Gourmet Magazine* as one of 25 people (including Thomas Jefferson, Upton Sinclair, and Julia Child) whose work has changed the way America eats. Her books have been translated into 15 languages and are used widely in university courses.

Frances makes frequent media appearances. Most notably she has been featured on the Today Show, Hardball with Chris Matthews, Fox News' Fox & Friends, WSJ.com, The Canadian Broadcasting Corporation's 'The National,' Frost Over the World, NPR, and the BBC, among other news outlets. Frances appears frequently as a public speaker and is a contributor to Medium and Common Dreams. She is also a contributing editor at *Yes! Magazine* and *Solutions Journal*. Articles featuring or written by Frances have also appeared in *O: The Oprah Magazine*, *Harper's*, *The New York Times*, *The Boston Globe*, *The Nation*, *People*, and more.

Frances is the cofounder of organizations, including Oakland based think tank [Food First](#) and, more recently, the Small Planet Institute which she leads with her daughter Anna Lappé. Frances and her daughter have also cofounded the Small Planet Fund, which channels resources to democratic social movements worldwide.

# We Need Your Feedback! ]

We are delighted you've chosen to read our book. We are eager for your input to make it stronger as well as your advice for sharing this edition ever-more widely.

Despair is humanity's worst enemy, I believe, so we—the whole Small Planet team—have created an easy-to-digest tour of inspiring ways that US cities, states, and farms are stepping up to meet the climate crisis. Plus we explore key lessons from abroad. Knowing that hope has power—as it organizes our minds toward solutions—we focus on surprising, motivating actions already underway in both red and blue states, and often in bipartisan collaboration.

We prepared this initial, online-only edition of *It's Not Too Late!*—for your review—during the height of the COVID-19 pandemic. Our goal has been to make it easy for readers to weigh in to make it stronger. In the next few months, we will then incorporate all your feedback and choose how best to publish the result.

Our goal is to inspire determination to take these solutions, and more, to scale. Very simply, learning that so much more is happening than we'd known has fired us up, and we sure hope it will motivate you!

Plus, the moment is right. With a new administration in Washington committed to climate action, we hope all our readers will use these stories to push forward the most effective Green New Deal possible. It is not too late to prevent the worst, but every day we delay makes it harder.

Please follow [THIS LINK](#) to submit your feedback about the book. Or copy & paste this link into your browser: <https://forms.gle/TFJSsfChtVRdZ5729>

Thank you for your time, energy and feedback!

Onward,

Frances Moore Lappé and the Small Planet Team

## Introduction

1 “National Poll Toplines” (Climate Nexus, Yale Program on Climate Change Communication, George Mason University Center for Climate Change Communication, June 6, 2020), 10, <https://climatenexus.org/wp-content/uploads/2015/09/Climate-Nexus-National-Poll-Toplines-Climate-Change-Voter-Opinions-in-2020.pdf>.

2 Sean McElwee, Julian NoiseCat, and John Ray, “The Coronavirus Pandemic Has Made Voters More Supportive of the Green New Deal,” Data for Progress (blog), May 5, 2020, <https://www.dataforprogress.org/blog/5/5/coronavirus-makes-voters-support-gnd>.

3 “Environmental Protection Rises on the Public’s Policy Agenda As Economic Concerns Recede,” Pew Research Center - U.S. Politics & Policy, February 13, 2020, <https://www.pewresearch.org/politics/2020/02/13/as-economic-concerns-recede-environmental-protection-rises-on-the-publics-policy-agenda/>.

4 Jurriaan M. de Vos et al., “Estimating the Normal Background Rate of Species Extinction,” *Conservation Biology: The Journal of the Society for Conservation Biology* 29, no. 2 (April 29, 2015): 452–62, <https://doi.org/10.1111/cobi.12380>.

5 V. Masson-Delmotte et al., “Global Warming of 1.5°C. An IPCC Special Report on the Impacts of Global Warming of 1.5°C above Pre-Industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty,” Summary for Policymakers (Geneva, Switzerland: World Meteorological Organization, 2018), 11, <https://www.ipcc.ch/sr15/chapter/spm/>.

6 Bob Berwyn, “Global Ice Loss on Pace to Drive Worst-Case Sea Level Rise,” *Inside Climate News*, January 25, 2021, <https://insideclimatenews.org/news/25012021/global-ice-loss-sea-level-rise/>.

7 Isabelle Khurshudyan, Andrew Freedman, and Brady Dennis, “Rapid Arctic Meltdown in Siberia Alarms Scientists,” *Washington Post*, March 7, 2020, [https://www.washingtonpost.com/climate-environment/rapid-arctic-meltdown-in-siberia-alarms-scientists/2020/07/03/4c1bd6a6-bbaa-11ea-bdaf-a129f921026f\\_story.html](https://www.washingtonpost.com/climate-environment/rapid-arctic-meltdown-in-siberia-alarms-scientists/2020/07/03/4c1bd6a6-bbaa-11ea-bdaf-a129f921026f_story.html).

8 Robert Reich, *Supercapitalism: The Transformation of Business, Democracy, and Everyday Life* (New York: Vintage Books, 2008).

9 “A History of Climate Activities,” World Meteorological Organization, November 12, 2015, <https://public.wmo.int/en/bulletin/history-climate-activities>.

10 Melissa Denchak, “Paris Climate Agreement: Everything You Need to Know,” National Resources Defense Council, December 12, 2018, <https://www.nrdc.org/stories/paris-climate-agreement-everything-you-need-know#sec-what-is>

---

11 “Paris Agreement” (United Nations Treaty Collection, 2015), 3, [https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg\\_no=XXVII-7-d&chapter=27&clang=\\_en](https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en).

12 Ibid.

13 Alessandra Mazzai, “After the UN Climate Action Summit, We Still Have a Long Way to Go,” Foresight, September 27, 2019, <https://www.climateforesight.eu/global-policy/after-the-un-climate-action-summit-we-still-have-a-long-way-to-go/>.

14 “Paris Agreement: Sustainable Development Knowledge Platform,” UN Sustainable Development, accessed December 16, 2020, <https://sustainabledevelopment.un.org/frameworks/parisagreement>.

15 Juliane Berger and John Christensen, “Emissions Gap Report 2019” (UN Environment Programme, September 2019), pp. xiii & 27, <https://wedocs.unep.org/bitstream/handle/20.500.11822/30797/EGR2019.pdf>.

16 Emma Newburger, “Covid Pandemic Drove a Record Drop in Global Carbon Emissions in 2020,” CNBC, December 11, 2020, <https://www.cnbc.com/2020/12/11/covid-record-drop-global-carbon-emissions-2020.html>.

17 Bob Berwyn, “Climate Tipping Points Are Closer Than We Think, Scientists Warn,” Inside Climate News, November 27, 2019, <https://insideclimatenews.org/news/27112019/climate-tipping-points-permafrost-forests-ice-antarctica-greenland-amazon-nature/>.

18 Timothy Lenton, “Climate Tipping Points — Too Risky to Bet Against,” Nature 575 (November 27, 2019): 592-595, <https://www.nature.com/articles/d41586-019-03595-0>.

19 Shaun Cox and Gabriel Zucman, “Study: Income of Top 1% Has Grown 100 Times Faster Than Bottom 50% Since 1970,” Money & Markets, December 31, 2019, <https://moneyandmarkets.com/wealth-inequality-since-1970/>.

20 Noah Kirsch, “The 3 Richest Americans Hold More Wealth Than Bottom 50% Of The Country, Study Finds,” Forbes, September 11, 2017, <https://www.forbes.com/sites/noahkirsch/2017/11/09/the-3-richest-americans-hold-more-wealth-than-bottom-50-of-country-study-finds/#266e8af13cf8>.

21 Gabriel Zucman and Saez Emmanuel, *The Triumph of Injustice: How the Rich Dodge Taxes and How to Make Them Pay* (WW Norton & Co, 2019), 5.

22 Karin Kirk, “Fossil Fuel Political Giving Outdistances Renewables 13 to One,” Yale Climate Connections, June 1, 2020, <https://yaleclimateconnections.org/2020/01/fossil-fuel-political-giving-outdistances-renewables-13-to-one/>.

23 “Public Trust in Government: 1958-2019,” Pew Research Center - U.S. Politics & Policy, November 4, 2019, <https://www.pewresearch.org/politics/2019/04/11/public-trust-in-government-1958-2019/>.

24 Alexander Burns, “Seeking: Big Democratic Ideas That Make Everything Better,” New York Times, May 17, 2020, <https://www.nytimes.com/2020/05/17/us/politics/joe-biden-economy-democrats.html>; “Plan for Climate Change and Environmental Justice: Joe Biden,” Joe Biden for President: Official Campaign Website, accessed February 17, 2021, <https://joebiden.com/climate-plan/>; Marianne Lavelle et al., “‘We Need to Be Bold,’ Biden Says, Taking the First Steps in a Major Shift in Climate Policy,” Inside Climate News, January 28,



---

2021, <https://insideclimatenews.org/news/28012021/biden-climate-policy-steps/>; Christopher Hickey et al., “Here Are the Executive Actions Biden Has Signed so Far,” CNN, February 11, 2021, <https://www.cnn.com/interactive/2021/politics/biden-executive-orders/>.

25 Kate Sullivan, “John Kerry: Biden Prioritizes Climate Crisis by Naming Special Envoy,” CNN Politics, November 24, 2020, <https://www.cnn.com/2020/11/23/politics/john-kerry-biden-climate-envoy/index.html>.

26 “Profits for Oil, Gas & Coal Companies Operating in the U.S. and Canada - Oil Change International,” Oil Change International, May 2015, <http://priceofoil.org/profits-oil-gas-coal-companies-operating-u-s-canada/>.

27 “Oil & Gas: Long-Term Contribution Trends,” OpenSecrets, accessed November 2020, <https://www.opensecrets.org/industries/totals.php?ind=E01++>.

## **Chapter One: The Power of Possibility**

1 Jeff Tollefson, “The Hard Truths of Climate Change- by the Numbers,” Nature, September 18, 2019, <https://www.nature.com/immersive/d41586-019-02711-4/index.html>.

2 Brady Dennis, Steve Mufson, and Scott Clement, “Americans Increasingly See Climate Change as a Crisis, Poll Shows,” Washington Post, September 13, 2019, [https://www.washingtonpost.com/climate-environment/americans-increasingly-see-climate-change-as-a-crisis-poll-shows/2019/09/12/74234db0-cd2a-11e9-87fa-8501a456c003\\_story.html](https://www.washingtonpost.com/climate-environment/americans-increasingly-see-climate-change-as-a-crisis-poll-shows/2019/09/12/74234db0-cd2a-11e9-87fa-8501a456c003_story.html).

3 John Cook, “Consensus on Consensus: A Synthesis of Consensus Estimates on Human-Caused Global Warming,” Environmental Research Letters 11, no. 4 (April 13, 2016): 6, <https://doi.org/10.1088/1748-9326/11/4/048002>.

4 “Global Energy Transformation: A Roadmap to 2050,” International Renewable Energy Agency, 2018, 3, [https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Apr/IRENA\\_Report\\_GET\\_2018.pdf](https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Apr/IRENA_Report_GET_2018.pdf)

5 “Our 100% Clean Energy Vision,” The Solutions Project, accessed February 16, 2021, <https://thesolutionsproject.org/why-clean-energy/#/map/countries/location/ALL>.

6 “Each Country’s Share of CO<sub>2</sub> Emissions,” Union of Concerned Scientists, July 16, 2008, <https://www.ucsusa.org/resources/each-countrys-share-co2-emissions>.

7 Ibid.

8 M. Crippa et al., “Fossil CO<sub>2</sub> and GHG Emissions of All World Countries: 2019 Report” (Luxembourg: European Commission Joint Research Centre, Publications Office of the European Union, 2019), 6, <https://data.europa.eu/doi/10.2760/687800>.

9 Hannah Ritchie and Max Roser, “CO<sub>2</sub> and Greenhouse Gas Emissions,” Our World in Data, May 2017, <https://ourworldindata.org/co2-and-other-greenhouse-gas-emissions#citation>.

10 Hannah Ritchie and Max Roser, “CO<sub>2</sub> and Greenhouse Gas Emissions,” Our World in Data, June 11, 2020, <https://ourworldindata.org/co2/country/united-states>.

---

11 “Global CO2 Emissions in 2019 – Analysis,” International Energy Agency, accessed December 1, 2020, <https://www.iea.org/articles/global-co2-emissions-in-2019>.

12 “Global Carbon Project: Coronavirus Causes ‘Record Fall’ in Fossil-Fuel Emissions in 2020,” Carbon Brief, December 11, 2020, <https://www.carbonbrief.org/global-carbon-project-coronavirus-causes-record-fall-in-fossil-fuel-emissions-in-2020>.

13 Damian Carrington, “‘Brutal News’: Global Carbon Emissions Jump to All-Time High in 2018,” Guardian, December 5, 2018, <https://www.theguardian.com/environment/2018/dec/05/brutal-news-global-carbon-emissions-jump-to-all-time-high-in-2018>.

14 The Editors of Encyclopedia Britannica, “Paris Agreement,” Encyclopedia Britannica, December 16, 2019, <https://www.britannica.com/topic/Paris-Agreement-2015>.

15 Robert Watson et al, “The Truth Behind the Climate Pledges – FEU-US,” Universal Ecological Fund FEU-US, accessed November 25, 2020, <https://feu-us.org/behind-the-climate-pledges/>.

16 “Global Temperatures on Track for 3-5 Degree Rise by 2100: U.N.,” Reuters, November 29, 2018, <https://www.reuters.com/article/us-climate-change-un-idUSKCN1NY186>.

17 Carl Funk and Meg Hefferon, “U.S. Public Views on Climate and Energy,” Pew Research Center - U.S. Politics & Policy, November 5, 2019, <https://www.pewresearch.org/science/2019/11/25/u-s-public-views-on-climate-and-energy/>.

18 Ibid.

19 Ibid.

20 Alexandra Ocasio-Cortez, “H.Res.109 - Recognizing the Duty of the Federal Government to Create a Green New Deal.,” Pub. L. No. 109, H.Res.109 (2019), <https://www.congress.gov/bill/116th-congress/house-resolution/109/text>.

21 Edward Markey, “A Resolution Recognizing the Duty of the Federal Government to Create a Green New Deal,” S.Res.59 § (2019), <https://www.congress.gov/bill/116th-congress/senate-resolution/59/cosponsors?searchResultViewType=expanded>.; Alexandria Ocasio-Cortez, “Cosponsors - H.Res.109 - 116th Congress (2019-2020): Recognizing the Duty of the Federal Government to Create a Green New Deal.,” webpage, February 12, 2019, <https://www.congress.gov/bill/116th-congress/house-resolution/109/cosponsors>.

22 Alexandra Ocasio-Cortez, “H.Res.109 - Recognizing the Duty of the Federal Government to Create a Green New Deal.,” Pub. L. No. 109, H.Res.109 (2019), <https://www.congress.gov/bill/116th-congress/house-resolution/109/text>.

23 Abel Gustafson, Seth Rosenthal, and Anthony Leiserowitz, “The Green New Deal Has Strong Bipartisan Support,” Yale Program on Climate Change Communication, December 14, 2018, <https://climatecommunication.yale.edu/publications/the-green-new-deal-has-strong-bipartisan-support/>.

24 E.A. Crunden, “‘Radical Socialism’ and ‘Cow Farts’: Green New Deal Opponents Lash out as Resolution Gains Momentum,” Think Progress, February 11, 2019, <https://thinkprogress.org/green-new-deal-socialism-cow-farts-2020-trump-ocasio-cortez-markey-c9ca93effede/>.

---

25 Anthony Adragna, "GOP Lawmaker: Green New Deal 'Tantamount to Genocide,'" Politico, March 14, 2019, <https://www.politico.com/story/2019/03/14/green-new-deal-genocide-1270839>.

26 Lisa Friedman, "Dianne Feinstein Lectures Children Who Want Green New Deal, Portraying It as Untenable," New York Times, February 22, 2019, <https://www.nytimes.com/2019/02/22/climate/feinstein-sunrise-green-new-deal.html>.

27 Stephen Leahy, "Hidden Costs of Climate Change Running Hundreds of Billions a Year," National Geographic, September 27, 2017, <https://www.nationalgeographic.com/news/2017/09/climate-change-costs-us-economy-billions-report/#close>.

28 World Health Organization, Air Pollution. [https://www.who.int/health-topics/air-pollution#tab=tab\\_1](https://www.who.int/health-topics/air-pollution#tab=tab_1); "Global COVID Deaths Near 2 Million as Hospitals Struggle," University of Minnesota, Center for Infectious Disease, Research and Policy, January 2021. <https://www.cidrap.umn.edu/news-perspective/2021/01/global-covid-deaths-near-2-million-hospitals-struggle>

29 Jose Zayas, "Wind Vision: A New Era for Wind Power in the United States" (US Department of Energy, March 25, 2015), 138, [https://www.energy.gov/sites/prod/files/WindVision\\_Report\\_final.pdf](https://www.energy.gov/sites/prod/files/WindVision_Report_final.pdf).

30 "Now Hiring: The Growth of America's Clean Energy & Sustainability Jobs" (Environmental Defense Climate Group, Meister, January 17, 2017), <http://edfclimatecorps.org/nowhiringreport>.

31 "Wind Power Pays \$222 Million a Year to Rural Landowners," American Wind Energy Association, March 22, 2016, [https://www.awea.org/resources/news/2016/wind-power-pays-\\$222-million-a-year-to-rural-lando](https://www.awea.org/resources/news/2016/wind-power-pays-$222-million-a-year-to-rural-lando).

32 Jose Zayas, "Wind Vision: A New Era for Wind Power in the United States" (US Department of Energy, March 25, 2015), 138, [https://www.energy.gov/sites/prod/files/WindVision\\_Report\\_final.pdf](https://www.energy.gov/sites/prod/files/WindVision_Report_final.pdf); "20% Wind Energy by 2030: Increasing Wind Energy's Contribution to U.S. Electricity Supply, Executive Summary" (Department of Energy, December 2008), 8, <https://www.nrel.gov/docs/fy09osti/42864.pdf>.

33 Jose Zayas, "Wind Vision: A New Era for Wind Power in the United States" (US Department of Energy, March 25, 2015), 138, [https://www.energy.gov/sites/prod/files/WindVision\\_Report\\_final.pdf](https://www.energy.gov/sites/prod/files/WindVision_Report_final.pdf).

34 Ibid.

35 Noah Kirsch, "The 3 Richest Americans Hold More Wealth Than Bottom 50% Of The Country, Study Finds," Forbes, November 9, 2017, <https://www.forbes.com/sites/noahkirsch/2017/11/09/the-3-richest-americans-hold-more-wealth-than-bottom-50-of-country-study-finds/#6661478b3cf8>.

36 Aidan Farrow, Kathryn A. Miller, and Lauri Myllyvirta, "Toxic Air: The Price of Fossil Fuels" (Seoul: Greenpeace Southeast Asia, February 2017), 10, <https://storage.googleapis.com/planet4-southeastasia-stateless/2020/02/21b480fa-toxic-air-report-110220.pdf>.

37 "Pollution and Health Metrics: Global, Regional, and Country Analysis" (Global Alliance on Health and Pollution, December 2019), [https://gahp.net/wp-content/uploads/2019/12/PollutionandHealthMetrics-final-12\\_18\\_2019.pdf](https://gahp.net/wp-content/uploads/2019/12/PollutionandHealthMetrics-final-12_18_2019.pdf); Spencer L. James et al., "Global, Regional, and National Incidence, Prevalence, and Years Lived with Disability for 354 Diseases and Injuries for 195 Countries and Territories, 1990–2017: A Systematic Analysis for the Global Burden of Disease Study 2017," The Lancet 392, no. 10159 (November 10, 2018): 1789–1858, [https://doi.org/10.1016/S0140-6736\(18\)32279-7](https://doi.org/10.1016/S0140-6736(18)32279-7).

---

38 “Key Findings | State of the Air,” American Lung Association, accessed December 1, 2020, <https://www.stateoftheair.org/key-findings/>.

39 “Our 100% Clean Energy Vision,” The Solutions Project, accessed February 19, 2021, <https://thesolutionsproject.org/why-clean-energy/>.

40 Phil McKenna, “EPA Finds Black Americans Face More Health-Threatening Air Pollution,” Inside Climate News, March 2, 2018, 480, <https://insideclimatenews.org/news/01032018/air-pollution-data-african-american-race-health-epa-research.>; Ihab Mikati et al., “Disparities in Distribution of Particulate Matter Emission Sources by Race and Poverty Status,” American Journal of Public Health 108, no. 4 (February 22, 2018): 480–85, <https://doi.org/10.2105/AJPH.2017.304297>.

41 Adrian Wilson, Kimberly Wasserman, and Jacqui Patterson, “Coal Blooded: Putting Profits Before People” (NAACP, 2012), 36, <https://www.naACP.org/wp-content/uploads/2016/04/CoalBlooded.pdf>.

42 Antonio Guterres, “Stressing Air Pollution Kills 7 Million People Annually, Secretary-General Urges Governments to Build Green Economy, in Message for World Environment Day,” United Nations, May 31, 2019, <https://www.un.org/press/en/2019/sgsm19607.doc.htm#:~:text=This%20polluted%20air%20kills%20some,pollutants%20also%20cause%20global%20warming.>

43 John Elflein, “Number of Coronavirus (COVID-19) Cases, Recoveries, and Deaths Worldwide as of August 17, 2020” (Statista, August 17, 2020), <https://www.statista.com/statistics/1087466/covid19-cases-recoveries-deaths-worldwide/>.

44 Leah Burrows, “The Complex Relationship between Heat and Ozone,” Harvard Gazette, April 21, 2016, <https://news.harvard.edu/gazette/story/2016/04/the-complex-relationship-between-heat-and-ozone/>.

45 “Particle Pollution,” American Lung Association, April 20, 2020, <https://www.lung.org/clean-air/outdoors/what-makes-air-unhealthy/particle-pollution>.

46 Yaguang Wei et al., “Short Term Exposure to Fine Particulate Matter and Hospital Admission Risks and Costs in the Medicare Population: Time Stratified, Case Crossover Study,” BMJ 367 (November 27, 2019), 1, <https://doi.org/10.1136/bmj.l6258>.

47 “Progress Cleaning the Air and Improving People’s Health,” Reports and Assessments, US EPA, Accessed February 1, 2021, <https://www.epa.gov/clean-air-act-overview/progress-cleaning-air-and-improving-peoples-health>.

48 Ibid.

49 Daniel Ingraham, “Air Pollution Is Getting Worse, and Data Show More People Are Dying,” *Washington Post*, October 31, 2019, <https://www.washingtonpost.com/business/2019/10/23/air-pollution-is-getting-worse-data-show-more-people-are-dying/>.

50 “Key Findings | State of the Air,” American Lung Association, accessed November 13, 2020, <https://www.stateoftheair.org/key-findings/>.

---

51 Rebecca Hersher, "Temperatures Above The Arctic Circle Hit Record High," NPR, June 23, 2020, <https://www.npr.org/2020/06/23/882481324/temperatures-above-the-arctic-circle-hit-record-high>.

52 Ibid.

53 D.R. Reidmiller, "Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment," (U.S. Global Change Research Program, February 2020), 47, [https://nca2018.globalchange.gov/downloads/NCA4\\_2018\\_FullReport.pdf](https://nca2018.globalchange.gov/downloads/NCA4_2018_FullReport.pdf).

54 Evan Comen, "15 Rivers in America That Are Running Dry," 24/7 Wall St., June 12, 2019, <https://247wallst.com/special-report/2019/06/12/15-us-rivers-running-dry/2/>.

55 Emma Bitterroot, "Dust Kicked up from the West's Drying Lakes Is a Looming Health Hazard," Park Record, November 8, 2019, <https://www.parkrecord.com/news/dust-kicked-up-from-the-wests-drying-lakes-is-a-looming-health-hazard/>.

56 D.R. Reidmiller, "Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment," (U.S. Global Change Research Program, February 2020), 47, [https://nca2018.globalchange.gov/downloads/NCA4\\_2018\\_FullReport.pdf](https://nca2018.globalchange.gov/downloads/NCA4_2018_FullReport.pdf).

57 Kendra Pierre-Louis, "Lagoons of Pig Waste Are Overflowing After Florence. Yes, That's as Nasty as It Sounds.," *New York Times*, September 19, 2018, <https://www.nytimes.com/2018/09/19/climate/florence-hog-farms.html>.

58 "Water Use Data for the Nation," USGS, June 2018, [https://waterdata.usgs.gov/nwis/water\\_use?format=html\\_table&rdb\\_compression=file&wu\\_year=2015&wu\\_category=ALL](https://waterdata.usgs.gov/nwis/water_use?format=html_table&rdb_compression=file&wu_year=2015&wu_category=ALL); Ernest Moniz, "Ensuring the Resiliency of Our Future Water and Energy Systems," Energy.Gov, June 18, 2014, <https://www.energy.gov/articles/ensuring-resiliency-our-future-water-and-energy-systems>; "How It Works: Water for Power Plant Cooling," Union of Concerned Scientists, June 15, 2013, <https://www.ucsusa.org/resources/water-power-plant-cooling>.

59 "Wind Power Pays \$222 Million a Year to Rural Landowners," American Wind Energy Association, March 22, 2016, [https://www.awea.org/resources/news/2016/wind-power-pays-\\$222-million-a-year-to-rural-landowners](https://www.awea.org/resources/news/2016/wind-power-pays-$222-million-a-year-to-rural-landowners).

60 M.B. Pell and Joshua Schneyer, "Thousands of U.S. Areas Afflicted with Lead Poisoning beyond Flint's," *Scientific American*, December 19, 2016, <https://www.scientificamerican.com/article/thousands-of-u-s-areas-afflicted-with-lead-poisoning-beyond-flint/>.

61 Ibid.

62 "Where in the World Do People Emit the Most CO<sub>2</sub>?," Our World in Data, accessed December 23, 2020, <https://ourworldindata.org/per-capita-co2>.

63 "US Wind Power Grew 8 Percent in 2018 amid Record Demand," American Wind Energy Association, September 4, 2019, [https://www.awea.org/2018-market-report\\_us-wind-power-grew-8-percent-in-2018](https://www.awea.org/2018-market-report_us-wind-power-grew-8-percent-in-2018).

64 Snapshot of Texas Growing Appetite for Wind and Solar, GreenTech Media, <https://www.greentechmedia.com/articles/read/a-snapshot-of-texas-growing-appetite-for-wind-and-solar-power>.

---

65 “10 States Now Get At Least 20 Percent of Their Electricity from Solar and Wind,” Yale Environment 360, October 15, 2018, <https://e360.yale.edu/digest/10-states-now-get-at-least-20-percent-of-their-electricity-from-solar-and-wind>.

66 “Iowa State Energy Profile Overview,” U.S. Energy Information Administration, April 2020, <https://www.eia.gov/state/?sid=IA#tabs-4>; “Four States Account for More than Half of U.S. Wind Electricity Generation” (US Energy Information Administration, June 7, 2017), <https://www.eia.gov/todayinenergy/detail.php?id=39772>.

67 Benjamin Sigrin and Meghan Mooney, “Rooftop Solar Technical Potential for Low-to-Moderate Income (LMI) Households” (National Renewable Energy Laboratory, May 1, 2018), 8, <https://www.nrel.gov/docs/fy18osti/71190.pdf>.

68 Zeke Hausfather, “Analysis: Why US Carbon Emissions Have Fallen 14% since 2005,” Carbon brief, August 15, 2017, <https://www.carbonbrief.org/analysis-why-us-carbon-emissions-have-fallen-14-since-2005>.

69 Lauren Tousignant, “US Making Progress on Paris Climate Goals, despite Trump,” The New York Post, September 13, 2018, <https://nypost.com/2018/09/13/us-making-progress-on-paris-climate-goals-despite-trump/>.

70 Nicholas Kusnetz, “U.S. Emissions Dropped in 2019: Here’s Why in 6 Charts,” Inside Climate News, January 7, 2020, <https://insideclimatenews.org/news/07012020/infographic-united-states-emissions-2019-climate-change-greenhouse-gas-coal-transportation>.

71 Emma Newburger, “Covid Pandemic Drove a Record Drop in Global Carbon Emissions in 2020,” CNBC, December 11, 2020, <https://www.cnbc.com/2020/12/11/covid-record-drop-global-carbon-emissions-2020.html>.

72 Mark Jacobson, “100% Clean and Renewable Wind, Water, and Sunlight All-Sector Energy Roadmaps for 139 Countries of the World,” Joule 1, no. 1 (September 6, 2017), <https://doi.org/10.1016/j.joule.2017.07.005>.

73 Robert Fares, “Landmark 100 Percent Renewable Energy Study Flawed, Say 21 Leading Experts,” Scientific American, June 23, 2017, <https://blogs.scientificamerican.com/plugged-in/landmark-100-percent-renewable-energy-study-flawed-say-21-leading-experts/>.

74 “Making Mission Possible: Delivering a Net-Zero Economy,” Energy Transitions Commission, September 2020, <https://www.energy-transitions.org/publications/making-mission-possible/>.

75 “Our 100% Clean Energy Vision,” The Solutions Project, 2020, <https://thesolutionsproject.org/why-clean-energy/>.

76 Mark Jacobson, “100% Clean and Renewable Wind, Water, and Sunlight All-Sector Energy Roadmaps for 139 Countries of the World,” Joule 1, no. 1 (September 6, 2017), <https://doi.org/10.1016/j.joule.2017.07.005>.

77 Ibid.

78 Ibid.

79 Michael Pompeo, “On the U.S. Withdrawal from the Paris Agreement” (United States Department of State, November 4, 2019), <https://www.state.gov/on-the-u-s-withdrawal-from-the-paris-agreement/>; Rob

---

Jackson and Pep Canadell, "What's 'Fair' When It Comes to Carbon Emissions?," New York Times, December 4, 2019, <https://www.nytimes.com/2019/12/04/opinion/global-climate-change.html>.

80 Mark Jacobson, "100% Clean and Renewable Wind, Water, and Sunlight All-Sector Energy Roadmaps for 139 Countries of the World," Joule 1, no. 1 (September 6, 2017), <https://doi.org/10.1016/j.joule.2017.07.005>.

81 Jessica McDonald, "How Much Will the Green New Deal Cost?," Fact Check, March 14, 2019, <https://www.factcheck.org/2019/03/how-much-will-the-green-new-deal-cost/>.

82 Ibid.

83 Nathan Rott, Stanford Study Charts Path to Green New Deal in 143 Countries, <https://woods.stanford.edu/news/stanford-study-charts-path-green-new-deal-143-countries>

84 Dan Shreve, "Deep Decarbonisation: The Multi-Trillion Dollar Question," June 27, 2019, [https://www.woodmac.com/news/feature/deep-decarbonisation-the-multi-trillion-dollar-question/?utm\\_source=gtmarticle&utm\\_medium=web&utm\\_campaign=wmpr\\_griddecarb](https://www.woodmac.com/news/feature/deep-decarbonisation-the-multi-trillion-dollar-question/?utm_source=gtmarticle&utm_medium=web&utm_campaign=wmpr_griddecarb).

85 "Our 100% Clean Energy Vision," The Solutions Project, 2020, <https://thesolutionsproject.org/why-clean-energy/>.

86 Ibid.

87 Wal van Lierop, "Covid-19, Climate Change and The End Of Baby Boomer Leadership," Forbes, June 23, 2020, <https://www.forbes.com/sites/walvanlierop/2020/06/23/covid-19-climate-change-and-the-end-of-baby-boomer-leadership/#75cf999d5c03>.

88 Robert Watson et al., "The Truth Behind the Climate Pledges" (The Universal Ecological Fund, November 2019), ii.

89 Doug Koplow, "Federal Energy-Related Tax Policy and Its Effects on Markets, Prices, and Consumers," § Subcommittee on Energy of the Committee on Energy and Commerce (2017), 8, <https://docs.house.gov/meetings/IF/IF03/20170329/105798/HHRG-115-IF03-20170329-SD063.pdf>; David Coady, "Global Fossil Fuel Subsidies Remain Large: An Update Based on Country-Level Estimates" (International Monetary Fund, May 2, 2019), <https://www.imf.org/en/Publications/WP/Issues/2019/05/02/Global-Fossil-Fuel-Subsidies-Remain-Large-An-Update-Based-on-Country-Level-Estimates-46509>.

90 Doug Koplow, "Federal Energy-Related Tax Policy and Its Effects on Markets, Prices, and Consumers," § Subcommittee on Energy of the Committee on Energy and Commerce (2017), 5.; David Coady, "Global Fossil Fuel Subsidies Remain Large: An Update Based on Country-Level Estimates" (International Monetary Fund, May 2, 2019), 8, <https://www.imf.org/en/Publications/WP/Issues/2019/05/02/Global-Fossil-Fuel-Subsidies-Remain-Large-An-Update-Based-on-Country-Level-Estimates-46509>.

91 Will Wade, "Americans Are Paying More than Ever to Store Deadly Nuclear Waste," LA Times, June 14, 2019, <https://www.latimes.com/business/la-fi-radioactive-nuclear-waste-storage-20190614-story.html>. (pp. 5, 35).

92 David Coady, et. al "Global Fossil Fuel Subsidies Remain Large: An Update Based on Country-Level Estimates" (International Monetary Fund, May 2, 2019), 8,



---

<https://www.imf.org/en/Publications/WP/Issues/2019/05/02/Global-Fossil-Fuel-Subsidies-Remain-Large-An-Update-Based-on-Country-Level-Estimates-46509>.

93 Stephanie Saul and Patricia Cohen, "Profitable Giants Like Amazon Pay \$0 in Corporate Taxes. Some Voters Are Sick of It.," New York Times, April 29, 2019, <https://www.nytimes.com/2019/04/29/us/politics/democrats-taxes-2020.html>.

94 See Gabriel Zucman, *The Hidden Wealth of Nations; the Scourge of Tax Havens* (University of Chicago Press, 2016).

95 Shaun Cox, "Study: Income of Top 1% Has Grown 100 Times Faster Than Bottom 50% Since 1970," Money and Markets, December 13, 2019, <https://moneyandmarkets.com/wealth-inequality-since-1970/>.

96 Craig Whitlock and Bob Woodward, "Pentagon Buries Evidence of \$125 Billion in Bureaucratic Waste," Washington Post, December 5, 2016, [https://www.washingtonpost.com/investigations/pentagon-buries-evidence-of-125-billion-in-bureaucratic-waste/2016/12/05/e0668c76-9af6-11e6-a0ed-ab0774c1eaa5\\_story.html](https://www.washingtonpost.com/investigations/pentagon-buries-evidence-of-125-billion-in-bureaucratic-waste/2016/12/05/e0668c76-9af6-11e6-a0ed-ab0774c1eaa5_story.html).

97 "District Will Begin Energy Savings Improvement Plan," Flemington-Raritan School District, accessed November 30, 2020, <https://www.frsd.k12.nj.us/site/default.aspx?PageType=3&DomainID%20=1&ModuleInstanceID%20=1592&ViewID=047E6BE3-6D87-4130-8424-D8E4E9ED6C2A&RenderLoc=%200&FlexDataID=6661&PageID=1&GroupByField=&GroupYear=0&GroupMonth=0&Tag=>.

98 Mark Sandeen, "All Electric Schools," Mark Sandeen, December 26, 2018, <https://marksandeen.com/2018/12/26/all-electric-schools/>.

99 Tobias Buck and Lucy Hornby, "China Recovery Pushes Greenhouse Emissions to Global Record," Financial Times, November 13, 2017, <https://www.ft.com/content/ba4212b6-c63f-11e7-a1d2-6786f39ef675>.

100 Kevin Mo, "The State of Solar: Bracing for a Post-Subsidy Era in China," Paulson Institute, July 6, 2020, <http://www.paulsoninstitute.org/our-stories/the-state-of-solar-bracing-for-a-post-subsidy-era-in-china/>.

101 David Stanway, "China Solar Installations to Slow as Subsidy Cuts Bite: Executive," Reuters, September 6, 2019, <https://www.reuters.com/article/us-china-solar-idUSKCN1VR08R>.

102 "The Solar-Powered Future Is Being Assembled in China," *Bloomberg*, September 14, 2020, <https://www.bloomberg.com/features/2020-china-solar-giant-longi/>.

103 Will Wade, "Everyone around the World Is Ditching Coal – except India, China," The Print, June 10, 2020, <https://theprint.in/economy/everyone-around-the-world-is-ditching-coal-except-india-china/438864/>.

104 Amelie Bahr, "China's Coal Capacity Surge Need Not Be at Odds with Ambitious Climate Action," China Dialogue, November 25, 2020, <https://chinadialogue.net/en/energy/chinas-coal-capacity-surge-need-not-be-at-odds-with-ambitious-climate-action/>.

105 Chelsea Harvey, "CO2 Emissions Reached an All-Time High in 2018," Scientific American, December 6, 2018, <https://www.scientificamerican.com/article/co2-emissions-reached-an-all-time-high-in-2018/>.

---

106 “Plan for Climate Change and Environmental Justice,” Biden Harris, Accessed November 30, 2020, <https://joebiden.com/climate-plan/#>.

107 Charlotte Alter, Suyin Haynes, and Justin Worland, “Greta Thunberg: TIME’s Person of the Year 2019,” TIME, December 11, 2019.; Mary Murguia and Andrew Hurwitz, “JULIANA V. UNITED STATES,” Pub. L. No. 18–36082 (2019), 11, <https://cdn.ca9.uscourts.gov/datastore/opinions/2020/01/17/18-36082.pdf>.

## Chapter 2: Tools That Work

1 “The Status of Renewable Electricity Mandates in the States” (Institute for Energy Research, January 2011), <https://www.instituteforenergyresearch.org/wp-content/uploads/2011/01/IER-RPS-Study-Final.pdf>.

2 Mitchell Schmidt, “Iowa’s Status as a Renewable Energy Leader: How We Got Here, and What’s Next,” Gazette, July 9, 2017, <https://www.thegazette.com/iowaideas/stories/energy-environment/iowas-status-as-a-renewable-energy-leader-how-we-got-here-and-whats-next-20170709>.

3 “United States,” U.S. Energy Information Administration (EIA), accessed November 5, 2020, <https://www.eia.gov/state/index.php>.

4 “Iowa: State Profile and Energy Estimates,” U.S. Energy Information Administration (EIA), accessed January 24, 2020, <https://www.eia.gov/state/analysis.php?sid=IA#24>.

5 Mitchell Schmidt, “Iowa Ranks High Nationally in Renewable Energy,” The Gazette, April 20, 2017, <https://www.thegazette.com/subject/news/government/iowa-ranks-high-nationally-in-renewable-energy-20170420>.

6 “Most States Have Renewable Portfolio Standards,” U.S. Energy Information Administration (EIA), February 3, 2012, <https://www.eia.gov/todayinenergy/detail.php?id=4850>; Galen Barbose, “U.S. Renewables Portfolio Standards: 2019 Annual Status Update” (Berkeley Lab, July 2019), <https://emp.lbl.gov/publications/us-renewables-portfolio-standards-2>.

7 “Press Release: Governor Ige Signs Bill Setting 100 Percent Renewable Energy Goal in Power Sector,” Press Release, Sta, June 8, 2015, <https://governor.hawaii.gov/newsroom/press-release-governor-ige-signs-bill-setting-100-percent-renewable-energy-goal-in-power-sector/>.

8 Camila Domonoske, “California Sets Goal Of 100 Percent Clean Electric Power By 2045,” National Public Radio, September 10, 2018, <https://www.npr.org/2018/09/10/646373423/california-sets-goal-of-100-percent-renewable-electric-power-by-2045>.

9 Galen Barbose, “U.S. Renewables Portfolio Standards: 2019 Annual Status Update” (Berkeley Lab, July 2019), 15–26, <https://emp.lbl.gov/publications/us-renewables-portfolio-standards-2>; “State Renewable Portfolio Standards and Goals,” National Conference of State Legislatures, April 17, 2020, <https://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx>.

10 “Iowa: State Profile and Energy Estimates,” U.S. Energy Information Administration (EIA), accessed January 24, 2020, <https://www.eia.gov/state/analysis.php?sid=IA#24>; S. Patricia Batres-Marquez, “Iowa Is a Leader in the Wind Energy Industry,” Iowa Farm Bureau, October 11, 2018, <https://www.iowafarmbureau.com/Article/iowa-is-a-Leader-in-the-Wind-Energy-Industry>; Natasha Riddle, “DC Passed the Most Ambitious Clean Energy Law in the US. Now What?,” Greater Greater Washington, May

---

8, 2019, <https://ggwash.org/view/71751/dc-passed-the-most-ambitious-clean-energy-law-in-the-us-now-what>.

11 “State Renewable Portfolio Standards and Goals,” National Conference of State Legislatures, April 17, 2020, <https://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx>.

12 Galen Barbose, “U.S. Renewables Portfolio Standards” (U.S. Department of Energy: Lawrence Berkeley National Laboratory, July 2019), 4-37, [https://eta-publications.lbl.gov/sites/default/files/rps\\_annual\\_status\\_update-2019\\_edition.pdf](https://eta-publications.lbl.gov/sites/default/files/rps_annual_status_update-2019_edition.pdf).

13. Ibid.

14 “State Renewable Portfolio Standards and Goals,” National Conference of State Legislatures, April 17, 2020, <https://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx>.

15 Ibid.

16 “State Renewable Portfolio Standards and Goals,” National Conference of State Legislatures, April 17, 2020, <https://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx>.

17 Galen Barbose, “U.S. Renewables Portfolio Standards” (U.S. Department of Energy: Lawrence Berkeley National Laboratory, July 2019), [https://eta-publications.lbl.gov/sites/default/files/rps\\_annual\\_status\\_update-2019\\_edition.pdf](https://eta-publications.lbl.gov/sites/default/files/rps_annual_status_update-2019_edition.pdf).

18 Bruce Ho, “The Regional Greenhouse Gas Initiative Is a Model for the Nation,” Natural Resources Defense Council, June 12, 2018, <https://www.nrdc.org/resources/regional-greenhouse-gas-initiative-model-nation>.; “The Regional Greenhouse Gas Initiative,” (Acadia Center, September 2019), 2, [https://acadiacenter.org/wp-content/uploads/2019/09/Acadia-Center\\_RGGI\\_10-Years-in-Review\\_2019-09-17.pdf](https://acadiacenter.org/wp-content/uploads/2019/09/Acadia-Center_RGGI_10-Years-in-Review_2019-09-17.pdf).

19 “Electricity Consumption by State, 2017” (The University of Kansas Institute for Policy and Social Research), accessed August 4, 2020, <http://www.ipsr.ku.edu/ksdata/ksah/energy/18ener7.pdf>.

20 Sarah Shemkus, “How Much Credit Does RGGI Deserve for the Northeast’s Progress on Emissions?,” Energy News Network, October 25, 2019, <https://energynews.us/2019/10/25/northeast/how-much-credit-does-rggi-deserve-for-the-northeasts-progress-on-emissions/>.

21 David Roberts, “The Regional Greenhouse Gas Initiative Is Boosting State Economies in the Northeast,” Vox, October 7, 2019, <https://www.vox.com/energy-and-environment/2018/4/25/17269544/fossil-fuel-carbon-trading-economies-rggi-northeast>.

22 “The Regional Greenhouse Gas Initiative” (Acadia Center, September 2019), 2, [https://acadiacenter.org/wp-content/uploads/2019/09/Acadia-Center\\_RGGI\\_10-Years-in-Review\\_2019-09-17.pdf](https://acadiacenter.org/wp-content/uploads/2019/09/Acadia-Center_RGGI_10-Years-in-Review_2019-09-17.pdf).

23 “Lower Emissions Cap for Regional Greenhouse Gas Initiative Takes Effect in 2014,” U.S. Energy Information Administration (EIA), February 3, 2014, <https://www.eia.gov/todayinenergy/detail.php?id=14851>.

24 “Success of the Regional Greenhouse Gas Initiative,” Living on Earth (World Media Foundation, October 4, 2019), <https://www.loe.org/shows/segments.html?programID=19-P13-00040&segmentID=3>.

---

25 Jackson Morris and Bruce Ho, "RGGI Agrees to Cut Power Plant Pollution by Another 30%," Natural Resources Defense Council, August 23, 2017, <https://www.nrdc.org/experts/bruce-ho/rggi-agrees-cut-power-plant-pollution-another-30>.

26 "About Us," Global Covenant of Mayors for Climate and Energy, accessed August 4, 2020, <https://www.globalcovenantofmayors.org/about/>.

27 "USA," Global Covenant of Mayors for Climate and Energy, accessed August 4, 2020, <https://www.globalcovenantofmayors.org/region/usa/>.

28 "C40: Cities100: Washington, D.C. - Retrofitted Municipal Roofs Mitigate and Adapt," C40, accessed August 4, 2020, [https://www.c40.org/case\\_studies/cities100-washington-d-c-retrofitted-municipal-roofs-mitigate-and-adapt](https://www.c40.org/case_studies/cities100-washington-d-c-retrofitted-municipal-roofs-mitigate-and-adapt).

29 "C40: Cities100: Washington, D.C. - Retrofitted Municipal Roofs Mitigate and Adapt," C40, accessed August 4, 2020, [https://www.c40.org/case\\_studies/cities100-washington-d-c-retrofitted-municipal-roofs-mitigate-and-adapt](https://www.c40.org/case_studies/cities100-washington-d-c-retrofitted-municipal-roofs-mitigate-and-adapt).; "What's in a Megawatt?," Solar Energy Industries Association, accessed January 24, 2020, <https://www.seia.org/initiatives/whats-megawatt>.

30 "C40: Cities100: Washington, D.C. - Retrofitted Municipal Roofs Mitigate and Adapt," C40, accessed August 4, 2020, [https://www.c40.org/case\\_studies/cities100-washington-d-c-retrofitted-municipal-roofs-mitigate-and-adapt](https://www.c40.org/case_studies/cities100-washington-d-c-retrofitted-municipal-roofs-mitigate-and-adapt).

31 "Green City Times 10 Greenest World Cities," Green City Times, January 15, 2011, <https://www.greencitytimes.com/10-greenest-cities-in-the-world/>.  
Bryan Clark, "San Diego Becomes First Major US City to Commit to 100% Renewable Energy," The Next Web, December 16, 2015, <https://thenextweb.com/insider/2015/12/16/san-diego-becomes-first-major-us-city-to-commit-to-100-renewable-energy/>.

32 "The City of San Diego 2019 Climate Action Plan" (San Diego Government Sustainability, 2019), 11, [https://www.sandiego.gov/sites/default/files/2019\\_cap\\_digital\\_version.pdf](https://www.sandiego.gov/sites/default/files/2019_cap_digital_version.pdf).

33 "Green City Times 10 Greenest World Cities," Green City Times, January 15, 2011, <https://www.greencitytimes.com/10-greenest-cities-in-the-world/>.  
"Green City: Portland, Oregon," Green City Times, October 26, 2010, <https://www.greencitytimes.com/portland/>.

34 "Glossary: Solar Terms Defined," Go Solar Group, accessed August 4, 2020, <https://gosolargroup.com/glossary/>. Pete Polonsky, "The Case for State Solar Feed-in-Tariffs (FiTs) in the USA," Duke Nicholas School of the Environment: US Environmental Policy, April 22, 2019, <https://blogs.nicholas.duke.edu/env212/the-case-for-state-solar-feed-in-tariffs-fits-in-the-usa/>.

35 "Feed-in Tariff: A Policy Tool Encouraging Deployment of Renewable Electricity Technologies," U.S. Energy Information Administration (EIA), May 30, 2013, [https://www.eia.gov/todayinenergy/detail.php?id=11471#](https://www.eia.gov/todayinenergy/detail.php?id=11471#;).; Toby D. Couture et al., "A Policymaker's Guide to Feed-in Tariff Policy Design," OSTI.gov, July 1, 2010, 72, <http://www.osti.gov/servlets/purl/1219187/>.

36 Pete Polonsky, "The Case for State Solar Feed-in-Tariffs (FiTs) in the USA," Duke Nicholas School of the Environment: US Environmental Policy, April 22, 2019, <https://blogs.nicholas.duke.edu/env212/the-case-for->

---

state-solar-feed-in-tariffs-fits-in-the-usa/; "Feed-In Tariffs: A Brief History," Building Efficiency Initiative, August 5, 2010, <https://buildingefficiencyinitiative.org/articles/feed-tariffs-brief-history/>; Herman K. Trabish, "RIP FITs: As US Feed-in Tariffs Fade, Adopting Elements Could Spur Solar Growth," Utility Dive, July 18, 2016, <https://www.utilitydive.com/news/rip-fits-as-us-feed-in-tariffs-fade-adopting-elements-could-spur-solar-gr/422727/>.

37 Rachel Waldholz, "Germany Marks First Ever Quarter with More than 50 Pct Renewable Electricity," Clean Energy Wire, April 1, 2020, <https://www.cleanenergywire.org/news/germany-marks-first-ever-quarter-more-50-pct-renewable-electricity>.

38 Erik Krischbaum, "Cloudy Germany Unlikely Hotspot for Solar Power," Reuters, July 29, 2007, <https://www.reuters.com/article/us-germany-solar-idUSL2389939520070730>.

39 "Renewable Energy: Are Feed-in Tariffs Going out of Style?," Power Technology, January 18, 2017, <https://www.power-technology.com/features/featurerenewable-energy-are-feed-in-tariffs-going-out-of-style-5718419/>.

40 "Renewable Energy Feed-in Tariffs," Organisation for Economic Co-Operation and Development, accessed August 4, 2020, [https://stats.oecd.org/Index.aspx?DataSetCode=RE\\_FIT](https://stats.oecd.org/Index.aspx?DataSetCode=RE_FIT).

41 Marian Willuhn and Ilias Tsagas, "Kenyan Government Blamed for Sluggish Progress of Solar," PV Magazine, September 2, 2019, <https://www.pv-magazine.com/2019/09/02/kenyan-government-blamed-for-sluggish-progress-of-solar/>; Alexander Richter, "Kenya Considering Auction System to Replace Feed-in Tariffs," Think GeoEnergy, April 12, 2018, <https://www.thinkgeoenergy.com/kenya-considering-auction-system-to-replace-feed-in-tariffs/>.

42 Johnny Wood, "Kenya Is Aiming to Be Powered Entirely by Green Energy by 2020," World Economic Forum, December 5, 2018, <https://www.weforum.org/agenda/2018/12/kenya-wants-to-run-entirely-on-green-energy-by-2020/>.

43 Pete Polonsky, "The Case for State Solar Feed-in-Tariffs (FiTs) in the USA," Duke Nicholas School of the Environment: US Environmental Policy, April 22, 2019, <https://blogs.nicholas.duke.edu/env212/the-case-for-state-solar-feed-in-tariffs-fits-in-the-usa/>.

44 "The German Feed-in Tariff," Future Policy, July 15, 2015, <https://www.futurepolicy.org/climate-stability/renewable-energies/the-german-feed-in-tariff/>.

45 Pete Polonsky, "The Case for State Solar Feed-in-Tariffs (FiTs) in the USA," Duke Nicholas School of the Environment: US Environmental Policy, April 22, 2019, <https://blogs.nicholas.duke.edu/env212/the-case-for-state-solar-feed-in-tariffs-fits-in-the-usa/>.

46 Christian Roselund, "Los Angeles Still Has a Feed-in Tariff. And It's Growing.," PV Magazine, September 27, 2019, <https://pv-magazine-usa.com/2019/09/27/los-angeles-still-has-a-feed-in-tariff-and-its-growing/>.

47 Nina DeSilva, "What Is the Difference Between Net Metering and Feed-in Tariffs?," Solstice Community Solar, April 4, 2018, <https://solstice.us/solstice-blog/difference-net-metering-feed-in-tariffs/>; "Net Metering Facts," Net Zero Solar, accessed December 15, 2020, <https://netzerosolar.net/NetMetering.html>.

48 Mark Durrenberger, "Different Types of Utility Meter for Solar," The Energy Miser, February 15, 2017, <https://newenglandcleanenergy.com/energymiser/2017/02/15/different-types-of-utility-meters-for-solar/>.

---

49 Nina DeSilva, "What Is the Difference Between Net Metering and Feed-in Tariffs?," Solstice Community Solar, April 4, 2018, <https://solstice.us/solstice-blog/difference-net-metering-feed-in-tariffs/>.; "Solar Energy and Net Metering" (Edison Electric Institute, January 2016), 2, <https://www.eei.org/issuesandpolicy/generation/NetMetering/Documents/Straight%20Talk%20About%20Net%20Metering.pdf>.

50 Christian Roselund, "Los Angeles Still Has a Feed-in Tariff. And It's Growing.," PV Magazine, September 27, 2019, <https://pv-magazine-usa.com/2019/09/27/los-angeles-still-has-a-feed-in-tariff-and-its-growing/>.

51 "Quarterly Residential Vacancies and Homeownership, Second Quarter 2020" (U.S. Census Bureau, July 28, 2020), 1, <https://www.census.gov/housing/hvs/files/currenthvspress.pdf>.  
David Montgomery, "Who Owns a Home in America, in 12 Charts," Bloomberg CityLab, August 8, 2018, [https://www.bloomberg.com/news/articles/2018-08-08/who-rents-their-home-here-s-what-the-data-says](https://www.bloomberg.com/news/articles/2018-08-08/who-rents-their-home-here-s-what-the-data-says;).; "The Vision for U.S. Community Solar: A Roadmap for 2030," Community Solar Vision (Vote Solar), accessed August 10, 2020, [https://votesolar.org/policy/policy-guides/shared-renewables-policy/csvisionstudy/?te=1&nl=climate-fwd:&emc=edit\\_clim\\_20190925?campaign\\_id=54&instance\\_id=12632&segment\\_id=17327&user\\_id=4037c2a46700fcf049e586d04ed74b06&regi\\_id=97955706](https://votesolar.org/policy/policy-guides/shared-renewables-policy/csvisionstudy/?te=1&nl=climate-fwd:&emc=edit_clim_20190925?campaign_id=54&instance_id=12632&segment_id=17327&user_id=4037c2a46700fcf049e586d04ed74b06&regi_id=97955706).

52 Kelly Pickerel, "30-MW California Community Solar Project Will Benefit Qualified Low-Income Customers in Imperial and Coachella," Solar Power World, September 25, 2019, <https://www.solarpowerworldonline.com/2019/09/30-mw-california-community-solar-project-will-benefit-qualified-low-income-customers-in-imperial-and-coachella/>.

53 "Community Solar," SEIA, accessed November 5, 2020, <https://www.seia.org/initiatives/community-solar>.; "What's in a Megawatt?," SEIA, accessed November 5, 2020, <https://www.seia.org/initiatives/whats-megawatt>.

54 "Demand for Solar Industry Installations to Double by 2023," Cision PR Newswire, accessed December 15, 2020, <https://www.prnewswire.com/news-releases/demand-for-solar-industry-installations-to-double-by-2023-301006393.html>.

55 "An Introduction to Retail Electricity Choice in the United States" (21st Century Power Partnership), accessed August 10, 2020, 1-2, <https://www.nrel.gov/docs/fy18osti/68993.pdf>.

56 "Third Party Solar Power Purchased Agreement Policies" (DSIRE, June 2019), 1-2, [https://s3.amazonaws.com/ncsolarcen-prod/wp-content/uploads/2019/07/DSIRE\\_3rd-Party-PPA\\_June\\_2019.pdf](https://s3.amazonaws.com/ncsolarcen-prod/wp-content/uploads/2019/07/DSIRE_3rd-Party-PPA_June_2019.pdf).

57 "Community Solar Vision Study," Community Solar Vision (Vote Solar), accessed August 12, 2020, [https://votesolar.org/policy/policy-guides/shared-renewables-policy/csvisionstudy/?te=1&nl=climate-fwd:&emc=edit\\_clim\\_%2020190925?campaign\\_id=54&instance\\_id=12632&segment\\_id=17327&user\\_id=4037c2a46700fcf049e586d04ed74b06&regi\\_id=97955706](https://votesolar.org/policy/policy-guides/shared-renewables-policy/csvisionstudy/?te=1&nl=climate-fwd:&emc=edit_clim_%2020190925?campaign_id=54&instance_id=12632&segment_id=17327&user_id=4037c2a46700fcf049e586d04ed74b06&regi_id=97955706)

58 "Solar Energy in the United States," Energy.gov, accessed August 12, 2020, <https://www.energy.gov/eere/solarpoweringamerica/solar-energy-united-states>.

59 "Solar Energy Farms Gaining Traction in Nebraska," US News & World Report, accessed August 12, 2020, <https://www.usnews.com/news/best-states/nebraska/articles/2018-06-03/solar-energy-farms-gaining>



---

traction-in-nebraska.; Sydnie Holzfaster, "OPPD Sells out of Shares for Community Solar Program," KPTM, June 9, 2019, <https://fox42kptm.com/news/local/oppd-sells-out-of-shares-for-community-solar-program>.

60 "MultiBrief: A Former Landfill Is Maryland's First Community Solar Farm," MultiBriefs, accessed August 12, 2020, <http://exclusive.multibriefs.com/content/a-former-landfill-is-marylands-first-community-solar-farm/facilities-grounds>.

61 "Most U.S. Utility-Scale Solar Photovoltaic Power Plants Are 5 Megawatts or Smaller," U.S. Energy Information Administration (EIA), accessed August 12, 2020, <https://www.eia.gov/todayinenergy/detail.php?id=38272>.

62 Sarah Shemkus, "Agrivoltaics: Solar Panels on Farms Could Be a Win-Win," Civil Eats, January 22, 2019, <https://civileats.com/2019/01/22/agrivoltaics-solar-panels-on-farms-could-be-a-win-win/>.

63 Ibid.

64 Marco Dorothal, "Advantages of Agrivoltaics in France," Solar Plaza, September 15, 2020, <https://www.solarplaza.com/channels/markets/12204/advantages-agrivoltaics-france/>.

65 "Promoting Solar Grazing," American Solar Grazing Association, accessed January 12, 2021, <https://solargrazing.org/>.

66 Amory Lovins, *Soft Energy Paths: Towards a Durable Peace* (San Francisco: Friends of the Earth International, 1977).

67 "Saving Energy and Money with Appliance and Equipment Standards in the United States," U.S. Department of Energy, 2017, <https://www.energy.gov/eere/buildings/history-and-impacts>.; Neal Elliott, Steven Nadel, and Therese Langer, "Energy Efficiency in the United States: 35 Years and Counting," American Council for an Energy Efficient Economy, June 2015, 26, <https://www.aceee.org/sites/default/files/publications/researchreports/e1502.pdf>.

68 Neal Elliott, Steven Nadel, and Therese Langer, "Energy Efficiency in the United States: 35 Years and Counting," American Council for an Energy Efficient Economy, June 2015, iv, <https://www.aceee.org/sites/default/files/publications/researchreports/e1502.pdf>.

69 Philip Shabecoff, "Reagan and Environment: To Many, a Stalemate," New York Times, January 2, 1989, sec. U.S., <https://www.nytimes.com/1989/01/02/us/reagan-and-environment-to-many-a-stalemate.html>.

70 Dave Metz and Lori Weigel, "Voter Attitude toward Energy Issues in the Midwest," Minnesota Environmental Partnership, August 2014, 3, <http://www.mepartnership.org/wp-content/uploads/2014/08/Re-AMP-2014MidwesternEnergyIssues-MediaRelease-Final.pdf>.

71 Steven Nadel, Neal Elliott, and Therese Langer, "Energy Efficiency in the United States: 35 Years and Counting," June 2015, 36, <https://www.aceee.org/sites/default/files/publications/researchreports/e1502.pdf>.

72 "Sources of Greenhouse Gas Emissions," Overviews and Factsheets, OAR US EPA, December 29, 2015, <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions>.



---

73 “Everything You Need to Know About the Fastest-Growing Source of Global Emissions: Transport,” World Resources Institute, October 16, 2019, <https://www.wri.org/blog/2019/10/everything-you-need-know-about-fastest-growing-source-global-emissions-transport>.; “CO2 Emissions from Fuel Combustion: Overview – Analysis,” IEA, accessed August 13, 2020, <https://www.iea.org/reports/co2-emissions-from-fuel-combustion-overview>.

74 “Public Transportation’s Role in Responding to Climate Change” (US Department of Transportation, Federal Transit Administration, January 2010), 2, <https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/PublicTransportationsRoleInRespondingToClimateChange2010.pdf>.

75 “Automobile Registrations - United States,” Statista, accessed August 13, 2020, <https://www.statista.com/statistics/192998/registered-passenger-cars-in-the-united-states-since-1975/>.; “U.S. Population 1950-2020,” Macrotrends, accessed August 13, 2020, <https://www.macrotrends.net/countries/USA/united-states/population>.

76 Bruce Schaller, “In a Reversal, ‘Car-Rich’ Households Are Growing,” Bloomberg.Com, January 7, 2019, <https://www.bloomberg.com/news/articles/2019-01-07/despite-uber-and-lyft-urban-car-ownership-is-growing>.

77 Laura Bliss, “Despite ‘Car-Free’ Hype, Millennials Drive a Lot,” Bloomberg City Lab, March 27, 2019, <https://www.bloomberg.com/news/articles/2019-03-27/despite-car-free-hype-millennials-drive-a-lot>.

78 Mary Wisniewski, “Why Americans, Particularly Millennials, Have Fallen out of Love with Cars,” Chicago Tribune, accessed August 13, 2020, <https://www.chicagotribune.com/business/ct-biz-young-adults-cars-attitudes-20181106-story.html>.

79 Steven Higashide et al., “A Green New Deal for City and Suburban Transportation” (Data for Progress, March 2020), 4, <https://filesforprogress.org/memos/gnd-for-transit.pdf>.

80 “Public Transportation’s Role in Responding to Climate Change” (US Department of Transportation, Federal Transit Administration, January 2010), 2, <https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/PublicTransportationsRoleInRespondingToClimateChange2010.pdf>.

81 Ellen Barry, “Should Public Transit Be Free? More Cities Say, Why Not?,” New York Times, January 14, 2020, sec. U.S., <https://www.nytimes.com/2020/01/14/us/free-public-transit.html>.

82 Laura Scott, “Olympia’s Fare Free Bus System Is off to a Strong Start, but Is It Sustainable?,” My Northwest January 31, 2020, <https://mynorthwest.com/1693320/olympia-free-transit-fare-system-sustainable/>?

83 Ellen Barry and Greta Rybus, “Cities like Boston and Worcester Look to Lawrence in Debate over Free Public Transit,” Boston, January 15, 2020, <https://www.boston.com/news/commute/2020/01/15/cities-like-boston-and-worcester-look-to-lawrence-in-debate-over-free-public-transit>.

84 Chiara Giordano, “Large Areas of London to Be Closed to Cars and Congestion Charge to Rise,” The Independent, May 15, 2020, <https://www.independent.co.uk/news/uk/home-news/coronavirus-london-tfl-close-central-streets-cars-vans-public-transport-a9517861.html>.

---

85 Superblocks: How Barcelona Is Taking City Streets Back from Cars, 2016, [https://www.youtube.com/watch?v=ZORzsubQA\\_M](https://www.youtube.com/watch?v=ZORzsubQA_M).

86 “Worldwide Number of Electric Cars,” Statista, accessed August 13, 2020, <https://www.statista.com/statistics/270603/worldwide-number-of-hybrid-and-electric-vehicles-since-2009/>.

87 Maximilian Holland, “France Hits Record 19.2% EV Share In December — Up Almost 6× Year On Year,” CleanTechnica, January 2, 2021, <https://cleantechnica.com/2021/01/02/france-hits-record-19-2-ev-share-in-december-up-almost-6x-year-on-year/>.

88 “Reducing Your Transportation Footprint,” Center for Climate and Energy Solutions, accessed August 17, 2020, <https://www.c2es.org/content/reducing-your-transportation-footprint/>.

89 Steven Mufson, “General Motors to Eliminate Gasoline and Diesel Light-duty Cars and SUVs by 2035,” Washington Post, January 28, 2021, <https://www.washingtonpost.com/climate-environment/2021/01/28/general-motors-electric/>.

<sup>90</sup> “Fuel Cells,” Energy.gov, accessed February 17, 2021, <https://www.energy.gov/eere/fuelcells/fuel-cells>.

<sup>91</sup> “Energy 101: Fuel Cell Technology,” Energy.gov, accessed February 17, 2021, <https://www.energy.gov/eere/videos/energy-101-fuel-cell-technology>.

<sup>92</sup> Joe D’Allegro, “Elon Musk Says the Tech Is ‘mind-Bogglingly Stupid,’ but Hydrogen Cars May yet Threaten Tesla,” CNBC, February 23, 2019, <https://www.cnbc.com/2019/02/21/musk-calls-hydrogen-fuel-cells-stupid-but-tech-may-threaten-tesla.html>.

<sup>93</sup> “Fuel Cells,” Energy.gov, accessed February 17, 2021, <https://www.energy.gov/eere/fuelcells/fuel-cells>.

<sup>94</sup> Jan Ellen Spiegel, “Fuel Cells: Pros and Cons,” Yale Climate Connections, November 21, 2016, <https://yaleclimatemediaforum.org/2016/11/fuel-cells-pros-and-cons/>; “Partner Country Information: Fuel Cells and Hydrogen,” International Partnership for Hydrogen and Fuel Cells in the Economy, 2020, <https://www.iphe.net/partners>.

<sup>95</sup> “History of Reducing Air Pollution from Transportation in the United States,” Overviews and Factsheets, OAR US EPA, September 10, 2015, <https://www.epa.gov/transportation-air-pollution-and-climate-change/accomplishments-and-success-air-pollution-transportation>.; “Trump to Revoke California’s Authority to Set Stricter Auto Emissions Rules” New York Times, accessed November 5, 2020, <https://www.nytimes.com/2019/09/17/climate/trump-california-emissions-waiver.html>.

<sup>96</sup> “Clean Car Standards,” State Energy & Environmental Impact Center, NYU School of Law, 2020, <https://www.law.nyu.edu/centers/state-impact/issues/climate-action/clean-car-standards>.

<sup>97</sup> “Zero Emission Vehicles,” Department of Environmental Conservation, accessed December 15, 2020, <https://dec.vermont.gov/air-quality/mobile-sources/zev>.

<sup>98</sup> “Progress Cleaning the Air and Improving People’s Health,” Reports and Assessments, OAR US EPA, June 8, 2015, <https://www.epa.gov/clean-air-act-overview/progress-cleaning-air-and-improving-peoples-health>.; “Historic Success of the Clean Air Act,” Environmental Protection Agency, accessed December 14, 2020, <https://www.epa.gov/transportation-air-pollution-and-climate-change/accomplishments-and-success-air-pollution-transportation>.

---

99 Coral Davenport, "Trump Defends Plan to Kill California's Auto-Emissions Authority (Published 2019)," *New York Times*, September 20, 2019, sec. U.S., <https://www.nytimes.com/2019/09/18/us/trump-california-emissions.html>.

100 Coral Davenport, "Trump to Revoke California's Authority to Set Stricter Auto Emissions Rules (Published 2019)," *New York Times*, September 20, 2019, sec. Climate, <https://www.nytimes.com/2019/09/17/climate/trump-california-emissions-waiver.html>.

101 Russ Mitchell, "Trump Says Automakers Are 'Crazy' to Side with California. They Don't Need Another Fight," *LA Times*, August 28, 2019, <https://www.latimes.com/business/story/2019-08-28/trump-aims-to-help-the-auto-industry-some-companies-dont-want-the-help>; Coral Davenport, "Defying Trump, 5 Automakers Lock In a Deal on Greenhouse Gas Pollution," *New York Times*, August 17, 2020, <https://www.nytimes.com/2020/08/17/climate/california-automakers-pollution.html>; Hiroko Tabuchi and Coral Davenport, "Justice Dept. Investigates California Emissions Pact That Embarrassed Trump," *New York Times*, September 6, 2019, sec. Business, <https://www.nytimes.com/2019/09/06/climate/automakers-california-emissions-antitrust.html>.

102 Juliet Eilperin, et al., "Trump Rolled Back More than 125 Environmental Safeguards. Here's How.," *Washington Post*, October 30, 2020, <https://www.washingtonpost.com/graphics/2020/climate-environment/trump-climate-environment-protections/>; Oliver Milman and Alvin Chang, "How Biden Is Reversing Trump's Assault on the Environment," *Guardian*, February 2, 2021, <https://www.theguardian.com/us-news/2021/feb/02/biden-trump-environment-climate-crisis>.

103 "Fact Sheet: The Growth in Greenhouse Gas Emissions from Commercial Aviation," Environmental and Energy Study Institute, October 17, 2019, <https://www.eesi.org/papers/view/fact-sheet-the-growth-in-greenhouse-gas-emissions-from-commercial-aviation>.

104 "Transportation and Climate Change," Environmental Protection Agency, accessed December 14, 2020, <https://www.epa.gov/transportation-air-pollution-and-climate-change/carbon-pollution-transportation#transportation>.

105 "Fixing America's Surface Transportation Act or 'FAST Act'" (US Department of Transportation (Federal Highway Administration), February 2016), <https://www.fhwa.dot.gov/fastact/factsheets/federalsharefs.cfm>; Susan Pantell, "Tipping the Playing Field: How America's Federal Funding Policy Heavily Favors Roads Over Transit," *Light Rail Now*, May 2009, [https://lightrailnow.org/features/f\\_lrt\\_2009-05a.htm](https://lightrailnow.org/features/f_lrt_2009-05a.htm).

106 Ben Fried et al., "A Green New Deal for City and Suburban Transportation" (Data for Progress, March 2020), 10-11, <https://filesforprogress.org/memos/gnd-for-transit.pdf>.

107 Heidi Groover, "No-Cost Bus Rides on King County Metro Coming to People with Very Low Incomes," *Seattle Times*, February 25, 2020, <https://www.seattletimes.com/seattle-news/transportation/no-cost-bus-rides-on-king-county-metro-coming-to-people-with-very-low-incomes/>.

108 "Safe Sidewalks LA," Safe Sidewalks LA, accessed December 14, 2020, <https://safesidewalks.lacity.org/about-us>.

109 Joseph Goodman, Melissa Laube, and Judith Schwenk, "Curitiba Bus System Is Model for Rapid Transit," *Reimagine*, accessed February 22, 2021, <https://www.reimaginepe.org/curitiba-bus-system>.

---

110 David Adler, "Story of Cities #37: How Radical Ideas Turned Curitiba into Brazil's 'Green Capital,'" *Guardian*, May 6, 2016, <https://www.theguardian.com/cities/2016/may/06/story-of-cities-37-mayor-jaimelerner-curitiba-brazil-green-capital-global-icon>.

111 Ibid.

112 David Adler, "Story of Cities #37: How Radical Ideas Turned Curitiba into Brazil's 'Green Capital,'" *Guardian*, May 6, 2016, <https://www.theguardian.com/cities/2016/may/06/story-of-cities-37-mayor-jaimelerner-curitiba-brazil-green-capital-global-icon>.; "Curitiba, Brazil, BRT Case Study" (National Renewable Energy Laboratory, May 30, 2013), 13, [https://onlinepubs.trb.org/onlinepubs/tcrp/tcrp90v1\\_cs/Curitiba.pdf](https://onlinepubs.trb.org/onlinepubs/tcrp/tcrp90v1_cs/Curitiba.pdf).; Admir Cr so Targino et al., "Bus Commuter Exposure and the Impact of Switching from Diesel to Biodiesel for Routes of Complex Urban Geometry," *Environmental Pollution* 263 (August 1, 2020): 114601, <https://doi.org/10.1016/j.envpol.2020.114601>.

113 David Adler, "Story of Cities #37: How Radical Ideas Turned Curitiba into Brazil's 'Green Capital,'" *Guardian*, May 6, 2016, <https://www.theguardian.com/cities/2016/may/06/story-of-cities-37-mayor-jaimelerner-curitiba-brazil-green-capital-global-icon>.

114 "Greenhouse Gas Emissions Reduction Toolkit," Oregon.gov, accessed December 14, 2020, <https://www.oregon.gov/odot/Planning/Pages/GHG-Toolkit.aspx>.

115 Shane Sticker, "6 Ways Portland Is Leading the Green City Movement," *The Inertia*, October 10, 2017, <https://www.theinertia.com/environment/6-ways-portland-is-leading-the-green-city-movement/>.

116 "Public Transportation's Role in Responding to Climate Change" (US Department of Transportation, Federal Transit Administration, January 2010), 6, <https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/PublicTransportationsRoleInRespondingToClimateChange2010.pdf>.

117 Ibid.

118 "About Us," Envision Utah, accessed December 14, 2020, <https://envisionutah.org/about>.

119 "Transportation Action Plan," Minneapolis Government, accessed September 17, 2020, <http://go.minneapolismn.gov/draft-plan-overview>.

120 Ibid.

121 "Transportation Action Plan - Goals and Strategies," Minneapolis Government, accessed September 17, 2020, <http://go.minneapolismn.gov/goals-strategies/mobility>.

122 "Congress for the New Urbanism," Congress for the New Urbanism, accessed September 17, 2020, <https://www.cnu.org>.

123 "Strong Towns," Strong Towns, accessed September 17, 2020, <https://www.strongtowns.org>.

124 Elle Hunt, "Meet the Numtots: The Millennials Who Find Fixing Public Transport Sexy," *Guardian*, July 5, 2018, <https://www.theguardian.com/cities/2018/jul/05/meet-the-numtots-the-millennials-who-find-fixing-public-transit-sexy-urbanist-memes>.

---

125 “Smart Grid: How Does It Work and Why Do We Need It?,” Environmental and Energy Study Institute, January 8, 2009, <https://www.eesi.org/briefings/view/smart-grid-how-does-it-work-and-why-do-we-need-it>.

126 “Time-Of-Use Tariffs Innovation Landscape Brief,” IRENA, accessed September 17, 2020, [https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/Feb/IRENA\\_Innovation\\_ToU\\_tariffs\\_2019.pdf?la=en&hash=36658ADA8AA98677888DB2C184D1EE6A048C7470](https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/Feb/IRENA_Innovation_ToU_tariffs_2019.pdf?la=en&hash=36658ADA8AA98677888DB2C184D1EE6A048C7470); “Demand Response Programs Can Reduce Utilities’ Peak Demand an Average of 10%, Complementing Savings from Energy Efficiency Programs,” ACEEE, February 9, 2017, <https://www.aceee.org/blog/2017/02/demand-response-programs-can-reduce>.

127 Adam Cooper and Mike Shuster, “Electric Company Smart Meter Deployments: Foundation for a Smart Grid (2019 Update),” Edison Foundation, December 2019, 1, [https://www.edisonfoundation.net/-/media/Files/IEI/publications/IEI\\_Smart-Meter-Report\\_2019\\_FINAL.ashx](https://www.edisonfoundation.net/-/media/Files/IEI/publications/IEI_Smart-Meter-Report_2019_FINAL.ashx).

128 David Murakami Wood, “Smart City, Surveillance City,” SCL, accessed December 14, 2020, <https://www.scl.org/articles/3405-smart-city-surveillance-city>.

129 Michael Kanellos, “Smart Grid Price Tag: \$476 Billion; Benefits: \$2 Trillion,” Green Tech Media, April 8, 2011, <https://www.greentechmedia.com/articles/read/smart-grid-price-tag-476-billion-benefits-2-trillion>.

130 “Charging Your Electric Car on the Smart Grid: Three Key Standards,” National Institute of Standards and Technology, US Department of Commerce, August 25, 2016, <https://www.nist.gov/el/smartgrid/charging-your-electric-car-smart-grid-three-key-standards>.

131 “Southeast Asia to Invest \$9.8 Billion in Smart Grid Infrastructure,” Smart Energy International, September 5, 2018, <https://www.smart-energy.com/industry-sectors/smart-grid/southeast-asia-9-8-billion-smart-grid-infrastructure/>; “Southeast Asia’s Annual Future Grid Revenue Expected to Reach \$13 Billion in 2027,” T&D World, April 3, 2019, <https://www.tdworld.com/grid-innovations/smart-grid/article/20972423/southeast-asias-annual-future-grid-revenue-expected-to-reach-13-billion-in-2027>.

132 “Wall Street and Green New Deal,” Living on Earth, February 22, 2019, <https://www.loe.org/shows/shows.html?programID=19-P13-00008#feature1>.

133 Ibid.

134 Ibid.

135 “President George W. Bush Archives,” White House, accessed December 14, 2020, <https://georgewbush.whitehouse.archives.gov/infocus/energy/>.

136 “Pigouvian Tax,” Policonomics, accessed December 14, 2020, <https://policonomics.com/pigouvian-tax/>.

137 Ibid.

138 Charles Frank, “Pricing Carbon: A Carbon Tax or Cap-And-Trade?,” Brookings, August 12, 2014, <https://www.brookings.edu/blog/planetpolicy/2014/08/12/pricing-carbon-a-carbon-tax-or-cap-and-trade/>.

139 “Tracking Global Carbon Revenues: A Survey of Carbon Taxes versus Cap-and-Trade in the Real World,” Science Direct, Energy Policy, 96 (September 2016): 50–77, <https://doi.org/10.1016/j.enpol.2016.05.023>.

---

140 Brad Plumer and Nadja Popovich, "These Countries Have Prices on Carbon. Are They Working?," *New York Times*, April 2, 2019, <https://www.nytimes.com/interactive/2019/04/02/climate/pricing-carbon-emissions.html?rref=%20collection%2Ftimestopic%2FCap%20and%20Trade&action=click&contentCollection=timestopics&region=stream&module=inline&version=latest&contentPlacement=1&pgtype=collection&mtrref=undefined&assetType=PAYWALL&mtrref=www.nytimes.com&gwh=F9CB34ED2B2406AA800A6C6F7FC5E871&gwt=pay&assetType=REGIWALL>; "Carbon Pricing Dashboard," The World Bank, accessed December 14, 2020, [https://carbonpricingdashboard.worldbank.org/map\\_data](https://carbonpricingdashboard.worldbank.org/map_data).

141 "Carbon Pricing Dashboard," The World Bank, accessed December 14, 2020, [https://carbonpricingdashboard.worldbank.org/map\\_data](https://carbonpricingdashboard.worldbank.org/map_data).

142 Ibid.

143 Franziska Funke and Linus Mattauch, "Why Is Carbon Pricing in Some Countries More Successful than in Others?," *Our World in Data*, August 10, 2018, <https://ourworldindata.org/carbon-pricing-popular>.

144 Lisa Friedman and Keith Bradsher, "China Unveils an Ambitious Plan to Curb Climate Change Emissions," *New York Times*, December 19, 2017, <https://www.nytimes.com/2017/12/19/climate/china-carbon-market-climate-change-emissions.html>.

145 "China Tries to Have It Both Ways With Virus Recovery," *Bloomberg Green*, June 9, 2020, <https://www.bloomberg.com/news/articles/2020-06-09/in-coronavirus-recovery-china-looks-to-climate-and-coal>.

146 Gao Baiyu, "China Relaxes Restrictions on Coal Power Expansion for Third Year Running," *China Dialogue*, April 17, 2020, <https://chinadialogue.net/en/energy/11966-china-relaxes-restrictions-on-coal-power-expansion-for-third-year-running/>.

147 "British Carbon Tax Leads to 93% Drop in Coal-Fired Electricity," *Phys Org*, January 27, 2020, <https://phys.org/news/2020-01-british-carbon-tax-coal-fired-electricity.html>.

148 Ibid.

149 Adrian Gault, "GHG Mitigation in the United Kingdom: An Overview of the Current Policy Landscape," (World Resource Institute, November 2012), 1, [https://files.wri.org/s3fs-public/pdf/ghg\\_mitigation\\_uk\\_policy\\_landscape.pdf](https://files.wri.org/s3fs-public/pdf/ghg_mitigation_uk_policy_landscape.pdf).

150 Simon Evans, "Analysis: UK's CO<sub>2</sub> Emissions Have Fallen 29% over the Past Decade," *Carbon Brief*, March 3, 2020, <https://www.carbonbrief.org/analysis-uks-co2-emissions-have-fallen-29-per-cent-over-the-past-decade>.

151 "How Much of U.S. Energy Consumption and Electricity Generation Comes from Renewable Energy Sources?," U.S. Energy Information Administration, GHG Mitigation in the United Kingdom: An Overview of the Current Policy Landscape, accessed December 14, 2020, <https://www.eia.gov/tools/faqs/faq.php?id=92&t=4#:~:text=In%202019%2C%20renewable%20energy%20sources,about%2017%25%20of%20electricity%20generation>.

152 "A Burning Issue: Biomass Is the Biggest Source of Renewable Energy Consumed in the UK," Office for National Statistics, August 30, 2019,

---

<https://www.ons.gov.uk/economy/environmentalaccounts/articles/aburningissuebiomassisthebiggestsourceofrenewableenergyconsumedintheuk/2019-08-30>.

153 Chris Giles, Leslie Hook, and Chris Campbell, "Zero Emissions Goal: The Mess of Britain's Carbon Taxes," *Financial Times*, March 10, 2020, <https://www.ft.com/content/c4e7cf36-61f5-11ea-a6cd-df28cc3c6a68>.

154 "Why Is Carbon Pricing in Some Countries More Successful than in Others?," *Our World in Data*, accessed December 14, 2020, <https://ourworldindata.org/carbon-pricing-popular#note-10>.

155 Joshua Burke and Rebecca Byrnes, "Guest Post: What the UK Can Learn from Carbon Pricing Schemes around the World," *Carbon Brief*, August 2, 2019, <https://www.carbonbrief.org/guest-post-what-the-uk-can-learn-from-carbon-pricing-schemes-around-the-world>.

156 "Trends in Greenhouse Gas Emissions in B.C. (1990- 2017)," *Environmental Reporting BC*, accessed December 14, 2020, <http://www.env.gov.bc.ca/soe/indicators/sustainability/ghg-emissions.html>.

157 "Lifting the High Energy Burden in America's Largest Cities: How Energy Efficiency Can Improve Low-Income and Underserved Communities," *American Council for an Energy Efficient Economy*, April 20, 2016, <https://www.aceee.org/research-report/u1602>.

158 "Emmanuel Macron's Carbon Tax Sparked Gilets Jaunes Protests, but Popular Climate Policy Is Possible," *The Conversation*, December 11, 2018, <https://theconversation.com/emmanuel-macrons-carbon-tax-sparked-gilets-jaunes-protests-but-popular-climate-policy-is-possible-108437>.; Pdraig Collins, "How Not to Introduce a Carbon Tax: The Australian Experience," *Irish Times*, December 11, 2018, <https://www.irishtimes.com/news/environment/how-not-to-introduce-a-carbon-tax-the-australian-experience-1.3746214>.

159 "Carbon Pricing 101," *Union of Concerned Scientists*, July 17, 2009, <https://www.ucsusa.org/resources/carbon-pricing-101>.

160 "Carbon Taxes Are Key to Stop Deforestation," *Climate Change News*, February 13, 2020, <https://www.climatechangenews.com/2020/02/13/carbon-taxes-key-stop-deforestation/>.

161 Edward Barbier et al., "Adopt a Carbon Tax to Protect Tropical Forests," *Nature*, February 12, 2020, <https://www.nature.com/articles/d41586-020-00324-w>.

162 Ibid.

163 David Gibbs, et al., "By the Numbers: The Value of Tropical Forests in the Climate Change Equation," *World Resources Institute*, October 4, 2018. <https://www.wri.org/blog/2018/10/numbers-value-tropical-forests-climate-change-equation>

164 "Tracking Global Carbon Revenues: A Survey of Carbon Taxes versus Cap-and-Trade in the Real World," *Science Direct, Energy Policy*, 96 (September 2016): 50–77, <https://doi.org/10.1016/j.enpol.2016.05.023>.

165 Mark Jaccard, "Divisive Carbon Prices Are Much Ado about Nothing," *Globe and Mail*, December 14, 2018, <https://www.theglobeandmail.com/opinion/article-divisive-carbon-prices-are-much-ado-about-nothing/>.



---

166 Isabella Burch and Jock Gilchrist, "Survey of Global Activity to Phase Out Internal Combustion Engine Vehicles," Center for Climate Protection, September 2018, 1-2, <https://theclimatescenter.org/wp-content/uploads/2018/10/Survey-on-Global-Activities-to-Phase-Out-ICE-Vehicles-FINAL-Oct-3-2018.pdf>.

167 Ben Machol and Sarah Rizk, "Economic Value of U.S. Fossil Fuel Electricity Health Impacts," Science Direct, Environment International, February 2013, <https://doi.org/10.1016/j.envint.2012.03.003>.  
<https://pubmed.ncbi.nlm.nih.gov/23246069/>

168 Matthew Taylor and Jillian Ambrose, "Revealed: Big Oil's Profits since 1990 Total Nearly \$2tn," Guardian, February 12, 2020, <https://www.theguardian.com/business/2020/feb/12/revealed-big-oil-profits-since-1990-total-nearly-2tn-bp-shell-chevron-exxon>.

169 "The People's Demand for Climate Justice," People's Demand, accessed December 14, 2020, <https://www.peoplesdemands.org>.

170 "Massachusetts Investigation of Exxon for Climate Fraud Can Proceed, Court Rules," Climate Docket, April 13, 2018, <https://www.climatedocket.com/2018/04/13/exxon-climate-maura-healey-massachusetts/>; "MassInsider," June 9, 2020, <https://www.massinsider.net/press-releases/27739>.

171 "Cities given Green Light to Pursue Liability against Big Oil," Corporate Accountability, May 26, 2020, <https://www.corporateaccountability.org/media/cities-pursue-liability-big-oil/>; Big Oil Loses Appeal to Stop Climate Lawsuits from Going to Court in California," LA Times, May 27, 2020, <https://www.latimes.com/california/story/2020-05-27/big-oil-loses-appeal-climate-lawsuits-california-court>.

172 "Big Oil Loses Appeal to Stop Climate Lawsuits from Going to Court in California," LA Times, May 27, 2020, [https://www.latimes.com/california/story/2020-05-27/big-oil-loses-appeal-climate-lawsuits-california-court?\\_amp=true](https://www.latimes.com/california/story/2020-05-27/big-oil-loses-appeal-climate-lawsuits-california-court?_amp=true).

173 "Cities given Green Light to Pursue Liability against Big Oil," Corporate Accountability, May 26, 2020, <https://www.corporateaccountability.org/media/cities-pursue-liability-big-oil/>.

174 John Schwartz, "David Kaiser, Rockefeller Heir Who Fought Exxon Mobil, Dies at 50," New York Times, July 16, 2020, <https://www.nytimes.com/2020/07/16/business/energy-environment/david-kaiser-dead.html>.

175 David Hasemyer, "'At the Forefront of Climate Change,' Hoboken, New Jersey, Seeks Damages from ExxonMobil," *Inside Climate News*, September 3, 2020, <https://insideclimatenews.org/news/03092020/exxonmobil-hoboken-climate-lawsuit/>.

176 "Juliana v. United States," Our Children's Trust, accessed December 23, 2020, <https://www.ourchildrenstrust.org/juliana-v-us>.

177 "Bill McKibben on the Divestment Movement," *Allegheny Front*, July 9, 2020, <https://www.alleghenyfront.org/bill-mckibben-on-the-divestment-movement/>.

178 "What Is Fossil Fuel Divestment?," Fossil Free: Divestment, accessed December 14, 2020, <https://gofossilfree.org/divestment/what-is-fossil-fuel-divestment/>.

179 "Divestment Commitments," Fossil Free: Divestment, accessed January 2021, <https://gofossilfree.org/divestment/commitments/>.

---

180 Ibid.

181 “Bill McKibben on the Divestment Movement,” *Allegheny Front*, July 9, 2020, <https://www.alleghenyfront.org/bill-mckibben-on-the-divestment-movement/>.

182 Umair Irfan, “Why Climate Activists Disrupted the Harvard-Yale Football Game,” *Vox*, November 23, 2019, <https://www.vox.com/2019/5/13/18282438/harvard-yale-football-game-climate-change-fossil-fuel-divestment-finance>.

183 Ibid.

184 Kate Aronoff, “A Moderate Proposal: Nationalize the Fossil Fuel Industry,” *New Republic*, March 17, 2020, <https://newrepublic.com/article/156941/moderate-proposal-nationalize-fossil-fuel-industry>.

185 Robin Wigglesworth, “How America’s 1% Came to Dominate Stock Ownership,” *Financial Post*, February 11, 2020, <https://financialpost.com/investing/how-americas-1-came-to-dominate-stock-ownership>.

186 Jesse Pound, “Biden Says Investors ‘Don’t Need Me,’ Calls for End of ‘Era of Shareholder Capitalism,’” *CNBC*, July 9, 2020, <https://www.cnn.com/2020/07/09/biden-says-investors-dont-need-me-calls-for-end-of-era-of-shareholder-capitalism.html>.

187 “Public Power,” American Public Power Association, accessed December 14, 2020, <https://www.publicpower.org/public-power>.

188 “Benefits of Public Power,” American Public Power Association, accessed December 14, 2020, 20, [https://www.publicpower.org/system/files/documents/municipalization-benefits\\_of\\_public\\_power.pdf](https://www.publicpower.org/system/files/documents/municipalization-benefits_of_public_power.pdf).

189 Glenn English, “Electric Cooperatives and Renewable Energy”, National Rural Electric Cooperative Association, Accessed October 2020, 2, [https://www.hwe.coop/media/1626/NRECA\\_renewable\\_brochure.pdf](https://www.hwe.coop/media/1626/NRECA_renewable_brochure.pdf); “Electricity Explained: Electricity Generation, Capacity, and Sales in the United States,” U.S. Energy Information Administration, March 19, 2020, <https://www.eia.gov/energyexplained/electricity/electricity-in-the-us-generation-capacity-and-sales.php>

190 Glenn English, “Electric Cooperatives and Renewable Energy”, National Rural Electric Cooperative Association, Accessed October 2020, [https://www.hwe.coop/media/1626/NRECA\\_renewable\\_brochure.pdf](https://www.hwe.coop/media/1626/NRECA_renewable_brochure.pdf).

191 Ibid.

192 “Michigan Co-Ops Lead the Way in Renewable Energy,” *PIE&G*, October 12, 2016, <https://www.pieg.com/michigan-co-ops-lead-the-way-in-renewable-energy/>.

193 “Benefits of Public Power,” American Public Power Association, Accessed October 2020, 12, [https://www.publicpower.org/system/files/documents/municipalization-benefits\\_of\\_public\\_power.pdf](https://www.publicpower.org/system/files/documents/municipalization-benefits_of_public_power.pdf).

194 Thomas M. Hanna, “Community-Owned Energy: How Nebraska Became the Only State to Bring Everyone Power From a Public Grid,” *Yes!Maganize*, January 30, 2015, <https://www.yesmagazine.org/economy/2015/01/30/nebraskas-community-owned-energy/>.

---

195 Jackson Koeppel, Johanna Bozuwa, and Liz Veazey, “The Green New Deal Must Put Utilities Under Public Control,” *In these times*, February 1, 2019, <https://inthesetimes.com/article/green-new-deal-community-ownership-electric-utilities-renewable-energy>.

196 James Steinbauer, “The Atlantic Coast Pipeline: Risky and Costly . . . and Unnecessary,” *Sierra Club*, August 27, 2019, <https://www.sierraclub.org/sierra/atlantic-coast-pipeline-risky-and-costly-and-unnecessary>.

197 Mary Harris, “Why It Took So Long to Defeat the Atlantic Coast Pipeline,” *Slate*, July 8, 2020, <https://slate.com/human-interest/2020/07/atlantic-coast-pipeline-canceled-victory-lawsuits-appalachia-virginia-north-carolina.html>.

198 Ivan Penn, “Atlantic Coast Pipeline Canceled as Delays and Costs Mount,” *New York Times*, July 5, 2020, <https://www.nytimes.com/2020/07/05/business/atlantic-coast-pipeline-cancel-dominion-energy-berkshire-hathaway.html>.

199 Kolby KickingWoman, “Dakota Access Pipeline: Timeline,” *Indian Country Today*, July 8, 2020, <https://indiancountrytoday.com/news/dakota-access-pipeline-timeline-FW2gTraDsE2Jn3tCXYjlyg>.

200 Elizabeth Hoover, “Feeding a Movement: The Kitchens of the Standing Rock Camps,” *Garden Warriors Good Seeds*, December 6, 2016, <https://gardenwarriorsgoodseeds.com/2016/12/06/feeding-a-movement-the-kitchens-of-the-standing-rock-camps/>.

201 Kolby KickingWoman, “Dakota Access Pipeline: Timeline,” *Indian Country Today*, July 8, 2020, <https://indiancountrytoday.com/news/dakota-access-pipeline-timeline-FW2gTraDsE2Jn3tCXYjlyg>.

202 Ibid.

203 Oliver Milman, “Dakota Access Pipeline Company and Donald Trump Have Close Financial Ties,” *Guardian*, October 26, 2016, <https://www.theguardian.com/us-news/2016/oct/26/donald-trump-dakota-access-pipeline-investment-energy-transfer-partners>.; Kolby KickingWoman, “Dakota Access Pipeline: Timeline,” *Indian Country Today*, July 8, 2020, <https://indiancountrytoday.com/news/dakota-access-pipeline-timeline-FW2gTraDsE2Jn3tCXYjlyg>.

204 Kolby KickingWoman, “Dakota Access Pipeline: Timeline,” *Indian Country Today*, July 8, 2020, <https://indiancountrytoday.com/news/dakota-access-pipeline-timeline-FW2gTraDsE2Jn3tCXYjlyg>.

205 Lisa Friedman and Jacey Fortin, “Dakota Access Pipeline to Shut Down Pending Review, Federal Judge Rules,” *New York Times*, July 6, 2020, <https://www.nytimes.com/2020/07/06/us/dakota-access-pipeline.html>.

## Chapter 3: Choosing the Greenest Green

1 The Solutions Project,” *The Solutions Project*, Accessed February 14, 2021, <https://thesolutionsproject.org/>. (Note that the Projects updates these projections.)

2 Jacobson, op. cit. 100% Clean, Renewable Energy and Storage for Everything Cambridge University Press, 2021.

---

3 Neil Beardmore, "Harnessing UK's Offshore Wind Potential," *Electric Energy Online*, accessed September 17, 2020, <http://electricenergyonline.com/energy/magazine/936/article/Harnessing-UK-s-offshore-wind-potential.htm>.

4 John Parnell, "Vattenfall Wins Approval for Huge Offshore Wind Farm as UK Struggles to Accelerate Market," *Greentech Media*, July 2, 2020, <https://www.greentechmedia.com/articles/read/vattenfall-gets-approval-for-major-offshore-wind-farm>.

5 "Vietnam Has Potential for 160 GW of Offshore Wind Energy," *Ewind*, May 19, 2020, <https://www.ewind.es/2020/05/19/vietnam-has-potential-for-160-gw-of-offshore-wind-energy/74789>.

6 Liz Hartman, "Computing America's Offshore Wind Energy Potential," *Energy.gov*, September 9, 2016, <https://www.energy.gov/eere/articles/computing-america-s-offshore-wind-energy-potential>.

7 "Offshore Wind Farms in the United States: Block Island Leads the Way," *Green City Times*, accessed February 19, 2021, <https://www.greencitytimes.com/the-block-island-wind-farm/>; "Average Number of Homes Powered by a MW of Solar PV," *Solar Energy Industries Association*, accessed September 17, 2020, <https://www.seia.org/sites/default/files/inline-images/average-homes-powered-by-MW-solar.jpg>; Liz Hartman, "Computing America's Offshore Wind Energy Potential," *Energy.gov*, September 9, 2016, <https://www.energy.gov/eere/articles/computing-america-s-offshore-wind-energy-potential>.

8 Alexandra Kelley, "US Completes Construction of Second Offshore Wind Farm," *The Hill*, June 30, 2020, <https://thehill.com/changing-america/sustainability/climate-change/505261-us-completes-construction-of-second-offshore>.

9 Katherine Blunt, "Offshore Wind Farms, Big in Europe, Could Boom in U.S. Under Biden," *Wall Street Journal*, February 6, 2021, sec. Business, <https://www.wsj.com/articles/offshore-wind-farms-big-in-europe-could-boom-in-u-s-under-biden-11612623600>.

10 Liz Hartman, "Computing America's Offshore Wind Energy Potential," *Energy.gov*, September 9, 2016, <https://www.energy.gov/eere/articles/computing-america-s-offshore-wind-energy-potential>.

<sup>11</sup> Anmar Frangoul, "Big Potential, but Challenges to Overcome: A Look at Offshore Wind in the U.S.," *CNBC*, September 18, 2020, <https://www.cnbc.com/2020/09/18/potential-but-challenges-too-a-look-at-offshore-wind-in-the-us.html>; "Examples of Offshore Renewable Energy," <https://www.doi.gov/sites/doi.gov/files/migrated/whatwedo/energy/ocs/upload/slides-POCS-2.pdf>.

12 Stanley Reed, "BP Reports a Huge Loss and Vows to Increase Renewable Investment," *New York Times*, August 4, 2020, sec. Business, <https://www.nytimes.com/2020/08/04/business/energy-environment/bp-renewable-investment.html>; Charles Kennedy, "Oil Major BP Makes First Ever Move In Offshore Wind Energy," *OilPrice.com*, September 10, 2020, <https://oilprice.com/Latest-Energy-News/World-News/Oil-Major-BP-Makes-First-Ever-Move-In-Offshore-Wind-Energy.html>.

13 Dave McQuilling, "US' First Offshore Wind Tower Plant to Be Built in Albany," *News10*, January 13, 2021, <https://www.news10.com/news/us-first-offshore-wind-tower-plant-to-be-built-in-albany/>.

14 Ibid.

---

15 “Energy Department Announces \$33 Million to Advance Hydrogen and Fuel Cell R&D and the H2@Scale Vision,” Energy.gov, December 10, 2020, <https://www.energy.gov/eere/articles/energy-department-announces-33-million-advance-hydrogen-and-fuel-cell-rd-and-h2scale>.

16 Mark Ruth et al., “The Technical and Economic Potential of the H2@Scale Hydrogen Concept within the United States” (NREL, October 2020), <https://www.osti.gov/servlets/purl/1677471/>.; “H2@Scale,” Energy.gov, accessed February 19, 2021, <https://www.energy.gov/eere/fuelcells/h2scale>.

17 “Which Countries Have the Most Offshore Wind Capacity?,” NS Energy, October 1, 2019, <https://www.nsenergybusiness.com/features/offshore-wind-energy-producing-countries/>.

18 Tess Riley, “Just 100 Companies Responsible for 71% of Global Emissions, Study Says,” *Guardian*, July 10, 2017, <https://www.theguardian.com/sustainable-business/2017/jul/10/100-fossil-fuel-companies-investors-responsible-71-global-emissions-cdp-study-climate-change>.

19 Alex Mey, “Most U.S. Utility-Scale Solar Photovoltaic Power Plants Are 5 Megawatts or Smaller,” U.S. Energy Information Administration (EIA), February 7, 2019, <https://www.eia.gov/todayinenergy/detail.php?id=38272>.

20 “Frequently Asked Questions (FAQs),” U.S. Energy Information Administration (EIA), June 9, 2020, <https://www.eia.gov/tools/faqs/faq.php>; Nuclear Power in the USA,” World Nuclear Association, September 2020, <https://www.world-nuclear.org/information-library/country-profiles/countries-t-z/usa-nuclear-power.aspx>

21 “Nuclear Power Today,” World Nuclear Association, accessed February 8, 2021, <https://www.world-nuclear.org/information-library/current-and-future-generation/nuclear-power-in-the-world-today.aspx>.; “Plans for New Nuclear Reactors Worldwide,” World Nuclear Association, accessed February 8, 2021, <https://www.world-nuclear.org/information-library/current-and-future-generation/plans-for-new-reactors-worldwide.aspx>.

22 “Plans for New Nuclear Reactors Worldwide,” World Nuclear Association, accessed February 8, 2021, <https://www.world-nuclear.org/information-library/current-and-future-generation/plans-for-new-reactors-worldwide.aspx>.

23 Mycle Schneider et al., “The World Nuclear Industry Status Report” (Paris, London, Washington D.C.: Mycle Schneider Consulting, July 2014), 4, <http://www.worldnuclearreport.org/IMG/pdf/201408msc-worldnuclearreport2014-hr-v4.pdf>.; “Nuclear Power Today,” World Nuclear Association, August 2020, <https://www.world-nuclear.org/information-library/current-and-future-generation/nuclear-power-in-the-world-today.aspx>.

24 Hannah Ritchie, “Global Renewables Are Growing, but Are Only Managing to Offset the Decline in Nuclear Production,” Our World in Data, May 19, 2017, <https://ourworldindata.org/global-renewables-are-growing-but-are-only-managing-to-offset-a-decline-in-nuclear-production>.

25 “Nuclear Power Today,” World Nuclear Association, August 2020, <https://www.world-nuclear.org/information-library/current-and-future-generation/nuclear-power-in-the-world-today.aspx>.; Hannah Ritchie and Max Roser, “Renewable Energy,” Our World in Data, accessed February 1, 2021, <https://ourworldindata.org/renewable-energy>.

---

26 “Nuclear Power in the USA,” World Nuclear Association, September 2020, <https://www.world-nuclear.org/information-library/country-profiles/countries-t-z/usa-nuclear-power.aspx>.

27 Courtney Goldsmith, “Nuclear Power Continues Its Decline as Renewable Alternatives Steam Ahead,” World Finance, October 15, 2018, <https://www.worldfinance.com/markets/nuclear-power-continues-its-decline-as-renewable-alternatives-steam-ahead>.

28 Maureen C. Hatch et al., “Cancer near the Three Mile Island Nuclear Plant: Radiation Emissions,” *American Journal of Epidemiology* 132, no. 3 (September 1990): 397, <https://doi.org/10.1093/oxfordjournals.aje.a115673>; Roger J. Levin, “Incidence of Thyroid Cancer in Residents Surrounding the Three Mile Island Nuclear Facility,” *Laryngoscope* 118, no. 4 (April 2008): 618–28, <https://doi.org/10.1097/MLG.0b013e3181613ad2>; Steve Wing et al., “A Reevaluation of Cancer Incidence near the Three Mile Island Nuclear Plant: The Collision of Evidence and Assumptions,” *Environmental Health Perspectives* 105, no. 1 (January 1997): 52; David Brennan, “Chernobyl Death Toll: How Many People Were Killed by the Nuclear Disaster?,” *Newsweek*, June 4, 2019, <https://www.newsweek.com/chernobyl-disaster-death-toll-estimates-radiation-cancer-1444029>; Ernest Moniz, “Why We Still Need Nuclear Power,” *Foreign Affairs*, December 2011, <https://www.foreignaffairs.com/articles/2011-10-17/why-we-still-need-nuclear-power>; Matthew L. Wald, “Nuclear Plant’s Use of River Water Prompts \$1.1 Billion Debate With State,” *New York Times*, August 23, 2010, <https://www.nytimes.com/2010/08/23/science/earth/23cooling.html>; Jordi Vivis i Batlle, “Impact of the Fukushima Accident on Marine Life, Five Years Later,” *ScienceDaily*, October 18, 2016, <https://www.sciencedaily.com/releases/2016/10/161018141309.htm>.

29 Ian Tiseo, “Number of Operable Nuclear Power Plants by Country 2020,” Statista, September 2, 2020, <https://www.statista.com/statistics/267158/number-of-nuclear-reactors-in-operation-by-country/>; John Vidal, “Are Coastal Nuclear Power Plants Ready for Sea Level Rise?,” *Hakai Magazine*, August 21, 2018, <https://www.hakaimagazine.com/features/are-coastal-nuclear-power-plants-ready-for-sea-level-rise/>.

30 Christopher Flavelle and Jeremy C. F. Lin, “90% of U.S. Nuclear Power Plants Aren’t Built for Climate Change,” *Bloomberg Businessweek*, April 18, 2019, <https://www.bloomberg.com/graphics/2019-nuclear-power-plants-climate-change/>.

31 Harrison Jacobs, “The 17 Countries Generating The Most Nuclear Power,” Business Insider, accessed November 12, 2020, <https://www.businessinsider.com/countries-generating-the-most-nuclear-energy-2014-3>; “Key Issues: Nuclear Waste Disposal,” U.S. Government Accountability Office, accessed November 12, 2020, [https://www.gao.gov/key\\_issues/nuclear\\_waste\\_disposal/issue\\_summary?from=topics](https://www.gao.gov/key_issues/nuclear_waste_disposal/issue_summary?from=topics).

32 “Worker Health Study Summaries - Uranium Miners,” Centers for Disease Control and Prevention, April 8, 2020, <https://www.cdc.gov/niosh/pgms/worknotify/uranium.html>.

33 “Nuclear Proliferation Risks in Nuclear Energy Programs” (Center for Arms Control and Non-Proliferation, April 24, 2018), <https://armscontrolcenter.org/nuclear-proliferation-risks-in-nuclear-energy-programs/>.

34 “Health Effects of Uranium Mining: Uranium Mining Fact Sheet” (International Physicians for the Prevention of Nuclear War, n.d.), <http://www.ippnw.org/pdf/uranium-factsheet4.pdf>.

35 Douglas Ray, “Lazard’s Levelized Cost of Energy Analysis—Version 13.0,” (Lazard, November 2019), 7, <https://www.lazard.com/media/451086/lazards-levelized-cost-of-energy-version-130-vf.pdf>.



---

36 Mycle Schneider et al., “The World Nuclear Industry Status Report 2019” (World Nuclear Industry, September 27, 2019), 23, <https://www.worldnuclearreport.org/The-World-Nuclear-Industry-Status-Report-2019-HTML.html>.

37 Mycle Schneider et al., “The World Nuclear Industry Status Report 2019” (World Nuclear Industry, September 27, 2019), <https://www.worldnuclearreport.org/The-World-Nuclear-Industry-Status-Report-2019-HTML.html>.

38 Douglas Ray, “Lazard’s Levelized Cost of Energy Analysis—Version 13.0,” (Lazard, November 2019), 10, <https://www.lazard.com/media/451086/lazards-levelized-cost-of-energy-version-130-vf.pdf>.

39 Daria Iurshina et al., “Why Nuclear Power Plants Cost so Much—and What Can Be Done about It,” *Bulletin of the Atomic Scientists*, June 20, 2019, <https://thebulletin.org/2019/06/why-nuclear-power-plants-cost-so-much-and-what-can-be-done-about-it/>.

40 “The Cost of Nuclear Power,” Union of Concerned Scientists, December 17, 2015, <https://www.ucsusa.org/resources/nuclear-power-cost>.

41 “Nuclear Decommissioning: Decommission Nuclear Facilities,” World Nuclear Association, August 2020, <https://www.world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-wastes/decommissioning-nuclear-facilities.aspx>; “Nuclear Power,” Union of Concerned Scientists, accessed January 22, 2020, <https://www.ucsusa.org/energy/nuclear-power>.

42 Dan Drollette, “The Rising Cost of Decommissioning a Nuclear Power Plant,” *Bulletin of the Atomic Scientists*, April 28, 2014, <https://thebulletin.org/2014/04/the-rising-cost-of-decommissioning-a-nuclear-power-plant/>.

43 Matthew L. Wald, “Nuclear Plants, Old and Uncompetitive, Are Closing Earlier Than Expected,” *New York Times*, June 14, 2013, <https://www.nytimes.com/2013/06/15/business/energy-environment/aging-nuclear-plants-are-closing-but-for-economic-reasons.html>.

44 Margaret Doane, “Recommendations for Enhancing the Reactor Oversight Process” (United States Nuclear Regulatory Commission, June 28, 2019), 15, <https://www.nrc.gov/docs/ML1907/ML19070A050.pdf>; Coral Davenport, “Fewer Inspections for Aging Nuclear Plants, Regulators Propose,” *New York Times*, July 17, 2019, <https://www.nytimes.com/2019/07/17/climate/nrc-nuclear-inspection-weakening.html>.

45 “Status of Initial License Renewal Applications and Industry Initiatives,” United States Nuclear Regulatory Commission, accessed October 9, 2020, <https://www.nrc.gov/reactors/operating/licensing/renewal/applications.html>; “Aging Nuclear Plants, Industry Cost-Cutting, and Reduced Safety Oversight: A Dangerous Mix,” *Bulletin of the Atomic Scientists*, August 29, 2019, <https://thebulletin.org/2019/08/aging-nuclear-plants-industry-cost-cutting-and-reduced-safety-oversight-a-dangerous-mix/>; “Nuclear Industry Push for Reduced Oversight Gaining Traction,” *US News & World Report*, accessed December 18, 2020, <https://www.usnews.com/news/politics/articles/2019-07-16/apnewsbreak-nrc-looking-at-reducing-inspections-at-reactors>; “Nuclear Industry Push for Reduced Oversight Gaining Traction,” *AP NEWS*, July 17, 2019, <https://apnews.com/article/2b7ebdbcec4b4b6788a7cf0468b1c054>; “NRC: Approved Applications for Power Upgrades,” Nuclear Regulatory Commission, accessed November 9, 2020, <https://www.nrc.gov/reactors/operating/licensing/power-updates/status-power-apps/approved-applications.html>.



---

46 “NRC: History of Watts Bar Unit 2 Reactivation,” Nuclear Regulatory Commission, October 28, 2015, <https://www.nrc.gov/info-finder/reactors/wb/watts-bar/history.html>.

47 “Frequently Asked Questions (FAQs),” U.S. Energy Information Administration (EIA), accessed October 30, 2020, <https://www.eia.gov/tools/faqs/faq.php>.

48 “Nuclear Explained - U.S. Nuclear Industry,” U.S. Energy Information Administration (EIA), accessed November 12, 2020, <https://www.eia.gov/energyexplained/nuclear/us-nuclear-industry.php>.

49 Jason Deign, “So, What Exactly Are Small Modular Nuclear Reactors?,” Greentech Media, September 9, 2020, <https://www.greentechmedia.com/articles/read/so-what-exactly-are-small-modular-nuclear-reactors>.

50 “Renewable Energy Financing Trends: The Year Ahead,” Greentech Media, 2021, [http://www2.greentechmedia.com/l/264512/2020-12-23/nfmk7?utm\\_source=Website](http://www2.greentechmedia.com/l/264512/2020-12-23/nfmk7?utm_source=Website).

51 “5 Fast Facts about Spent Nuclear Fuel,” Energy.gov, March 30, 2020, <https://www.energy.gov/ne/articles/5-fast-facts-about-spent-nuclear-fuel>.

52 Dan Gearino, “What Germany Can Teach the US About Quitting Coal,” Inside Climate News, October 15, 2020, <https://insideclimatenews.org/news/15102020/germany-coal-transition/>.

53 Henry Spelter and Daniel Toth, “North America’s Wood Pellet Sector” (Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory, 2009), <https://www.fs.usda.gov/treearch/pubs/35060>.

54 “Biomass Explained,” U.S. Energy Information Administration (EIA), August 28, 2020, <https://www.eia.gov/energyexplained/biomass/>.

55 Tim Searchinger et al., “Europe’s Renewable Energy Directive Poised to Harm Global Forests | Nature Communications,” Nature Communications 9, no. 3741 (2018), <https://doi.org/10.1038/s41467-018-06175-4>.

56 Summary “Burning Trees for Power: The Truth About Woody Biomass, Energy and Wildlife” (Chapel Hill, NC: Southern Environmental Law Center, January 2018), [https://www.southernenvironment.org/uploads/words\\_docs/Biomass\\_Biodiversity\\_white\\_paper\\_2.pdf](https://www.southernenvironment.org/uploads/words_docs/Biomass_Biodiversity_white_paper_2.pdf); “Fossil Fuels vs. Renewable Energy - Clean Energy,” Enviva Biomass, November 25, 2020, <https://www.envivabiomass.com/sustainability/environment/fossil-fuels-vs-renewable-energy/>.

57 Lawrence S. Earley, *Looking for Longleaf: The Rise and Fall of the American Forest* (Chapel Hill, NC: UNC Press, 2006).

58 “Enviva and The Longleaf Alliance Announce Partnership to Protect and Restore Longleaf Pine Forests,” Enviva Biomass, March 27, 2020, <https://www.envivabiomass.com/enviva-and-the-longleaf-alliance-announce-partnership-to-protect-and-restore-longleaf-pine-forests/>.

59 James P. Barnett, “Longleaf Pine Ecosystem Restoration: The Role of Fire,” *Journal of Sustainable Forestry*, Vol. 9, No. 1/2, 1999, Pp. 89-96, 1999, <https://www.fs.usda.gov/treearch/pubs/2125>.

60 “Burning Trees for Power: The Truth About Woody Biomass, Energy and Wildlife” (Chapel Hill, NC: Southern Environmental Law Center, January 2018), [https://www.southernenvironment.org/uploads/words\\_docs/Biomass\\_Biodiversity\\_white\\_paper.pdf](https://www.southernenvironment.org/uploads/words_docs/Biomass_Biodiversity_white_paper.pdf);

---

“Global Markets for Biomass Energy Are Devastating U.S. Forests” (NRDC, June 17, 2019), <https://www.nrdc.org/sites/default/files/global-markets-biomass-energy-06172019.pdf>.

61 “Burning Trees for Power: The Truth About Woody Biomass, Energy and Wildlife” (Chapel Hill, NC: Southern Environmental Law Center, January 2018), [https://www.southernenvironment.org/uploads/words\\_docs/Biomass\\_Biodiversity\\_white\\_paper.pdf](https://www.southernenvironment.org/uploads/words_docs/Biomass_Biodiversity_white_paper.pdf).

62 “Ethanol Market Is Disturbing to American Farmers. And Now There’s Covid-19,” Successful Farming, March 30, 2020, <https://www.agriculture.com/news/business/ethanol-market-is-disturbing-as-hell-to-american-farmers-and-now-there-s-covid-19>; “EWG’s Farm Subsidy Database,” EWG, accessed December 16, 2020, [https://farm.ewg.org/cropinsurance.php?fips=00000&summpage=IN\\_BY\\_CROP&regionname=theUnitedStates](https://farm.ewg.org/cropinsurance.php?fips=00000&summpage=IN_BY_CROP&regionname=theUnitedStates).

63 Timothy A. Wise, *Eating Tomorrow: Agribusiness, Family Farmers, and the Battle for the Future of Food*, (New York, NY: New Press, 2019).

64 C. Ford Runge, “The Case Against More Ethanol: It’s Simply Bad for Environment,” *Yale Environment* 360, May 25, 2016, [https://e360.yale.edu/features/the\\_case\\_against\\_ethanol\\_bad\\_for\\_environment](https://e360.yale.edu/features/the_case_against_ethanol_bad_for_environment).

65 “Electricity Explained: Electricity in the United States,” U.S. Energy Information Administration (EIA), accessed November 12, 2020, <https://www.eia.gov/energyexplained/electricity/electricity-in-the-us.php>.

66 “Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018” (United States Environmental Protection Agency, February 4, 2020), <https://www.epa.gov/sites/production/files/2020-04/documents/us-ghg-inventory-2020-main-text.pdf>; Ilissa B. Ocko and Steven P. Hamburg, “Climate Impacts of Hydropower: Enormous Differences among Facilities and over Time,” *Environmental Science & Technology* 53, no. 23 (November 13, 2019): 14071, <https://doi.org/10.1021/acs.est.9b05083>.

67 “Hydroelectric Generators Are among the United States’ Oldest Power Plants,” U.S. Energy Information Administration (EIA), March 13, 2017, <https://www.eia.gov/todayinenergy/detail.php?id=30312>.

68 “Hydropower Explained: Where Hydropower Is Generated,” U.S. Energy Information Administration (EIA), March 2020, <https://www.eia.gov/energyexplained/hydropower/where-hydropower-is-generated.php>.

69 Boualem Hadjerioua, Kurt Johnson, and Rocio Uria Martinez, “Small Hydropower in the United States” (Oak Ridge National Laboratory, October 2018), 5, <http://www.osti.gov/servlets/purl/1237617/>.

70 Taylor Curtis, Aaron Levine, and Kurt Johnson, “State Models to Incentivize and Streamline Small Hydropower Development,” *National Renewable Energy Laboratory*, 2017, 10, <https://www.nrel.gov/docs/fy18osti/70098.pdf>.

71 “Hydropower Basics,” Energy.gov, accessed November 2, 2020, <https://www.energy.gov/eere/water/hydropower-basics>; “Hydropower Explained: Hydropower and the Environment,” U.S. Energy Information Administration (EIA), accessed November 2, 2020, <https://www.eia.gov/energyexplained/hydropower/hydropower-and-the-environment.php>.

72 “Hydropower Explained: Hydropower and the Environment,” U.S. Energy Information Administration (EIA), accessed November 2, 2020, <https://www.eia.gov/energyexplained/hydropower/hydropower-and-the-environment.php>.

---

73 "Is Hydropower 'Clean Energy,'" American Rivers, accessed November 2, 2020, <https://americanrivers.org/threats-solutions/energy-development/hydropower/>.

74 "Electricity Explained: Electricity in the United States," U.S. Energy Information Administration (EIA), accessed November 12, 2020, <https://www.eia.gov/energyexplained/electricity/electricity-in-the-us.php>.

75 "Geothermal Energy," Environmental Protection Agency's Web Archive, accessed November 2, 2020, <https://archive.epa.gov/climatechange/kids/solutions/technologies/geothermal.html>.

Jack Unwin, "What Is Geothermal Energy and Where Is It Used in the World?," Power Technology, accessed November 2, 2020, <https://www.power-technology.com/features/what-is-geothermal-energy/>.

76 Bruce Gellerman, "How A Climate Change Nonprofit Got Eversource Thinking About A Geothermal Future," *WBUR: Earthwhile*, January 13, 2020, <https://www.wbur.org/earthwhile/2020/01/13/heat-eversource-geothermal-energy-climate-change>.

77 "How Geothermal Energy Works," Union of Concerned Scientists, July 14, 2008 <https://www.ucsusa.org/resources/how-geothermal-energy-works>.

78 Bruce Gellerman, "How A Climate Change Nonprofit Got Eversource Thinking About A Geothermal Future," *WBUR: Earthwhile*, January 13, 2020, <https://www.wbur.org/earthwhile/2020/01/13/heat-eversource-geothermal-energy-climate-change>.

79 Ibid.

80 Ibid.

81 "Geothermal micro-district projects move ahead in Massachusetts," *Energy Capital*, December 3, 2020, <https://energycapitalmedia.com/2020/12/03/geothermal-districts-massachusetts/>, <https://energycapitalmedia.com/2020/12/03/geothermal-districts-massachusetts/>.

82 "Feasibility Study," HEET, accessed November 12, 2020, <http://yze.6bb.myftpupload.com/feasibility-study/>.

83 "Regulators Approve First Commercial Hydrokinetic Projects in the United States," U.S. Energy Information Administration (EIA), October 2, 2012, <https://www.eia.gov/todayinenergy/detail.php?id=8210>.

84 "Hydropower Explained: Wave Power," U.S. Energy Information Administration (EIA), accessed November 2, 2020, <https://www.eia.gov/energyexplained/hydropower/wave-power.php>.

"Marine and Hydrokinetic Resource Assessment and Characterization," Energy.gov, accessed November 2, 2020, <https://www.energy.gov/eere/water/marine-and-hydrokinetic-resource-assessment-and-characterization>.

85 "Tidal Power - U.S. Energy Information Administration (EIA)," Energy Information Administration, accessed November 2, 2020, <https://www.eia.gov/energyexplained/hydropower/tidal-power.php>; "Regulators Approve First Commercial Hydrokinetic Projects in the United States - Today in Energy - U.S. Energy Information Administration (EIA)," Energy Information Administration, accessed November 2, 2020, <https://www.eia.gov/todayinenergy/detail.php?id=8210>.

---

86 “Ocean Power,” Project Drawdown, February 12, 2020, <https://www.drawdown.org/solutions/ocean-power/technical-summary>.

87 “Ocean Power,” Project Drawdown, February 6, 2020, <https://www.drawdown.org/solutions/ocean-power>.; Dave Levitan, “Why Wave Power Has Lagged Far Behind as Energy Source,” *Yale Environment 360*, April 28, 2014, [https://e360.yale.edu/features/why\\_wave\\_power\\_has\\_lagged\\_far\\_behind\\_as\\_energy\\_source](https://e360.yale.edu/features/why_wave_power_has_lagged_far_behind_as_energy_source).

88 “Closing in on Commercial-Scale Ocean-Energy Capture,” *CompositesWorld*, March 3, 2017, <https://www.compositesworld.com/articles/closing-in-on-commercial-scale-ocean-energy-capture>.

## Chapter 4: Climate Stories of Possibility

1 Julia Cerqueria, “U.S. Climate Alliance States Within Reach of Their Commitment to the Paris Agreement,” Press Release, U.S. Climate Alliance, December 9, 2019, <http://www.usclimatealliance.org/publications/2019/12/9/us-climate-alliance-states-within-reach-of-their-commitment-to-the-paris-agreement>.

2 “Committed,” Sierra Club, accessed February 2021, <https://www.sierraclub.org/ready-for-100/commitments>.

3 “Check Out Where We Are Ready For 100%,” Sierra Club, June 17, 2020, <https://www.sierraclub.org/ready-for-100/map>.

4 Kelly Levin and Chantal Davis, “What Does ‘Net-Zero Emissions’ Mean? 6 Common Questions, Answered,” World Resources Institute, September 17, 2019, <https://www.wri.org/blog/2019/09/what-does-net-zero-emissions-mean-6-common-questions-answered>.; John Podesta et al., “A 100 Percent Clean Future,” Center for American Progress, October 10, 2019, <https://www.americanprogress.org/issues/green/reports/2019/10/10/475605/100-percent-clean-future/>.

5 “State-Level Energy-Related Carbon Dioxide Emissions, 2005-2016,” accessed August 17, 2020, <https://www.eia.gov/environment/emissions/state/analysis/>.

6 “Nine States Campaign for 100 Percent Clean Energy,” News Release, Environment America, January 24, 2019, <https://environmentamerica.org/news/ame/nine-states-campaign-100-percent-clean-energy>.

7 Andy Balaskovitz, “Michigan’s Renewable Energy Law Levels off next Year. What’s next?,” Energy News Network, February 5, 2020, <https://energynews.us/2020/02/05/midwest/michigans-renewable-energy-law-levels-off-next-year-whats-next/>.; “Whitmer - Governor Whitmer Signs Bipartisan, Bicameral Bills to Promote Investment in Clean, Renewable Energy,” Press Release, The Office of Governor Gretchen Whitmer, November 14, 2019, [https://www.michigan.gov/whitmer/0,9309,7-387-90499\\_90640-512413--,00.html](https://www.michigan.gov/whitmer/0,9309,7-387-90499_90640-512413--,00.html).

8 “Sierra Club Commends New York’s Historic, Nation Leading Climate Legislation,” Sierra Club, June 19, 2019, <https://www.sierraclub.org/press-releases/2019/06/sierra-club-commends-new-york-s-historic-nation-leading-climate-legislation>.

9 “Top 10 Solar States” (Solar Energy Industries Association, 2020), 5, [https://seia.org/sites/default/files/2020-06/SEIA\\_Top10\\_Solar\\_States\\_2020-Q2.pdf](https://seia.org/sites/default/files/2020-06/SEIA_Top10_Solar_States_2020-Q2.pdf).

---

<sup>10</sup> Veronica Penney, "How Texas' Power Generation Failed During the Storm, In Charts," *The New York Times*, February 19, 2021, sec. Climate, <https://www.nytimes.com/interactive/2021/02/19/climate/texas-storm-power-generation-charts.html>.

<sup>11</sup> "Crude Oil Production," accessed August 17, 2020, [https://www.eia.gov/dnav/pet/pet\\_crd\\_crpdn\\_adc\\_mbbbl\\_a.htm](https://www.eia.gov/dnav/pet/pet_crd_crpdn_adc_mbbbl_a.htm).; "Texas State Energy Profile," U.S. Energy Information Administration, March 19, 2020, <https://www.eia.gov/state/print.php?sid=TX>.; "Texas State Energy Profile," U.S. Energy Information Administration, March 19, 2020, <https://www.eia.gov/state/print.php?sid=TX>.

<sup>12</sup> "State Electricity Profiles: Texas Electricity Profile 2018," U.S. Energy Information Administration, December 31, 2019, <https://www.eia.gov/electricity/state/texas/index.php>.; "State Electricity Profiles: United States Electricity 2018," U.S. Energy Information Administration, accessed August 17, 2020, <https://www.eia.gov/electricity/state/unitedstates/index.php>. .; "State Electricity Profiles: United States Electricity 2018," U.S. Energy Information Administration, accessed August 17, 2020, <https://www.eia.gov/electricity/state/unitedstates/index.php>.

<sup>13</sup> "A Mighty Wind," *Texas Monthly*, August 2011, <https://web.archive.org/web/20151002171030/http://www.texasmonthly.com/article/a-mighty-wind-2/>.

<sup>14</sup> Ibid.

<sup>15</sup> Ibid.

<sup>16</sup> Tasneem Raja, "How Texas Became a Renewable Energy Powerhouse—and How All That Wind and Sun Power Gets to East Texas," *The Tyler Loop*, October 19, 2018, <https://thetylerloop.com/how-texas-become-a-renewable-energy-powerhouse-and-how-all-that-wind-and-sun-power-gets-to-east-texas/>.

<sup>17</sup> "Deregulation of Electricity in Texas," Acacia Energy, accessed August 17, 2020, <https://www.acaciaenergy.com/deregulation-of-electricity-in-texas/>.

<sup>18</sup> Kate Galbraith and Asher Price, "Book Excerpt: How the Public Got Behind Texas Wind Power," *Texas Tribune*, September 17, 2013, <https://www.texastribune.org/2013/09/17/book-excerpt-how-public-got-behind-tx-wind-power/>

<sup>19</sup> "What Is Deliberative Polling?," Stanford University Center for Deliberative Democracy, accessed August 17, 2020, <https://cdd.stanford.edu/what-is-deliberative-polling/>.

<sup>20</sup> R. L. Lehr et al., "Listening to Customers: How Deliberative Polling Helped Build 1,000 MW of New Renewable Energy Projects in Texas" (National Renewable Energy Library, June 1, 2003): 5, <http://www.osti.gov/servlets/purl/15003900-ooZylw/native/>.

<sup>21</sup> Ibid.

<sup>22</sup> Kate Galbraith and Asher Price, "The Great Texas Wind Rush: How George Bush, Ann Richards, and a Bunch of Tinkerers Helped the Oil and Gas State Win the Race to Wind Power," *UT Press*, 2013, 123, <https://utpress.utexas.edu/books/galgre>.

<sup>23</sup> "Deregulation of Electricity in Texas," Acacia Energy, accessed August 17, 2020, <https://www.acaciaenergy.com/deregulation-of-electricity-in-texas/>.

---

24 “Renewable Resources: The New Texas Energy Powerhouse” (Public Citizen, September 2002), 3, [https://www.citizen.org/wp-content/uploads/migration/tx\\_energy\\_powerhouse.pdf](https://www.citizen.org/wp-content/uploads/migration/tx_energy_powerhouse.pdf).; For homes per MW of power see: What is a Megawatt? <https://www.nrc.gov/docs/ML1209/ML120960701.pdf>

25 Thomas L. Friedman, “Whichever Way the Wind Blows,” *New York Times*, December 15, 2006, sec. Opinion, <https://www.nytimes.com/2006/12/15/opinion/15friedman.html>.

26 Ryan Wiser and Mark Bolinger, “2010 Wind Technologies Market Report,” U.S. Department of Energy, 2010, iv.

27 “Texas: State Energy Profile Analysis,” U.S. Energy Information Administration, March 19, 2020, <https://www.eia.gov/state/analysis.php?sid=TX#114>.

28 “State Wind Energy Facts,” American Wind Energy Association, 2020, <https://www.awea.org/resources/fact-sheets/state-facts-sheets>.

29 “Texas: State Energy Profile Analysis,” U.S. Energy Information Administration, March 2020, <https://www.eia.gov/state/analysis.php?sid=TX#114>

30 Tasneem Raja, “How Texas Became a Renewable Energy Powerhouse—and How All That Wind and Sun Power Gets to East Texas,” *The Tyler Loop*, October 19, 2018, <https://thetylerloop.com/how-texas-become-a-renewable-energy-powerhouse-and-how-all-that-wind-and-sun-power-gets-to-east-texas/>.

31 “Renewable Energy State-by-State Fact Sheets,” ACP, accessed February 23, 2021, <https://cleanpower.org/facts/state-fact-sheets/>.

32 Christian Brannstrom et al., “Spatial Distribution of Estimated Wind-Power Royalties in West Texas,” *Land* 4, no. 4 (December 2015): 1183, <https://doi.org/10.3390/land4041182>.; “Renewable Energy State-by-State Fact Sheets,” ACP, accessed February 23, 2021, <https://cleanpower.org/facts/state-fact-sheets/>.; “Wind and Solar Builders Descend on Texas as Tax Incentives Fade,” *Courthouse News Service*, October 18, 2019, <https://www.courthousenews.com/wind-and-solar-builders-descend-on-texas-as-tax-incentives-fade/>

33 “Renewable Energy State-by-State Fact Sheets,” ACP, accessed February 23, 2021, <https://cleanpower.org/facts/state-fact-sheets/>.

34 Sarina Weiss, “As Crop Prices Fluctuate, Wind Turbine Income Becomes Critical for Farmers,” *Into the Wind: The AWEA Blog*, July 20, 2018, <https://www.aweablog.org/crop-prices-fluctuate-wind-turbine-income-become-critical-farmers/>.; Clifford Krauss, “Move Over, Oil, There’s Money in Texas Wind,” *New York Times*, February 23, 2008, <https://www.nytimes.com/2008/02/23/business/23wind.html>.

35 “A Mighty Wind,” *Texas Monthly*, August 2011, <https://web.archive.org/web/20151002171030/http://www.texasmonthly.com/article/a-mighty-wind-2/>.

36 “Texas’ Sixth Largest Wind Production in World Costs Taxpayers and Consumers Billions,” *National Wind Watch*, July 2019, <https://www.wind-watch.org/news/2019/07/17/texas-sixth-largest-wind-production-in-world-costs-taxpayers-and-consumers-billions/>.

37 “Top 10 Biggest Wind Farms in the World,” *PowerTechnology*, accessed December 21, 2020, <https://www.power-technology.com/features/feature-biggest-wind-farms-in-the-world-texas/>.



---

38 D. L. Elliott, L. L. Wendell, and G. L. Gower, "An Assessment of the Available Windy Land Area and Wind Energy Potential in the Contiguous United States" (Pacific Northwest Lab., Richland, WA (United States): U.S. Department of Energy: Office of Scientific and Technical Information, August 1, 1991): Appendix B, Table B.1, <https://www.osti.gov/biblio/5252760>.

39 "AWEA State Wind Energy Facts," American Wind Energy Association, April 2020, <https://www.awea.org/resources/fact-sheets/state-facts-sheets>.

40 "Fastest Growing Occupations: Occupational Outlook Handbook," U.S. Bureau of Labor Statistics, accessed August 19, 2020, <https://www.bls.gov/ooh/fastest-growing.htm>.

41 "Wind Manufacturing and Supply Chain," Energy.gov, accessed September 17, 2020, <https://www.energy.gov/eere/wind/wind-manufacturing-and-supply-chain>.; Brady Dennis, "The U.S. Wind Industry Now Employs More than 100,000 People," *Washington Post*, accessed September 17, 2020, <https://www.washingtonpost.com/news/energy-environment/wp/2017/04/19/the-u-s-wind-industry-now-employs-more-than-100000-people/>.

42 "Veteran Workforce Development," American Wind Energy Association, accessed August 19, 2020, <https://www.awea.org/policy-and-issues/project-operations/workforce-development/veterans>.

43 Joshua Rhodes, "Even Renewables Are Bigger in Texas," *Forbes*, September 25, 2020, <https://www.forbes.com/sites/joshuarhodes/2020/09/25/even-renewables-are-bigger-in-texas/>.

44 L. M. Sixel, "Solar Expected to Disrupt Texas Fossil-Fuel Apple Cart," *Houston Chronicle*, December 2, 2019, sec. Energy, <https://www.houstonchronicle.com/business/energy/article/Solar-expected-to-disrupt-Texas-fossil-fuel-apple-14874064.php>.; "State Electricity Profiles: Texas Electricity Profile 2018," U.S. Energy Information Administration, December 31, 2019, <https://www.eia.gov/electricity/state/texas/>.; "Southwestern States Have Better Solar Resources and Higher Solar PV Capacity Factors," U.S. Energy Information Administration, June 12, 2019, <https://www.eia.gov/todayinenergy/detail.php?id=39832>.

45 L. M. Sixel, "Solar Expected to Disrupt Texas Fossil-Fuel Apple Cart," *Houston Chronicle*, December 2, 2019, sec. Energy, <https://www.houstonchronicle.com/business/energy/article/Solar-expected-to-disrupt-Texas-fossil-fuel-apple-14874064.php>.

46 Ibid.

47 Kate Galbraith and Asher Price, *The Great Texas Wind Rush: How George Bush, Ann Richards, and a Bunch of Tinkerers Helped the Oil and Gas State Win the Race to Wind Power*, 2013, 167, <https://utpress.utexas.edu/books/galgre>.

48 "Georgia General Assembly," Ballotpedia, accessed August 19, 2020, [https://ballotpedia.org/Georgia\\_General\\_Assembly](https://ballotpedia.org/Georgia_General_Assembly).; Toni Monkovic, "50 Years of Electoral College Maps: How the U.S. Turned Red and Blue," *New York Times*, August 22, 2016, <https://www.nytimes.com/2016/08/23/upshot/50-years-of-electoral-college-maps-how-the-us-turned-red-and-blue.html>; "How Georgia Became a Top Ten Solar State", James Bruggers, *Inside Climate News*, June 14, 2018; <https://insideclimatenews.org/news/14062018/georgia-solar-power-renewable-utility-scale-clean-energy-investments-2018-election>



---

49 “National Solar Jobs Census,” The Solar Foundation, accessed September 21, 2020, <https://www.thesolarfoundation.org/national/>; “Georgia,” Southern Alliance for Clean Energy, accessed September 21, 2020, <https://cleanenergy.org/georgia/>.

50 Dave Flessner, “Solar power get cheaper, more popular in Georgia,” *Chattanooga Times Free Press*, May 21, 2019, <https://www.timesfreepress.com/news/breakingnews/story/2019/may/21/solar-power-gets-cheaper-more-popular-georgia/495053/?bcsbid=866e3633-b739-4c47-a4b9-f0c35a2a0b99&pbdialog=reg-wall-login-created-tfp>; James Bruggers, “How Georgia Became a Top 10 Solar State, With Lawmakers Barely Lifting a Finger,” *Inside Climate News*, June 14, 2018, <https://insideclimatenews.org/news/14062018/georgia-solar-power-renewable-utility-scale-clean-energy-investments-2018-election>.

51 Greer Ryan, “Throwing Shade: 10 Sunny States Blocking Distributed Solar Development” (Center for Biological Diversity, April 2016), 11, [https://www.biologicaldiversity.org/programs/population\\_and\\_sustainability/energy/pdfs/ThrowingShade.pdf](https://www.biologicaldiversity.org/programs/population_and_sustainability/energy/pdfs/ThrowingShade.pdf).

52 Herman K. Trabish, “Georgia Gov. Deal Signs Solar Third Party Ownership Bill into Law,” *Utility Dive*, May 13, 2015, <https://www.utilitydive.com/news/georgia-gov-deal-signs-solar-third-party-ownership-bill-into-law/397173/>; “A Win for Solar Energy in Georgia: SGR’s Sustainability Practice Group Instrumental in Passage of HB 57,” Press Release, SGR Law, May 12, 2015, <https://www.sgrlaw.com/press-releases/sgr-attorneys-celebrate-enactment-of-solar-energy-free-market-financing-act-of-2015/>.

53 “Third-Party Solar Financing,” Solar Energy Industries Association, accessed August 20, 2020, <https://www.seia.org/initiatives/third-party-solar-financing>; “Understanding Third-Party Ownership Financing Structures for Renewable Energy,” United States Environmental Protection Agency, accessed August 20, 2020, <https://www.epa.gov/repowertoolbox/understanding-third-party-ownership-financing-structures-renewable-energy>.

54 “A Win for Solar Energy in Georgia: SGR’s Sustainability Practice Group Instrumental in Passage of HB 57,” Press Release, SGR Law, May 12, 2015, <https://www.sgrlaw.com/press-releases/sgr-attorneys-celebrate-enactment-of-solar-energy-free-market-financing-act-of-2015/>.

55 Michelle Davis, “Commercial Solar May Be 78% Third-Party Owned by 2021,” *Green Tech Media*, April 26, 2018, <https://www.greentechmedia.com/articles/read/commercial-solar-expected-to-be-78-third-party-owned-by-2021>; “Third-Party Solar Financing,” Solar Energy Industries Association, accessed August 20, 2020, <https://www.seia.org/initiatives/third-party-solar-financing>.

56 “Facts and Figures,” Georgia Power, December 31, 2018, <http://www.georgiapower.com/company/about-us/facts-and-financials.html>.

57 “Frequently Asked Questions,” State of Georgia Public Service Commission, accessed August 24, 2020, <https://psc.ga.gov/faqs/>.

58 “Commission Adds 2,210 MW of Renewable Energy in Georgia Power 2019 Integrated Resources Plan” (Georgia Public Service Commission, July 16, 2019), 1-2, [https://psc.ga.gov/site/assets/files/4279/media\\_advisory\\_for\\_7-16-19\\_gpc\\_irp\\_for\\_web.pdf](https://psc.ga.gov/site/assets/files/4279/media_advisory_for_7-16-19_gpc_irp_for_web.pdf).

59 Bob Graham and Chris Hand, *America, the Owner’s Manual: Making the Government Work for You*, 2010, Washington, DC, CQ Press; “Consumer Energy,” Georgia Watch, accessed November 9, 2020, <https://georgiawatch.org/protect-yourself/energy-and-utilities/>.

---

<sup>60</sup> James Bruggers, "How Georgia Became a Top 10 Solar State, With Lawmakers Barely Lifting a Finger," *Inside Climate News*, June 14, 2018, <https://insideclimatenews.org/news/14062018/georgia-solar-power-renewable-utility-scale-clean-energy-investments-2018-election>.

<sup>61</sup> "Ga. Power Lobbyists Push Hard on Nuke Charges," *Henry Herald*, February 21, 2009, [https://www.henryherald.com/news/ga-power-lobbyists-push-hard-on-nuke-charges/article\\_cfc7e89-6722-548a-8884-a70559a1bc7a.html](https://www.henryherald.com/news/ga-power-lobbyists-push-hard-on-nuke-charges/article_cfc7e89-6722-548a-8884-a70559a1bc7a.html).

<sup>62</sup> Alan Judd, "Vogtle Saga Puts Georgia Power's Clout in Spotlight," *Atlanta Journal-Constitution*, December 15, 2017, <https://www.ajc.com/news/state--regional-govt--politics/vogtle-saga-puts-georgia-power-clout-spotlight/XtEdd4A7Ch8h8Uup9VuyyH/>.

<sup>63</sup> Richard Luscombe and Tom Pietrasik, "The Tea Party Leader Taking a Stand for Solar Energy: 'I Will Do What's Right,'" *Guardian*, December 6, 2015, sec. US news, <https://www.theguardian.com/us-news/2015/dec/06/debbie-dooley-tea-party-solar-energy-florida-environment>.

<sup>64</sup> James Bruggers, "How Georgia Became a Top 10 Solar State, With Lawmakers Barely Lifting a Finger," *Inside Climate News*, June 14, 2018, <https://insideclimatenews.org/news/14062018/georgia-solar-power-renewable-utility-scale-clean-energy-investments-2018-election>.

<sup>65</sup> "Georgia - State Energy Profile Analysis - U.S. Energy Information Administration (EIA)," accessed November 6, 2020, <https://www.eia.gov/state/analysis.php?sid=GA>.

<sup>66</sup> "Georgia - State Energy Profile Overview," U.S. Energy Information Administration (EIA), accessed February 1, 2021, <https://www.eia.gov/state/?sid=GA>.

<sup>67</sup> Matt Kempner, "Never Say Never: Atlanta Draws Fresh Jolt of Energy from Sunshine," *Atlanta Journal-Constitution*, February 18, 2019, <https://www.ajc.com/news/local/never-say-never-atlanta-draws-fresh-jolt-energy-from-sunshine/OJ5cXw824C1xCqhPinvAFK/>; Charlie Harper, "Georgia Continues to Move Away from Coal for Energy Needs," *Columbus Ledger-Enquirer*, July 28, 2019, <https://www.ledger-enquirer.com/opinion/opn-columns-blogs/article233123461.html>;

<sup>68</sup> James Bruggers, "How Georgia Became a Top 10 Solar State, With Lawmakers Barely Lifting a Finger," *InsideClimate News*, June 14, 2018, <https://insideclimatenews.org/news/14062018/georgia-solar-power-renewable-utility-scale-clean-energy-investments-2018-election>; "U.S. Nuclear Regulators: Fuel Loading at Vogtle Unit 3 Could Begin in November," *Power Engineering*, February 14, 2020, <https://www.power-eng.com/2020/02/14/u-s-nuclear-regulators-fuel-loading-at-vogtle-unit-3-could-begin-in-november/>.

<sup>69</sup> Bill Chappell, "Idaho Utility Spurns Coal, Pledges 100 Percent 'Clean' Energy By 2045," *National Public Radio*, March 27, 2019, <https://www.npr.org/2019/03/27/707225124/idaho-utility-spurns-coal-pledges-100-percent-clean-energy-by-2045>; Colin Tiernan, "This Massive Proposed Idaho Wind Farm Could Be among the World's Largest," *Idaho Statesman*, March 22, 2020, <https://www.idahostatesman.com/news/business/article241370971.html>; Caleb Michael Smith, "PacifiCorp Outlines Phased Closure of Jim Bridger Power Plant," *Rocket Miner*, October 4, 2019, [https://www.rocketminer.com/news/local/pacificorp-outlines-phased-closure-of-jim-bridger-power-plant/article\\_d73a455d-22cf-5958-b928-717657dd26bd.html](https://www.rocketminer.com/news/local/pacificorp-outlines-phased-closure-of-jim-bridger-power-plant/article_d73a455d-22cf-5958-b928-717657dd26bd.html); "Electricity," U.S. Energy Information Administration, accessed August 24, 2020, <https://www.eia.gov/electricity/index.php>; "Company Facts," Idaho Power, December 31, 2019, <https://www.idahopower.com/about-us/company-information/company-facts/>; "Our Path Away from Coal," Idaho Power, accessed August 24, 2020,

---

<https://www.idahopower.com/energy-environment/energy/energy-sources/thermal/emissions-data/>; “Jim Bridger Power Plant, Wyoming,” Database, The Center for Land Use Interpretation, accessed August 24, 2020, <https://www.clui.org/ludb/site/jim-bridger-power-plant/>; “Idaho Solar,” Solar Energy Industries Association, accessed August 24, 2020, <https://www.seia.org/state-solar-policy/idaho-solar>.

70 “Committed,” Sierra Club, June 18, 2020, <https://www.sierraclub.org/ready-for-100/commitments>.

71 “Greenest States in America 2019,” Tote Bag Factory, September 26, 2018, <https://totebagfactory.com/blogs/news/greenest-states-in-america/>; “America’s Cleanest and Dirtiest Energy States,” Modernize (blog), October 26, 2015, <https://modernize.com/home-ideas/13512/americas-cleanest-and-dirtiest-energy-states/>; Jesse McKinley and Brad Plumer, “New York to Approve One of the World’s Most Ambitious Climate Plans,” *New York Times*, June 18, 2019, <https://www.nytimes.com/2019/06/18/nyregion/greenhouse-gases-ny.html>; “The 2019 Community Power Scorecard,” Institute for Local Self-Reliance, accessed August 24, 2020, <https://ilsr.org/2019-community-power-scorecard/>; “Our Policies,” NY Renew, accessed August 24, 2020, <https://www.nyrenews.org/what-we-do>.

72 “North Carolina Solar,” Solar Energy Industries Association, accessed August 24, 2020, <https://www.seia.org/state-solar-policy/north-carolina-solar/>; “State-By-State Map,” Solar Energy Industries Association, accessed August 24, 2020, <https://www.seia.org/states-map/>; “Southwestern States Have Better Solar Resources and Higher Solar PV Capacity Factors,” U.S. Energy Information Administration, June 12, 2019, <https://www.eia.gov/todayinenergy/detail.php?id=39832>.

73 “Clean Energy by the Numbers,” North Carolina Sustainable Energy Association, accessed August 24, 2020, <https://energync.org/clean-energy-numbers/>; U.S. Bureau of Labor Statistics, “All Employees, Coal Mining,” FRED, Federal Reserve Bank of St. Louis, January 8, 2021, <https://fred.stlouisfed.org/series/CES1021210001>.

74 Sundar Pichai, “Our Biggest Renewable Energy Purchase Ever,” Google, September 19, 2019, <https://www.blog.google/outreach-initiatives/sustainability/our-biggest-renewable-energy-purchase-ever/>; “Apple Now Globally Powered by 100 Percent Renewable Energy,” Press Release, Apple Newsroom, April 9, 2018, <https://www.apple.com/newsroom/2018/04/apple-now-globally-powered-by-100-percent-renewable-energy/>; “Sustainable Data Centers,” Facebook, accessed August 26, 2020, <https://sustainability.fb.com/innovation-for-our-world/sustainable-data-centers/>.

75 William Driscoll, “North Carolina Groups Call for End to Utility Monopoly, 100% Renewable Energy,” *PV Magazine*, February 18, 2019, <https://pv-magazine-usa.com/2019/02/18/north-carolina-groups-call-for-end-to-utility-monopoly-to-advance-solar-wind-and-storage/>.

76 Sarah Vogelsong, “Virginia Clean Economy Act Clears General Assembly, Aided by Beefed-up Ratepayer Protections,” *Virginia Mercury*, March 6, 2020, <https://www.virginiamercury.com/2020/03/06/virginia-clean-economy-act-clears-general-assembly-aided-by-beefed-up-ratepayer-protections/>; “Senate Bill No. 851,” Pub. L. No. 851 (2020), <https://lis.virginia.gov/cgi-bin/legp604.exe?201+ful+SB851H2>; Matthew Bandyk, “Virginia Approves 100% Clean Energy Legislation, Pushing State toward 2.4 GW Storage, RGGI,” *Utility Dive*, March 6, 2020, <https://www.utilitydive.com/news/virginia-clean-energy-legislation-pushes-state-toward-storage-rggi/572349/>.

77 Gregory S. Schneider, “Virginia becomes the First Southern state with a Goal of Carbon-free Energy,” *Washington Post*, April 13, 2020. [https://www.washingtonpost.com/climate-solutions/virginia-becomes-the-first-southern-state-with-a-goal-of-carbon-free-energy/2020/04/13/4ef22dd6-7db5-11ea-8013-1b6da0e4a2b7\\_story.html](https://www.washingtonpost.com/climate-solutions/virginia-becomes-the-first-southern-state-with-a-goal-of-carbon-free-energy/2020/04/13/4ef22dd6-7db5-11ea-8013-1b6da0e4a2b7_story.html)

---

78 “State Solar Spotlight: Virginia” (Solar Energy Industries Association, September 10, 2020), 1, <https://www.seia.org/sites/default/files/2020-09/Virginia.pdf>; “Virginia Solar,” Solar Energy Industries Association, accessed August 26, 2020, <https://www.seia.org/state-solar-policy/virginia-solar..>

79 Billy Ludt, “Dominion Energy planning 498 MW of new solar projects in Virginia,” Solar Power World, accessed November 7, 2020, <https://www.solarpowerworldonline.com/2020/11/dominion-energy-planning-solar-projects-in-virginia/>.

<sup>80</sup> “State of West Virginia: Energy Sector Risk Profile” (United States Department of Energy, n.d.), [https://www.energy.gov/sites/prod/files/2016/09/f33/WV\\_Energy%20Sector%20Risk%20Profile.pdf](https://www.energy.gov/sites/prod/files/2016/09/f33/WV_Energy%20Sector%20Risk%20Profile.pdf); Jeff St. John, “Dominion Energy Highlights Move From Natural Gas to Offshore Wind in Q3 Earnings Call,” Greentech Media, November 6, 2020, <https://www.greentechmedia.com/articles/read/dominion-energy-q3-highlights-utilitys-push-to-clean-power-offshore-wind>; “Virginia Clean Economy Act of 2020,” VA Clean Economy, accessed February 12, 2021, <https://www.vacleaneconomy.org>.

81 Will Cleveland and Ivy Main, “Solar Power in Virginia: Know Your Rights,” Virginia Conservation Network, accessed August 26, 2020, <http://www.vcnva.org/solar/>.

82 Karl-Erik Stromsta, “Dominion Lays Out Plan for 2.6GW of Offshore Wind in Virginia,” Green Tech Media, September 19, 2019, <https://www.greentechmedia.com/articles/read/dominion-lays-out-plan-for-2-6gw-of-offshore-wind-in-virginia>.

83 “Why Energy Efficiency Is a Smart Investment for Virginia” (Virginia: Virginia Energy Efficiency Council, May 2017), 3, <https://vaeec.org/wp-content/uploads/2017/05/VAEEC-2017-Report-FINAL.pdf>.

84 “Renewable Energy – Invest In Renewable Energy Such As Solar Power | Arizona Commerce Authority,” AZ Commerce, accessed September 28, 2020, <https://www.azcommerce.com/industries/renewable-energy/>; “Arizona Solar,” SEIA, accessed September 28, 2020, [https://www.seia.org/state-solar-policy/arizona-solar](https://www.seia.org/state-solar-policy/arizona-solar;);

85 “APS Plans to Add Nearly 1GW of New Battery Storage and Solar Resources by 2025,” Green Tech Media, accessed September 30, 2020, <https://www.greentechmedia.com/articles/read/aps-battery-storage-solar-2025>.

86 Dino Grandoni and Steven Mufson, “Arizona’s Biggest Utility Says It Will Get All of Its Electricity from Carbon-Free Sources by 2050,” *Washington Post*, accessed September 30, 2020, <https://www.washingtonpost.com/climate-environment/2020/01/22/arizonas-biggest-utility-says-it-will-get-all-its-electricity-carbon-free-sources-by-2050/>; “Aps – Arizona Public Service Electric,” Arizona Public Service Co., August 21, 2019, <https://www.aps.com/en/About/Our-Company/Newsroom/Articles/Pinnacle-West-Chairman-Don-Brandt-to-retire-in-November>.

87 Dino Grandoni and Steven Mufson, “Arizona’s Biggest Utility Says It Will Get All of Its Electricity from Carbon-Free Sources by 2050,” *Washington Post*, accessed September 30, 2020, <https://www.washingtonpost.com/climate-environment/2020/01/22/arizonas-biggest-utility-says-it-will-get-all-its-electricity-carbon-free-sources-by-2050/>.

88 “REPORT: Replacing Arizona’s Coal Fleet with Solar Power Would Save Customers Billions of Dollars,” Sierra Club, September 17, 2019, <https://www.sierraclub.org/press-releases/2020/03/report-replacing-arizona-s-coal-fleet-solar-power-would-save-customers>.

---

89 "Oregon," ACEEE, accessed October 5, 2020, <https://database.aceee.org/state/oregon>.

90 "Oregon Trailblazing the Path to a Clean Energy Future," We Are Still In, accessed October 5, 2020, <https://www.wearestillin.com/success/oregon-trailblazing-path-clean-energy-future>.

91 "Oregon Set to Become First Coal-Free State," *Huffington Post*, accessed October 5, 2020, [https://www.huffpost.com/entry/oregon-coal-free\\_n\\_56da088ce4b0ffe6f8e98a7c](https://www.huffpost.com/entry/oregon-coal-free_n_56da088ce4b0ffe6f8e98a7c); "Oregon Clean Electricity and Coal Transition Plan Signed into Law," *Renewable Energy Insights*, March 29, 2016, <https://www.renewableinsights.com/2016/03/oregon-clean-electricity-and-coal-transition-plan-signed-into-law/>; "How Oregon Plans to Quit Coal," *Christian Science Monitor*, March 24, 2016, <https://www.csmonitor.com/Environment/Energy-Voices/2016/0324/How-Oregon-plans-to-quit-coal>.

92 Cassandra Profita, "Oregon's Only Coal-Fired Power Plant Closes for Good," Oregon Public Broadcasting, October 15, 2020, <https://www.opb.org/article/2020/10/16/portland-general-electric-coal-boardman-power-plant/>; Cassandra Profita, "Pacific Power Rates to Drop in 2021 with Shift Away from Coal," Oregon Public Broadcasting, December 23, 2020, <https://www.opb.org/article/2020/12/23/pacific-power-oregon-lower-rates-energy-bills-coal-energy/>.

93 "2020 Boardman Closure Concludes National Precedent Setting Story," Oregon CUB, accessed October 8, 2020, <https://oregoncub.org/news/blog/2020-boardman-closure-concludes-national-precedent-setting-story/2155>; "Big Power Companies Hail Oregon Lawmakers' Approval Of Plan Phasing Out Coal," NPR.org, accessed October 8, 2020, <https://www.npr.org/sections/thetwo-way/2016/03/03/469026657/big-power-companies-hail-oregon-lawmakers-approval-of-plan-phasing-out-coal>.

94 Oregon's Clean Energy and Resources Economy, <https://www.nrel.gov/docs/fy13osti/57715.pdf>

95 "Oregon State Energy Profile," U.S. Energy Information Administration, accessed October 19, 2020, <https://www.eia.gov/state/print.php?sid=OR>.

96 "Energy Rankings," U.S. News & World Report, accessed December 16, 2020, <https://www.usnews.com/news/best-states/rankings/infrastructure/energy>.

97 "Wind Energy in Oregon" (American Wind Energy Association, n.d.), 1-2, <https://www.awea.org/Awea/media/Resources/StateFactSheets/Oregon.pdf>; "Oregon Solar," SEIA, accessed October 19, 2020, <https://www.seia.org/state-solar-policy/oregon-solar>; "These States Use the Most Renewable Energy," US News & World Report, accessed October 19, 2020, <https://www.usnews.com/news/best-states/slideshows/these-states-use-the-most-renewable-energy>; "The 2019 Community Power Scorecard," Institute for Local Self-Reliance, accessed October 19, 2020, <https://ilsr.org/2019-community-power-scorecard/>; "Initiative Petition 48," (Oregon Votes, October 7, 2019), 1-2, <http://oregonvotes.org/irr/2020/048text.pdf>; "Initiative Petition 50," (Oregon Votes, October 7, 2019), 1-2, <http://oregonvotes.org/irr/2020/050text.pdf>; "Initiative Petition 49," (Oregon Votes, October 7, 2019), 1-2 <http://oregonvotes.org/irr/2020/049text.pdf>; "America's Cleanest and Dirtiest Energy States," *Modernize*, October 26, 2015, <https://modernize.com/homeowner-resources/13512/americas-cleanest-and-dirtiest-energy-states>.

98 "Cities and Climate Change," UN Environment Programme, September 26, 2017, <http://www.unenvironment.org/explore-topics/resource-efficiency/what-we-do/cities/cities-and-climate-change>; Maya Miller, "Here's How Much Cities Contribute to the World's Carbon Footprint," *Scientific American*, June 27, 2018, <https://www.scientificamerican.com/article/heres-how-much-cities-contribute-to-the-worlds-carbon-footprint/>, Felix Creutzig et al., "Global Typology of Urban Energy Use and Potentials for

---

an Urbanization Mitigation Wedge,” Proceedings of the National Academy of Sciences 112, no. 20 (May 19, 2015): 6283-84, <https://doi.org/10.1073/pnas.1315545112>.

99 “USA,” Global Covenant of Mayors, accessed October 19, 2020, <https://www.globalcovenantofmayors.org/region/usa/>.

100 “Committed,” Sierra Club, Accessed February 16, 2021, <https://www.sierraclub.org/ready-for-100/commitments>.

101 “Check Out Where We Are Ready For 100%,” Sierra Club, June 17, 2020, <https://www.sierraclub.org/ready-for-100/map>.

102 “Washington, D.C. Named First LEED Platinum City in the World,” U.S. Green Building Council, accessed October 19, 2020, <https://www.usgbc.org/articles/washington-dc-named-first-leed-platinum-city-world>.; “What Is LEED?” U.S. Green Building Council, accessed October 19, 2020, <https://www.usgbc.org/help/what-leed>.

103 “District of Columbia - State Energy Profile Analysis,” U.S. Energy Information Administration (EIA), accessed October 19, 2020, <https://www.eia.gov/state/analysis.php?sid=DC>.

104 “Mayor Bowser Signs Historic Clean Energy Bill, Calling for 100% Renewable Electricity by 2032,” MayorMB, accessed October 19, 2020, <https://mayor.dc.gov/release/mayor-bowser-signs-historic-clean-energy-bill-calling-100-renewable-electricity-2032>.; “Clean Energy DC Act,” Ddoe, accessed October 19, 2020, <https://doee.dc.gov/service/clean-energy-dc-act>.; Leda Marritz, “LEEDing by Example: How D.C. Became the First LEED Platinum City in the World,” Deep Root Blog, accessed October 19, 2020, <https://www.deeproot.com/blog/blog-entries/leeding-by-example-how-d-c-became-the-first-leed-platinum-city-in-the-world>.

105 “For Climate Action in D.C., Look Outside Congress,” DC Climate Coalition, April 11, 2017, <https://www.dccclimate.org/2017/04/11/dc-carbon-price-story/>.

106 Ibid.

107 “Washington D.C. Passes Historic Climate Legislation, Establishes 100 Percent Renewable Energy Goal,” Sierra Club, December 18, 2018, <https://www.sierraclub.org/press-releases/2019/11/washington-dc-passes-historic-climate-legislation-establishes-100-percent>.

108 Natasha Riddle, “DC Passed the Most Ambitious Clean Energy Law in the US. Now What?,” Greater Greater Washington, May 8, 2019, <https://ggwash.org/view/71751/dc-passed-the-most-ambitious-clean-energy-law-in-the-us-now-what>.

109 “Clean Energy DC Omnibus Amendment Act of 2018,” January 18, 2019, 10, <https://dcpsc.org/PSCDC/media/Images/Clean-Energy-DC-Omnibus-Amendment-Act-of-2018.pdf>.

110 “DC Is Home to the Most Green Roofs in North America,” Smart Cities Dive, accessed October 21, 2020, <https://www.smartcitiesdive.com/news/dc-is-home-to-the-most-green-roofs-in-north-america/528865/>.

111 “Green Roofs in the District of Columbia,” Ddoe, accessed October 21, 2020, <https://doee.dc.gov/greenroofs>.



---

112 “Stuttgart Green Corridors,” WWF, accessed October 21, 2020, <https://wwf.panda.org/?204461/Stuttgart-green-corridors>.

113 “Green Roofs in the District of Columbia,” Ddoe, accessed October 21, 2020, <https://doee.dc.gov/greenroofs>.

114 “DC Greenworks,” Community-Wealth.org, August 2, 2015, <https://community-wealth.org/content/dc-greenworks-0>.

115 “DC Green Bank,” DC Green Bank, accessed October 21, 2020, <https://dcgreenbank.org/>.

116 “What Is a Green Bank? – Green Bank Network,” accessed October 21, 2020, <https://greenbanknetwork.org/what-is-a-green-bank-2/>.

117 “Implementing Carbon Pricing at the Municipal Level” (Climate XChange, n.d.): 3, <https://climate-xchange.org/wp-content/uploads/2018/08/Implementing-a-Carbon-Price-at-the-Municipal-Level-Climate-XChange-compressed.pdf>.

118 “Boulder’s Community Greenhouse Gas Inventory,” City of Boulder, Colorado, 2019, <https://bouldercolorado.gov/climate/boulders-community-greenhouse-gas-inventory>; “Community Greenhouse Gas Emissions,” City of Boulder, Colorado, 2019, <https://bouldercolorado.gov/boulder-measures/community-greenhouse-gas-emissions>

119 “Climate Mobilization Action Plan,” CMAP, accessed October 21, 2020, <https://bouldercolorado.gov/climate/cmap>.

120 “How One Small City Sowed the Seeds for Its Own Green New Deal,” CBS News, accessed October 29, 2020, <https://www.cbsnews.com/news/climate-change-how-one-small-city-sowed-the-seeds-for-its-own-green-new-deal/>; “Holyoke Solar Plant Gets Battery Storage,” *Daily Hampshire Gazette*, accessed October 29, 2020, <https://www.gazettenet.com/MtTomEnergyStorage-hg-092618-20322909>; Adele Peters, “This Old Coal Plant Is Now a Solar Farm, Thanks to Pressure from Local Activists,” *Fast Company*, January 3, 2019, <https://www.fastcompany.com/90286009/this-old-coal-plant-is-now-a-solar-farm-thanks-to-pressure-from-local-activists>.

121 “How a Holyoke, MA Coal Plant Became a Solar Farm,” *Fast Company*, accessed October 29, 2020, <https://www.fastcompany.com/90286009/this-old-coal-plant-is-now-a-solar-farm-thanks-to-pressure-from-local-activists>.

122 “Georgetown’s Energy 100 Percent Renewable with Solar Plant,” City of Georgetown Texas, accessed October 29, 2020, <https://georgetown.org/2019/05/08/georgetown-s-energy-100-percent-renewable-with-solar-plant-2/>; Catherine Trautwein, “The Conservative Texas Mayor Leading the Charge With Renewable Energy Talks About the Green New Deal,” *Frontline*, March 7, 2019, <https://www.pbs.org/wgbh/frontline/article/the-conservative-texas-mayor-leading-the-charge-with-renewable-energy-on-the-green-new-deal/>.

123 Catherine Trautwein, “The Conservative Texas Mayor Leading the Charge With Renewable Energy Talks About the Green New Deal,” *Frontline*, March 7, 2019, <https://www.pbs.org/wgbh/frontline/article/the-conservative-texas-mayor-leading-the-charge-with-renewable-energy-on-the-green-new-deal/>.



---

124 “Greensburg Wind Farm,” National Renewable Energy Laboratory, accessed February 16, 2021, 1, [https://www1.eere.energy.gov/office\\_eere/pdfs/greensburgsign\\_windfarm.pdf](https://www1.eere.energy.gov/office_eere/pdfs/greensburgsign_windfarm.pdf); “After Devastating Tornado, Town Is Reborn ‘Green,’” *USA Today*, accessed October 30, 2020, <https://www.usatoday.com/story/news/greenhouse/2013/04/13/greensburg-kansas/2078901/>.

125 “After Devastating Tornado, Town Is Reborn ‘Green,’” *USA Today*, accessed October 30, 2020, <https://www.usatoday.com/story/news/greenhouse/2013/04/13/greensburg-kansas/2078901/>.

126 “Illinois - State Energy Profile Analysis,” U.S. Energy Information Administration (EIA), accessed October 30, 2020, <https://www.eia.gov/state/analysis.php?sid=IL#15>; Lavannya Pulluveetil Barrera, “This Utility Is Training Workers for the Clean Energy Future – with an Eye on Inclusion and Equity,” *Energy Exchange*, October 12, 2017, <http://blogs.edf.org/energyexchange/2017/10/12/this-utility-is-training-workers-for-the-clean-energy-future-with-an-eye-on-inclusion-and-equity/>.

127 Lavannya Pulluveetil Barrera, “This Utility Is Training Workers for the Clean Energy Future – with an Eye on Inclusion and Equity,” *Energy Exchange*, October 12, 2017, <http://blogs.edf.org/energyexchange/2017/10/12/this-utility-is-training-workers-for-the-clean-energy-future-with-an-eye-on-inclusion-and-equity/>.

128 “Engine of Growth” (Natural Resources Defense Council, July 2017), 1, <https://www.nrdc.org/sites/default/files/illinois-energy-efficiency-ib.pdf>.

129 “IL Power Bills Lowest in the Midwest (Again)-but That Advantage Is Threatened,” Citizens Utility Board, November 2, 2019, <https://www.citizensutilityboard.org/blog/2019/11/02/illinois-power-bills-lowest-in-the-midwest-again/>.

130 “What Is the Future Energy Jobs Act?,” Citizens Utility Board, accessed October 30, 2020, <https://www.citizensutilityboard.org/future-energy-jobs-act/>

131 John Podesta et al., “State Fact Sheet: A 100 Percent Clean Future,” Center for American Progress, accessed October 30, 2020, <https://www.americanprogress.org/issues/green/reports/2019/10/16/475863/state-fact-sheet-100-percent-clean-future/>.

132 “NY State Senate Bill S6599,” NY State Senate, June 18, 2019, <https://www.nysenate.gov/legislation/bills/2019/s6599>.

133 “Our Policies,” NY Renewables, accessed October 30, 2020, <https://www.nyrenews.org/what-we-do>.

134 “S. 6599” (State of New York, June 18, 2019), 5, <https://legislation.nysenate.gov/pdf/bills/2019/S6599>.

135 “Our Policies,” NY Renewables, accessed October 30, 2020, <https://www.nyrenews.org/what-we-do>.

136 Jimmy Vielkind and Russell Gold, “Two New Wind Energy Projects Coming to New York,” *Wall Street Journal*, July 18, 2019, <https://www.wsj.com/articles/two-new-wind-energy-projects-coming-to-new-york-11563492150>; “New York’s Offshore Wind Projects,” NYSEDA, accessed November 9, 2020, <https://www.nyserda.ny.gov/All-Programs/Programs/Offshore-Wind/Focus-Areas/NY-Offshore-Wind-Projects>.

---

137 “New York Passes Renewable Energy Growth Act in State Budget,” Solar Power World, April 3, 2020, <https://www.solarpowerworldonline.com/2020/04/new-york-passes-renewable-energy-growth-act-in-state-budget/>.

138 “SENATE BILL 5116” (State of Washington, January 10, 2019), 1, <http://lawfilesexternal.wa.gov/biennium/2019-20/Pdf/Bills/Senate%20Bills/5116.pdf>.

139 “Governor Jared Polis Signs Major Climate and Energy Bills Into Law,” Sierra Club, May 30, 2019, <https://www.sierraclub.org/press-releases/2019/05/governor-jared-polis-signs-major-climate-and-energy-bills-law>.; “Just Transition From Coal-Based Electrical Energy Economy,” Colorado General Assembly, 2019, <https://leg.colorado.gov/bills/hb19-1314>.

140 “Home,” Global Covenant of Mayors, accessed October 30, 2020, <https://www.globalcovenantofmayors.org/>.

141 Marian Hetherly, “Can Buffalo Overcome Its Racial Inequities? The Answer Isn’t Black and White,” WBFO NPR, June 19, 2020, <https://news.wbfo.org/post/can-buffalo-overcome-its-racial-inequities-answer-isnt-black-and-white>.

142 “Mission,” PUSH Buffalo, accessed October 30, 2020, <https://www.pushbuffalo.org/mission/>.

143 Jen Koons, “In West Buffalo, a Community Learns to Own Its Power,” Groundswell, accessed October 30, 2020, <https://groundswell.org/in-west-buffalo,-a-community-learns-to-own-its-power/>.

144 Skye Hart and Sam Magavern, “PUSH Buffalo’s Green Development Zone: A Model for New Economy Community Development,” 2017, 1, [https://ppgbuffalo.org/files/documents/push\\_buffalo\\_27s\\_green\\_development\\_zone.pdf](https://ppgbuffalo.org/files/documents/push_buffalo_27s_green_development_zone.pdf).

145 “Minneapolis Commits To 100% Clean Energy,” Sierra Club, April 27, 2018, <https://www.sierraclub.org/press-releases/2018/04/minneapolis-commits-100-clean-energy>.

146 Ibid.

147 “City Clean Energy Scorecard,” ACEEE, accessed October 30, 2020, <https://www.aceee.org/local-policy/city-scorecard>.

## **Chapter 5: Down to Earth—More Plants, More Peat...Less Meat**

1 “Forests and Climate Change,” Food and Agriculture Organization of the United Nations, 2003, <http://www.fao.org/3/ac836e/AC836E03.htm>.

2 “Forests and Climate Change,” International Union for Conservation and Nature, November 11, 2017, <https://www.iucn.org/resources/issues-briefs/forests-and-climate-change>.

3 Ibid.

4 “Global CO<sub>2</sub>-Emissions,” The World Counts, accessed January 19, 2021, <https://www.theworldcounts.com/challenges/climate-change/global-warming/global-co2-emissions/story>.

---

5 “Fen Montaigne, “Why Keeping Mature Forests Intact Is Key to the Climate Fight,” *Yale Environment* 360, October 15, 2019, <https://e360.yale.edu/features/why-keeping-mature-forests-intact-is-key-to-the-climate-fight>.

6 Jeremy Hance, “Ultimate Bogs: How Saving Peatlands Could Help Save the Planet,” *Guardian*, July 28, 2017, <https://amp.theguardian.com/environment/2017/jul/28/ultimate-bogs-how-saving-peatlands-could-help-save-the-planet>.

7 Thomas Gumbricht et al., “An Expert System Model for Mapping Tropical Wetlands and Peatlands Reveals South America as the Largest Contributor,” *Global Change Biology* 23, no. 9 (March 15, 2017): 3581–99, <https://doi.org/10.1111/gcb.13689>.

8 Jeremy Hance, “Ultimate Bogs: How Saving Peatlands Could Help Save the Planet,” *Guardian*, July 28, 2017, <https://amp.theguardian.com/environment/2017/jul/28/ultimate-bogs-how-saving-peatlands-could-help-save-the-planet>.

9 “Peatlands and Climate Change,” International Union for Conservation and Nature, November 6, 2017, <https://www.iucn.org/resources/issues-briefs/peatlands-and-climate-change>.

10 Ibid.

11 Valentin Bellassen and Sebastiaan Luyssaert, “Carbon Sequestration: Managing Forests in Uncertain Times,” *Nature International Weekly Journal of Science* 506, no. 7487 (February 13, 2014): 153, <https://doi.org/10.1038/506153a>.

12 “The Bonn Challenge,” Bonn Challenge, 2020, <https://www.bonnchallenge.org/>.

13 Gabriel Gatehouse, “Deforested Parts of Amazon ‘Emitting More CO<sub>2</sub> than They Absorb,’” *BBC News*, February 11, 2020, sec. Science & Environment, <https://www.bbc.com/news/science-environment-51464694>.

14 “United States Deforestation Rates & Statistics,” Global Forest Watch, accessed December 11, 2020, <https://tinyurl.com/yd3jdh4j>

15 “Solutions to Deforestation,” *Greenpeace USA* (blog), accessed December 10, 2020, <https://www.greenpeace.org/usa/forests/solutions-to-deforestation/>.

16 Roni A. Neff, Iris L. Chan, and Katherine Clegg Smith, “Yesterday’s Dinner, Tomorrow’s Weather, Today’s News? US Newspaper Coverage of Food System Contributions to Climate Change,” *Public Health Nutrition* 12, no. 7 (July 2009): 1006–14, <https://doi.org/10.1017/S1368980008003480>.

17 Karl Burkart, “Project Drawdown: 100 Solutions to Reverse Global Warming,” Leonardo DiCaprio Foundation, accessed August 14, 2020, <https://www.leonardodicaprio.org/project-drawdown-100-solutions-to-reverse-global-warming/>.

18 Alison E. King and Jennifer Blesh, “Crop Rotations for Increased Soil Carbon: Perenniality as a Guiding Principle,” *Ecological Applications* 28, no. 1 (January 2018): 249–61, <https://doi.org/10.1002/eap.1648>.

19 “Regulatory Definitions of Large CAFOs, Medium CAFO, and Small CAFOs” (Environmental Protection Agency, n.d.), [https://www3.epa.gov/npdes/pubs/sector\\_table.pdf](https://www3.epa.gov/npdes/pubs/sector_table.pdf).

---

20 William J. Ripple et al., "Ruminants, Climate Change and Climate Policy," *Nature Climate Change* 4, no. 1 (December 20, 2013): 2–5, <https://doi.org/10.1038/nclimate2081>.

21 Ibid.

22 OAR US EPA, "Overview of Greenhouse Gases," Overviews and Factsheets, U.S. Environmental Protection Agency, December 23, 2015, <https://www.epa.gov/ghgemissions/overview-greenhouse-gases>.

23 Jessica McDonald, "How Potent Is Methane?," FactCheck.org, September 24, 2018, <https://www.factcheck.org/2018/09/how-potent-is-methane/>.

24 "2016 Packers and Stockyards Program Annual Report" (U.S. Department of Agriculture, 2016), 11, [https://www.gipsa.usda.gov/psp/publication/ar/2016\\_psp\\_annual\\_report.pdf](https://www.gipsa.usda.gov/psp/publication/ar/2016_psp_annual_report.pdf).

25 Leah Douglas and Christopher Leonard, "Is the US Chicken Industry Cheating Its Farmers?," *Guardian*, August 2, 2019, sec. Environment, <https://www.theguardian.com/environment/2019/aug/03/is-the-us-chicken-industry-cheating-its-farmers>.

26 "Fertilizer Plants Emit 100 Times More Methane than Reported," *ScienceDaily*, June 6, 2019, <https://www.sciencedaily.com/releases/2019/06/190606183254.htm>.

27 Ibid.

28 Ibid.

29 "Understanding Global Warming Potentials," Overviews and Factsheets, U.S. Environmental Protection Agency, January 12, 2016, <https://www.epa.gov/ghgemissions/understanding-global-warming-potentials>.

30 Robert Sanders, "Fertilizer Use Responsible for Increase in Nitrous Oxide in Atmosphere," *Berkeley News*, April 2, 2012, <https://news.berkeley.edu/2012/04/02/fertilizer-use-responsible-for-increase-in-nitrous-oxide-in-atmosphere/>.

31 Riley Snyder, "Reid Right on Claiming Kochs Produce More Pollution than Oil Giants," PolitiFact, July 19, 2016, <https://www.politifact.com/factchecks/2016/jul/19/harry-reid/reid-right-claiming-kochs-produce-more-pollution-o/>.

32 Dan Voorhis, "Fertilizer Helps Koch Grow," *Wichita Eagle*, December 16, 2010, <https://www.kansas.com/news/business/agriculture/article1050283.html>; "Koch Nitrogen Company to Pay \$380,000 Civil Penalty for Clean Air Act Violations at Facilities in Iowa and Kansas," Newsroom, Environmental Protection Agency, February 13, 2013, [https://archive.epa.gov/epapages/newsroom\\_archive/newsreleases/a9537cb213c0371985257b1100738628.html](https://archive.epa.gov/epapages/newsroom_archive/newsreleases/a9537cb213c0371985257b1100738628.html).

33 Jane Mayer, "'Kochland' Examines the Koch Brothers' Early, Crucial Role in Climate-Change Denial," *New Yorker*, August 13, 2019, <https://www.newyorker.com/news/daily-comment/kochland-examines-how-the-koch-brothers-made-their-fortune-and-the-influence-it-bought>.

34 "News Article: Key Facts and Findings," Food and Agriculture Organization of the United Nations, accessed August 17, 2020, <http://www.fao.org/news/story/en/item/197623/icode/>.

---

35 “National Agricultural Statistics Service - Charts and Maps - Cattle: Inventory on January 1 by Year, US,” United States Department of Agriculture, accessed August 17, 2020, [https://www.nass.usda.gov/Charts\\_and\\_Maps/Cattle/inv.php](https://www.nass.usda.gov/Charts_and_Maps/Cattle/inv.php); “United States Demographic Statistics,” Infoplease, accessed October 1, 2020, <https://www.infoplease.com/us/census/demographic-statistics>.

36 OAR US EPA, “Overview of Greenhouse Gases,” Overviews and Factsheets, U.S. Environmental Protection Agency, December 23, 2015, <https://www.epa.gov/ghgemissions/overview-greenhouse-gases>.

37 Sabrina Shankman, “What Is Nitrous Oxide and Why Is It a Climate Threat?,” InsideClimate News, September 11, 2019, <https://insideclimatenews.org/news/11092019/nitrous-oxide-climate-pollutant-explainer-greenhouse-gas-agriculture-livestock>.

38 Food and Climate Change - Food System Primer,” Johns Hopkins Center for a Livable Future, accessed August 17, 2020, <http://www.foodsystemprimer.org/food-production/food-and-climate-change/>.

39 Adam Satariano, “The Business of Burps: Scientists Smell Profit in Cow Emissions,” *New York Times*, May 1, 2020, <https://www.nytimes.com/2020/05/01/business/cow-methane-climate-change.html>.

40 National Agricultural Statistics Service, Agricultural Statistics Board, United States Department of Agriculture, Agricultural Statistics Board, and United States Department of Agriculture, “Acreage,” June 30, 2020, 1, [https://www.nass.usda.gov/Publications/Todays\\_Reports/reports/acrg0620.pdf](https://www.nass.usda.gov/Publications/Todays_Reports/reports/acrg0620.pdf); “U.S.: Acres of Farmland,” Statista, accessed January 19, 2021, <https://www.statista.com/statistics/201762/projection-for-total-us-cropland-area-from-2010/>.

41 “DRAWDOWN | Top 10 Solutions to Reverse Climate Change,” Kosmos Journal for Global Transformation, May 7, 2019, <https://www.kosmosjournal.org/news/drawdown-top-10-solutions-to-reverse-climate-change/>.

42 Emily S Cassidy et al., “Redefining Agricultural Yields: From Tonnes to People Nourished per Hectare,” *Environmental Research Letters* 8, no. 3 (August 1, 2013): 3, <https://doi.org/10.1088/1748-9326/8/3/034015>.

43 Richard Waite, Tim Searchinger, and Janet Ranganathan, “6 Pressing Questions About Beef and Climate Change, Answered,” World Resources Institute, April 8, 2019, <https://www.wri.org/blog/2019/04/6-pressing-questions-about-beef-and-climate-change-answered>.

44 Dario Caro et al., “Global and Regional Trends in Greenhouse Gas Emissions from Livestock,” *Climatic Change* 126, no. 1 (July 9, 2014): 203–16, <https://doi.org/10.1007/s10584-014-1197-x>.

45 Adam Satariano, “The Business of Burps: Scientists Smell Profit in Cow Emissions,” *New York Times*, May 1, 2020, sec. Business, <https://www.nytimes.com/2020/05/01/business/cow-methane-climate-change.html>.

46 “News Article: Key Facts and Findings,” Food and Agriculture Organization of the United Nations, accessed October 1, 2020, <http://www.fao.org/news/story/en/item/197623/icode/>.

47 “World Agriculture: Towards 2015/2030 - An FAO Perspective” (Food and Agricultural Organization of the United Nations, 2002), <http://www.fao.org/3/Y4252E/y4252e05b.htm>.

48 Ibid.

---

49 Durk Nijdam, Trudy Rood, and Henk Westhoek, "The Price of Protein: Review of Land Use and Carbon Footprints from Life Cycle Assessments of Animal Food Products and Their Substitutes," *Food Policy* 37, no. 6 (December 1, 2012): 760–70, <https://doi.org/10.1016/j.foodpol.2012.08.002>.

50 Matthew N Hayek and Rachael D Garrett, "Nationwide Shift to Grass-Fed Beef Requires Larger Cattle Population," *Environmental Research Letters* 13, no. 8 (July 25, 2018), <https://doi.org/10.1088/1748-9326/aad401>.

51 "Pasture to Plate Series: Feedlot," The Meat We Eat, February 23, 2017, <https://meatscience.org/TheMeatWeEat/topics/raising-animals-for-meat/article/2017/02/23/pasture-to-plate-series-feedlot>.

52 Matthew N Hayek and Rachael D Garrett, "Nationwide Shift to Grass-Fed Beef Requires Larger Cattle Population," *Environmental Research Letters* 13, no. 8 (July 25, 2018), <https://doi.org/10.1088/1748-9326/aad401>.

53 Richard Waite and Daniel Vennard, "Without Changing Diets, Agriculture Alone Could Produce Enough Emissions to Surpass 1.5°C of Global Warming," World Resources Institute, October 17, 2018, <https://www.wri.org/blog/2018/10/we-cant-limit-global-warming-15c-without-changing-diets>.

54 Joan Sabaté and Sam Soret, "Sustainability of Plant-Based Diets: Back to the Future," *The American Journal of Clinical Nutrition* 100, no. suppl\_1 (July 1, 2014): 476S-482S, <https://doi.org/10.3945/ajcn.113.071522>.

55 Frances Lappé and Joseph Collins, "World Hunger: 10 Myths," *Food First Backgrounder* 21, no. 2 (2015), 3, <https://foodfirst.org/wp-content/uploads/2015/08/Summer-2015-Backgrounder-10-Myths.pdf>.

56 J. Poore and T. Nemecek, "Reducing Food's Environmental Impacts through Producers and Consumers," *Science* 360, no. 6392 (June 1, 2018): 987–92, <https://doi.org/10.1126/science.aag0216>.

57 "Food Wastage Footprint & Climate Change" (Food and Agriculture Organization of the United Nations, 2014), 1-4, <http://www.fao.org/3/a-bb144e.pdf>.

58 Ibid.

59 "Food Loss and Waste," U.S. Food and Drug Administration, accessed October 8, 2020, <https://www.fda.gov/food/consumers/food-loss-and-waste>.

60 "Updated: New Jersey Senate Passes Long-Awaited Food Waste Bill," Waste360, March 6, 2020, <https://www.waste360.com/legislation-regulation/updated-new-jersey-senate-passes-long-awaited-food-waste-bill>.

61 "The State of Food and Agriculture: Moving Forward on Food Loss and Waste Reduction" (Food and Agricultural Organization of the United Nations, 2019), 17-27, <http://www.fao.org/3/ca6030en/ca6030en.pdf>.

62 "Food Waste Is a Massive Problem—Here's Why," FoodPrint, accessed October 8, 2020, <https://foodprint.org/issues/the-problem-of-food-waste/>.

63 Maria Godoy, "In Europe, Ugly Sells in The Produce Aisle," National Public Radio, December 9, 2014, <https://www.npr.org/sections/thesalt/2014/12/09/369613561/in-europe-ugly-sells-in-the-produce-aisle>.

- 
- 64 "Climate Change and Agriculture," Union of Concerned Scientists, March 20, 2019, <https://www.ucsusa.org/resources/climate-change-and-agriculture>; Matthew R. Smith et al., "Effects of Decreases of Animal Pollinators on Human Nutrition and Global Health: A Modelling Analysis," *The Lancet* 386, no. 10007 (July 16, 2015): 1964–72, [https://doi.org/10.1016/S0140-6736\(15\)61085-6](https://doi.org/10.1016/S0140-6736(15)61085-6).
- 65 Samuel S. Myers et al., "Increasing CO<sub>2</sub> Threatens Human Nutrition," *Nature* 510, no. 7503 (June 5, 2014): 139–42, <https://doi.org/10.1038/nature13179>.
- 66 "Tropical Deforestation and Global Warming," Union of Concerned Scientists, July 27, 2008, <https://www.ucsusa.org/resources/tropical-deforestation-and-global-warming>; "Cattle Ranching in the Amazon Region," Yale School of the Environment, Global Forest Atlas, accessed January 22, 2021, <https://globalforestatlas.yale.edu/amazon/land-use/cattle-ranching>.
- 67 Aoife Bennett, Ashwin Ravikumar, and Homero Paltan, "The Political Ecology of Oil Palm Company-Community Partnerships in the Peruvian Amazon: Deforestation Consequences of the Privatization of Rural Development," *World Development Forum* 109 (September 1, 2018), 29, <https://doi.org/10.1016/j.worlddev.2018.04.001>.
- 68 "Deforestation and Its Extreme Effect on Global Warming," *Scientific American*, November 13, 2012, <https://www.scientificamerican.com/article/deforestation-and-global-warming/>.
- 69 Gary Polakovic, "Disease Detectives Investigate How COVID-19 Spread from Animals to Humans," USC News, April 21, 2020, <https://news.usc.edu/168960/how-covid-19-spread-animals-humans-usc-scientists/>.
- 70 Laura S. P. Bloomfield, Tyler L. McIntosh, and Eric F. Lambin, "Habitat Fragmentation, Livelihood Behaviors, and Contact between People and Nonhuman Primates in Africa," *Landscape Ecology* 35, no. 4 (April 1, 2020): 985–1000, <https://doi.org/10.1007/s10980-020-00995-w>.
- 71 B A Wilcox and B Ellis, "Forests and Emerging Infectious Diseases of Humans," *Food and Agriculture Organization of the United Nations* 57 (2006), 224, <http://www.fao.org/tempref/docrep/fao/009/a0789e/a0789e03.pdf>.
- 72 David Tilman and Michael Clark, "Global Diets Link Environmental Sustainability and Human Health," *Nature* 515, no. 7528 (November 27, 2014): 518–22, <https://doi.org/10.1038/nature13959>.
- 73 Shefali Sharma, "Big Meat and Dairy Are Heating up Our Planet," Institute for Agriculture and Trade Policy, July 18, 2018, <https://www.iatp.org/blog/emissions-impossible>.
- 74 IATP and GRAIN, "Emissions Impossible," Institute for Agriculture and Trade Policy, July 18, 2018, <https://www.iatp.org/emissions-impossible>.
- 75 "World Agriculture: Towards 2015/2030 - An FAO Perspective" (Food and Agricultural Organization of the United Nations, 2002), <http://www.fao.org/3/y4252e/y4252e05b.htm>.
- 76 Hannah Ritchie and Max Roser, "Meat and Dairy Production," Our World in Data, August 2017, <https://ourworldindata.org/meat-production#which-countries-eat-the-most-meat>.



---

77 “Beef and Buffalo Meat Consumption per Person,” Our World in Data, accessed November 12, 2020, <https://ourworldindata.org/grapher/beef-and-buffalo-meat-consumption-per-person>; Rob Cook, “World Beef Consumption Per Capita (Ranking of Countries),” Beef 2 Live, October 15, 2020, [//beef2live.com/story-world-beef-consumption-per-capita-ranking-countries-0-111634](https://beef2live.com/story-world-beef-consumption-per-capita-ranking-countries-0-111634).

78 U.S Department of Health and Human Services and U.S. Department of Agriculture, “Appendix 7. Nutritional Goals for Age-Sex Groups Based on Dietary Reference Intakes and Dietary Guidelines Recommendations - 2015-2020 Dietary Guidelines,” Health.gov, December 2015, <https://health.gov/our-work/food-nutrition/2015-2020-dietary-guidelines/guidelines/appendix-7/>; Aglaee Jacob, “How Unhealthy Is an 8-Ounce Steak?,” LIVESTRONG.COM, November 30, 2018, <https://www.livestrong.com/article/501790-nutritional-facts-for-an-8-oz-steak/>.

79 “Plant Power: The 10 Veggies with the Most Protein,” Medical News Today, June 16, 2020, <https://www.medicalnewstoday.com/articles/318600>.

80 “The Top 4 Protein Sources May Surprise You,” Health Essentials from Cleveland Clinic, March 2, 2017, <https://health.clevelandclinic.org/these-top-4-protein-sources-may-surprise-you/>.

81 “Noncommunicable Diseases,” World Health Organization, June 1, 2018, <https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases>.

82 Ashkan Afshin et al., “Health Effects of Dietary Risks in 195 Countries, 1990–2017: A Systematic Analysis for the Global Burden of Disease Study 2017,” *Lancet* 393, no. 10184 (April 3, 2019): 1958–72, [https://doi.org/10.1016/S0140-6736\(19\)30041-8](https://doi.org/10.1016/S0140-6736(19)30041-8).

83 “EAT-Lancet Report Recommends Healthy Diets from Sustainable Food Systems,” Institute of Food Technologists, January 18, 2019, <https://www.ift.org/news-and-publications/news/2019/january/18/eat-lancet-report-recommends-healthy-diets-from-sustainable-food-systems>.

84 “Americans Poor Diet Drives \$50 Billion a Year in Health Care Costs,” National Heart, Lung, and Blood Institute, December 17, 2019, <https://www.nhlbi.nih.gov/news/2019/americans-poor-diet-drives-50-billion-year-health-care-costs>.

85 “Food Planet Health” (EAT-Lancet, 2019), 5-7, [https://eatforum.org/content/uploads/2019/07/EAT-Lancet\\_Commission\\_Summary\\_Report.pdf](https://eatforum.org/content/uploads/2019/07/EAT-Lancet_Commission_Summary_Report.pdf).

86 Marco Springmann et al., “Analysis and Valuation of the Health and Climate Change Cobenefits of Dietary Change,” *Proceedings of the National Academy of Sciences* 113, no. 15 (April 12, 2016): 4146–51, <https://doi.org/10.1073/pnas.1523119113>.

87 Walter Willett et al., “Food in the Anthropocene: The EAT–Lancet Commission on Healthy Diets from Sustainable Food Systems,” *Lancet* 393, no. 10170 (July 2, 2018): 447–92, [https://doi.org/10.1016/S0140-6736\(18\)31788-4](https://doi.org/10.1016/S0140-6736(18)31788-4).

88 Helen Harwatt et al., “Substituting Beans for Beef as a Contribution toward US Climate Change Targets,” *Climatic Change* 143, no. 1 (May 11, 2017): 261–70, <https://doi.org/10.1007/s10584-017-1969-1>.

89 Carol Smith, “New Research Says Plant-Based Diet Best for Planet and People,” Resilience, November 21, 2014, <https://www.resilience.org/stories/2014-11-21/new-research-says-plant-based-diet-best-for-planet-and-people/>.

---

90 “Methane: The Other Important Greenhouse Gas,” Environmental Defense Fund, accessed October 21, 2020, <https://www.edf.org/climate/methane-other-important-greenhouse-gas>; Steven Schultz, “Controlling Methane Is a Fast and Critical Way to Slow Global Warming, Say Princeton Experts,” Princeton University, September 19, 2019, <https://www.princeton.edu/news/2019/09/19/controlling-methane-fast-and-critical-way-slow-global-warming-say-princeton-experts>.

91 David Tilman and Michael Clark, “Global Diets Link Environmental Sustainability and Human Health,” *Nature* 515, no. 7528 (November 27, 2014): 518–22, <https://doi.org/10.1038/nature13959>; “Live Longer? Save the Planet? Better Diet Could Nail Both,” ScienceDaily, November 12, 2014, <https://www.sciencedaily.com/releases/2014/11/141112132057.htm>.

92 Lukasz Aleksandrowicz et al., “The Impacts of Dietary Change on Greenhouse Gas Emissions, Land Use, Water Use, and Health: A Systematic Review,” *PLOS ONE* 11, no. 11 (November 3, 2016): e0165797, <https://doi.org/10.1371/journal.pone.0165797>.

93 David Tilman and Michael Clark, “Global Diets Link Environmental Sustainability and Human Health,” *Nature* 515, no. 7528 (November 27, 2014): 518–22, <https://doi.org/10.1038/nature13959>.

94 Walter Willett et al., “Food in the Anthropocene: The EAT–Lancet Commission on Healthy Diets from Sustainable Food Systems,” *Lancet* 393, no. 10170 (January 16, 2019): 447–92, [https://doi.org/10.1016/S0140-6736\(18\)31788-4](https://doi.org/10.1016/S0140-6736(18)31788-4).

95 Michael J. Orlich et al., “Vegetarian Dietary Patterns and Mortality in Adventist Health Study 2,” *JAMA Internal Medicine* 173, no. 13 (July 8, 2013): 1230–38, <https://doi.org/10.1001/jamainternmed.2013.6473>.

96 “Micronutrient Deficiencies,” World Health Organization, accessed October 21, 2020, <http://www.who.int/nutrition/topics/ida/en/>.

97 “Nearly Half the World Lives on Less than \$5.50 a Day,” World Bank, October 17, 2018, <https://www.worldbank.org/en/news/press-release/2018/10/17/nearly-half-the-world-lives-on-less-than-550-a-day>.

98 Max Roser and Hannah Ritchie, “Food Supply,” *Our World in Data*, March 5, 2013, <https://ourworldindata.org/food-supply>.

99 Summer Sewell, “There Were Nearly a Million Black Farmers in 1920. Why Have They Disappeared?,” *Guardian*, April 29, 2019, <http://www.theguardian.com/environment/2019/apr/29/why-have-americas-black-farmers-disappeared>.

100 “Farm Demographics: U.S. Farmers by Gender, Age, Race, Ethnicity, and More” (United State Department of Agriculture, May 2014), 6, [https://www.nass.usda.gov/Publications/Highlights/2014/Farm\\_Demographics/Highlights\\_Farm\\_Demographics.pdf](https://www.nass.usda.gov/Publications/Highlights/2014/Farm_Demographics/Highlights_Farm_Demographics.pdf).

101 Mario Parker, “More Black U.S. Farmers, But Fewer Own Land or Earn Top Income,” *Bloomberg*, April 11, 2019, <https://www.bloomberg.com/news/articles/2019-04-11/more-black-u-s-farmers-but-fewer-own-land-or-make-big-bucks>.

---

102 Summer Sewell, "There Were Nearly a Million Black Farmers in 1920. Why Have They Disappeared?," *Guardian*, April 29, 2019, <http://www.theguardian.com/environment/2019/apr/29/why-have-americas-black-farmers-disappeared>.

103 "USDA ERS - Farming and Farm Income," United States Department of Agriculture, accessed October 22, 2020, <https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/farming-and-farm-income/>.

104 "USDA ERS - Farming and Farm Income," United States Department of Agriculture, accessed October 22, 2020, <https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/farming-and-farm-income/>; "1950 Census of Agriculture" (U.S. Department of Commerce, 1950), <https://www2.census.gov/library/publications/decennial/1950/agriculture-preliminary-reports/41632338v1.pdf>.

105 "USDA ERS - Farm Household Income Forecast," United States Department of Agriculture, September 2, 2020, <https://www.ers.usda.gov/topics/farm-economy/farm-household-well-being/farm-household-income-forecast/>.

106 Adam Andrzejewski, "Mapping the U.S. Farm Subsidy \$1M Club," *Forbes*, August 14, 2018, <https://www.forbes.com/sites/adamandrzejewski/2018/08/14/mapping-the-u-s-farm-subsidy-1-million-club/>.

107 Susan Lang, "'Slow, Insidious' Soil Erosion Threatens Human Health and Welfare as Well as the Environment, Cornell Study Asserts," *Cornell Chronicle*, March 20, 2006, <https://news.cornell.edu/stories/2006/03/slow-insidious-soil-erosion-threatens-human-health-and-welfare>.

108 Mackenzie Feldman et al., "REGENERATIVE FARMING AND THE GREEN NEW DEAL" (Data for Progress, January 2020), 2, <https://filesforprogress.org/memos/regenerative-farming-and-the-green-new-deal.pdf>.

109 Frances Moore Lappé, "Seeing Answers to the Climate Crisis Right Under Our Feet," Center for Humans & Nature, January 31, 2020, <https://www.humansandnature.org/seeing-answers-to-the-climate-crisis-right-under-our-feet>.

110 Hannah Ritchie, "Which Countries Eat the Most Meat?," *BBC News*, February 4, 2019, sec. Health, <https://www.bbc.com/news/health-47057341>.

111 "School Meal Trends & Stats," School Nutrition Association, accessed October 28, 2020, <https://schoolnutrition.org/aboutschoolmeals/schoolmealtrendsstats/>.

112 "Purchasing Power: How Institutional 'Good Food' Procurement Policies Can Shape a Food System That's Better for People and Our Planet," Union of Concerned Scientists, November 20, 2017, <https://www.ucsusa.org/resources/purchasing-power>.

113 Christina Bronsing-Lazalde, "The Center for Good Food Purchasing," Center for Good Food Purchasing, accessed November 12, 2020, <https://goodfoodpurchasing.org/>; Personal communication with Anna Lappé, 2020.

114 Ibid.

---

115 Christina Bronsing-Lazalde, "The Center for Good Food Purchasing," Center for Good Food Purchasing, accessed November 12, 2020, <https://goodfoodpurchasing.org/>; Personal communication with Anna Lappé, 2020; "Purchasing Power: How Institutional 'Good Food' Procurement Policies Can Shape a Food System That's Better for People and Our Planet," November 20, 2017, <https://www.ucsusa.org/resources/purchasing-power>.

116 Amy Leibrock, "Good Growth: Farmers Markets Still on the Rise," August 6, 2014, <https://sustainableamerica.org/blog/good-growth-farmers-markets-still-on-the-rise/>.

117 Renee Cho, "Can Soil Help Combat Climate Change?," State of the Planet, February 21, 2018, <https://blogs.ei.columbia.edu/2018/02/21/can-soil-help-combat-climate-change/>.

118 "EverGreening the Earth Campaign: A Global Campaign to Overcome the Climate Crisis While Alleviating Poverty and Hunger, and Caring for the Land" (EverGreening Global Alliance, n.d.), 1, [https://www.evergreening.org/wp-content/uploads/2019/11/EverGreening\\_CampaignPaper.pdf](https://www.evergreening.org/wp-content/uploads/2019/11/EverGreening_CampaignPaper.pdf).

119 Joris Aertsens, Leo De Nocker, and Anne Gobin, "Valuing the Carbon Sequestration Potential for European Agriculture," *Land Use Policy* 31 (March 1, 2013): 584–94, <https://doi.org/10.1016/j.landusepol.2012.09.003>.

120 William J. Ripple et al., "Ruminants, Climate Change and Climate Policy," *Nature Climate Change* 4, no. 1 (January 2014): 2–5, <https://doi.org/10.1038/nclimate2081>.

121 "A Natural Path for U.S. Climate Action," The Nature Conservancy, November 14, 2018, <https://www.nature.org/en-us/what-we-do/our-insights/perspectives/a-natural-path-for-u-s-climate-action/>.

122 "Soils Help to Combat and Adapt to Climate Change by Playing a Key Role in the Carbon Cycle" (Food and Agriculture Organization of the United Nations, 2015), <http://www.fao.org/resources/infographics/infographics-details/en/c/340783/#:~:text=Healthy%20soils%20provide%20the%20largest,gas%20emissions%20in%20the%20atmosphere>.

123 "What Is Regenerative Agriculture?," Green America, accessed October 28, 2020, <https://www.greenamerica.org/what-regenerative-agriculture>.

124 Zareen Pervez Bharucha, Sol Bermejo Mitjans, and Jules Pretty, "Towards Redesign at Scale through Zero Budget Natural Farming in Andhra Pradesh, India," *International Journal of Agricultural Sustainability* 18, no. 1 (January 12, 2020): 1–20, <https://doi.org/10.1080/14735903.2019.1694465>.

125 Ibid.

126 Ibid.

127 "My Best Gift, Ever: I Saw the Solution to World Hunger" *HuffPost*, accessed November 2, 2020, [https://www.huffpost.com/entry/solution-to-world-hunger\\_b\\_2353318?guccounter=1&guce\\_referrer=aHR0cHM6Ly93d3cuZ29vZ2xlLnNvbS8&guce\\_referrer\\_sig=AQAAAKz2cYW3L\\_OpOobSfdM-CYZv6vkx0vwh3rpjHbyqxli1DvNbq5jNnWKhDPvYCiDIzzezeA3mHsG\\_jmxixQAD2uy\\_g5IPOxc7nBVeHqAN2DXQI\\_xh38YMXeIJa2gPA\\_X\\_WvJgInutzSDEWYEYe1S30wyeQ6ASuUloboSx4P85xyHAI](https://www.huffpost.com/entry/solution-to-world-hunger_b_2353318?guccounter=1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xlLnNvbS8&guce_referrer_sig=AQAAAKz2cYW3L_OpOobSfdM-CYZv6vkx0vwh3rpjHbyqxli1DvNbq5jNnWKhDPvYCiDIzzezeA3mHsG_jmxixQAD2uy_g5IPOxc7nBVeHqAN2DXQI_xh38YMXeIJa2gPA_X_WvJgInutzSDEWYEYe1S30wyeQ6ASuUloboSx4P85xyHAI).

---

128 Tiffany Stecker ClimateWire, "What Helps Organic Soils Store More Carbon?," *Scientific American*, accessed November 2, 2020, <https://www.scientificamerican.com/article/what-helps-organic-soils-store-more-carbon/>.

129 "Regenerative Farming and The Green New Deal," Data for Progress, accessed November 6, 2020, <https://www.dataforprogress.org/memos/regenerative-agriculture-and-the-green-new-deal>.

130 "Farm Bankruptcies in 2018 – The Truth Is Out There," accessed November 12, 2020, <https://www.fb.org/market-intel/farm-bankruptcies-in-2018-the-truth-is-out-there>.

131 Holly Shively, "Farmers Face Worst Season in Memory, 1.5M Acres Not Planted," *Dayton Daily News*, August 16, 2019, <https://www.daytondailynews.com/business/more-than-ohio-acres-remain-unplanted-worst-season-record/FyuQigdCN36fvCs5567vXJ/>.

132 "Federal Farm Subsidies: What the Data Says," USAFacts, June 4, 2019, <https://usafacts.org/articles/federal-farm-subsidies-what-data-says/>.

133 EWG's Farm Subsidy Database, "EWG's Farm Subsidy Database," accessed November 11, 2020, <http://farm.ewg.org/region.php?fips=00000>.

134 "Conservation Stewardship Program (CSP)," NCRS Conservation Program, 2019, [https://www.nrcs.usda.gov/Internet/NRCS\\_RCA/reports/fb08\\_cp\\_cstp.html](https://www.nrcs.usda.gov/Internet/NRCS_RCA/reports/fb08_cp_cstp.html).

135 Dan Charles, "Farmers Got Billions From Taxpayers In 2019, And Hardly Anyone Objected," *National Public Radio*, December 31, 2019, <https://www.npr.org/sections/thesalt/2019/12/31/790261705/farmers-got-billions-from-taxpayers-in-2019-and-hardly-anyone-objected>.

136 Robert J. Zomer et al, "Global Tree Cover and Biomass Carbon on Agricultural Land: The Contribution of Agroforestry to Global and National Carbon Budgets," *Scientific Reports* 6, no. 1 (July 20, 2016): 29987, <https://doi.org/10.1038/srep29987>.

137 Joe Hasell and Max Roser, "Famines," *Our World in Data*, October 10, 2013, <https://ourworldindata.org/famines>.

138 John Carey, "News Feature: The Best Strategy for Using Trees to Improve Climate and Ecosystems? Go Natural," *Proceedings of the National Academy of Sciences* 117, no. 9 (March 3, 2020): 4434–38, <https://doi.org/10.1073/pnas.2000425117>.

139 Mark Hertsgaard, "The Great Green Wall: African Farmers Beat Back Drought and Climate Change with Trees," *Scientific American*, January 28, 2011, <https://www.scientificamerican.com/article/farmers-in-sahel-beat-back-drought-and-climate-change-with-trees/>; "The Spread of FMNR in Niger," *Farmer Managed Natural Regeneration*, 2019, <https://fmnrhub.com.au/projects/niger/>.

140 "Tony Rinaudo - The Forest Maker," *World Vision Australia*, 2020, <https://www.worldvision.com.au/global-issues/work-we-do/poverty/forest-maker>.

141 "The Spread of FMNR in Niger," *Farmer Managed Natural Regeneration*, 2019, <https://fmnrhub.com.au/projects/niger/>.

---

142 Ruth Maclean, "The Great African Regreening: Millions of 'magical' New Trees Bring Renewal," *Guardian*, August 16, 2018, sec. World news, <https://www.theguardian.com/world/2018/aug/16/regreening-niger-how-magical-gaas-transformed-land>.

143 "Farmer Managed Natural Regeneration (FMNR): A Technique to Effectively Combat Poverty and Hunger through Land and Vegetation Restoration. - United Nations Partnerships for SDGs Platform," United Nations Sustainable Development, accessed November 11, 2020, <https://sustainabledevelopment.un.org/partnership/?p=30735>.

144 "Farmer-Managed Natural Regeneration," Global EverGreening Alliance, accessed November 11, 2020, <https://www.evergreening.org/evergreening/fmnr/>.

145 "Mexico Announces New Agricultural Support Programs" (Mexico: USDA Foreign Agricultural Service Global Agricultural Information Network, April 5, 2019), 5, [https://apps.fas.usda.gov/newgainapi/api/report/downloadreportbyfilename?filename=Mexico%20Announces%20New%20Agricultural%20Support%20Programs\\_Mexico\\_Mexico\\_4-5-2019.pdf](https://apps.fas.usda.gov/newgainapi/api/report/downloadreportbyfilename?filename=Mexico%20Announces%20New%20Agricultural%20Support%20Programs_Mexico_Mexico_4-5-2019.pdf).

146 Ibid.

147 Ibid.

148 "The Center for Agroforestry at the University of Missouri," accessed November 5, 2020, <http://www.centerforagroforestry.org/>.

149 "Earthdance Organic Teaching Farm," EarthDance, accessed November 5, 2020, <https://earthdancefarms.org/>.

150 "Savanna Institute Receives Grant to Support Midwest Farmers Planting Tree Crops," Association for Temperate Agroforestry, accessed November 10, 2020, <https://www.aftaweb.org/146-2020-vol-26/volume-26-no-2-june-2020/268-savanna-institute-receives-grant-to-support-midwest-farmers-planting-tree-crops.html#:~:text=%E2%80%9COur%20research%20shows%20at%20least,to%20corn%20and%20soybean%20monocultures.&text=Even%20better%2C%20they'll%20be,crops%20and%20building%20soil%20health>.

151 "Farmers Get Support for Planting Tree Crops," Morning Ag Clips, March 2, 2020, <https://www.morningagclips.com/farmers-get-support-for-planting-tree-crops/>.

152 Anna Lappé, *Diet for a Hot Planet: The Climate Crisis at the End of Your Fork and What You Can Do About It*, Bloomsbury, 2010, 133.

153 Susan Lang, "'Slow, Insidious' Soil Erosion Threatens Human Health and Welfare as Well as the Environment, Cornell Study Asserts," Cornell Chronicle, March 20, 2006, <https://news.cornell.edu/stories/2006/03/slow-insidious-soil-erosion-threatens-human-health-and-welfare>.

154 "Mark Shepard," Forest Agriculture Enterprises, accessed November 6, 2020, <https://www.forestag.com/pages/mark-shepard>.

155 Michael DiBartolomeis et al, "An Assessment of Acute Insecticide Toxicity Loading (AITL) of Chemical Pesticides Used on Agricultural Land in the United States," *PLOS ONE* 14, no. 8 (August 6, 2019), <https://doi.org/10.1371/journal.pone.0220029>.

---

156 Tina Bellon and Ludwig Burger, “Bayer to Pay up to \$10.9 Billion to Settle Bulk of Roundup Weedkiller Cancer Lawsuits,” *Reuters*, July 24, 2020, <https://www.reuters.com/article/us-bayer-litigation-settlement-idUSKBN23V2NP>; “Monsanto Roundup & Dicamba Trial Tracker,” U.S. Right to Know, January 13, 2021, <https://usrtk.org/monsanto-roundup-trial-tracker-index/>.

157 Wolfgang Boedeker et al, “The Global Distribution of Acute Unintentional Pesticide Poisoning: Estimations Based on a Systematic Review,” *BMC Public Health* 20, no. 1 (December 7, 2020): 1875, <https://doi.org/10.1186/s12889-020-09939-0>; Charikleia Kalliora et al., “Association of Pesticide Exposure with Human Congenital Abnormalities,” *Toxicology and Applied Pharmacology* 346 (May 1, 2018): 58–75, <https://doi.org/10.1016/j.taap.2018.03.025>.

158 Kristen Bialik and Kristi Walker, “Organic Farming Is on the Rise in the U.S.,” Pew Research Center, January 10, 2019, <https://www.pewresearch.org/fact-tank/2019/01/10/organic-farming-is-on-the-rise-in-the-u-s/>.

159 “Sara Clarke, “5 States With the Most Organic Farms,” US News & World Report, March 15, 2019, <https://www.usnews.com/news/best-states/slideshows/5-states-with-the-most-organic-farms>.

160 Ibid.

161 “Home,” SAAFON, accessed November 6, 2020, <https://saafon.org/>.

162 Steve Curwood, “Living on Earth: Farming While Black: Soul Fire Farm’s Practical Guide to Liberation on the Land,” accessed October 20, 2020, <https://www.loe.org/shows/segments.html?programID=18-P13-00047&segmentID=7>.

163 “Agribusiness: Long-Term Contribution Trends” OpenSecrets, accessed November 10, 2020, <https://www.opensecrets.org/industries/totals.php?cycle=2020&ind=A>; “Defense: Long-Term Contribution Trends,” OpenSecrets, accessed November 10, 2020, <https://www.opensecrets.org/industries/totals.php?cycle=2018&ind=D>.

## Chapter 6: And From Here? Trusting the Power of Courageous Action

1 Larry Buchanan, Quoc Trung Bui, and Jugal K. Patel, “Black Lives Matter May Be the Largest Movement in U.S. History,” *New York Times*, July 3, 2020, <https://www.nytimes.com/interactive/2020/07/03/us/george-floyd-protests-crowd-size.html>.

2 Kim Parker, Juliana Horowitz, and Monica Anderson, “Majorities Across Racial, Ethnic Groups Express Support for the Black Lives Matter Movement,” (Pew Research Center, June 12, 2020), <https://www.pewsocialtrends.org/2020/06/12/amid-protests-majorities-across-racial-and-ethnic-groups-express-support-for-the-black-lives-matter-movement/>.

3 “Follow the Money,” *New York Times*, July 7, 2020, sec. Business, <https://www.nytimes.com/2020/07/07/business/dealbook/ppp-loan-names.html>.

4 Ezra Klein, “‘No Permanent Friends, No Permanent Enemies’: Inside the Sunrise Movement’s Plan to Save Humanity,” *Vox*, July 31, 2019, <https://www.vox.com/ezra-klein-show-podcast/2019/7/31/20732041/varshini-prakash-sunrise-movement-green-new-deal>.



---

5 Michael Sandoval, "Sunrise Movement Challenges House Democratic Leadership On 'Green New Deal,'" *Fairfield Sun Times*, November 21, 2018, [https://www.fairfieldsuntimes.com/business/energy/sunrise-movement-challenges-house-democratic-leadership-on-green-new-deal/article\\_9c143ae4-edee-11e8-a6df-9f670dcbbfdd.html](https://www.fairfieldsuntimes.com/business/energy/sunrise-movement-challenges-house-democratic-leadership-on-green-new-deal/article_9c143ae4-edee-11e8-a6df-9f670dcbbfdd.html).

6 Aída Chávez and Ryan Grim, "The Viral Confrontation With Dianne Feinstein Had a Political Impact Most Pundits Missed," *The Intercept*, March 1, 2019, <https://theintercept.com/2019/03/01/dianne-feinstein-green-new-deal-sunrise-movement/>.

7 Adam Levy and Leyla Santiago, "Democratic National Committee Votes against Allowing 2020 Candidates to Participate in Climate Change Debate," *CNN Politics*, August 24, 2019, <https://www.cnn.com/2019/08/24/politics/democrats-2020-debate-climate-dnc-summer-meeting/index.html>.

8 "Extinction Rebellion Launches Biggest Global Wave of Protest Action yet in September," *Extinction Rebellion*, September 1, 2020, <https://rebellion.global/press/2020/09/01/global-rebellion/>.

9 "Demands," *Extinction Rebellion US*, accessed November 6, 2020, <https://extinctionrebellion.us/demands>.

10 Patrick Fournier et al., *When Citizens Decide: Lessons from Citizen Assemblies on Electoral Reform* (Oxford University Press Scholarship Online, 2011), <https://oxford.universitypressscholarship.com/view/10.1093/acprof:oso/9780199567843.001.0001/acprof-9780199567843>.

11 "What Is XR," *Extinction Rebellion*, accessed September 18, 2020, <https://rebellion.global/about-us/>.

12 "Extinction Rebellion Launches Biggest Climate Hunger Strike in History," *Extinction Rebellion*, accessed September 14, 2020, <https://rebellion.global/blog/2019/11/15/biggest-climate-hunger-strike-in-history/>.

13 Ciara Nugent, "How Extinction Rebellion Is Changing Its Climate Activism," *Time*, July 9, 2020, <https://time.com/5864702/extinction-rebellion-climate-activism/>.

14 "Officials Cede to Hunger Strikers' Demands as Extinction Rebellion Enters Day 3 of the Biggest Climate Hunger Strike in History," *Extinction Rebellion*, accessed September 14, 2020, <https://rebellion.global/blog/2019/11/21/hunger-strike-day-3/>.

15 Sarah Bates, "Transform the Streets and Tackle Climate Chaos, Says Extinction Rebellion," *Socialist Worker*, May 19, 2020, <https://socialistworker.co.uk/art/50079/Transform+the+streets+and+tackle+climate+chaos%2C+says+Extinction+Rebellion>.

16 Andrew J. Hoffman and Todd Schifeling, "What 350.Org Can Teach Us About Effective Social Change," December 13, 2017, <https://www.fastcompany.com/40506882/what-we-can-learn-from-350-org-about-effective-social-change>.

17 Heather Smith, "How 350.Org Went from 'Strange Kid' to Head of the Green Class," *Grist*, February 5, 2014, <https://grist.org/climate-energy/how-350-org-went-from-strange-kid-to-head-of-the-green-class/>.

---

18 "In Pictures: The 350.Org Climate Change Worldwide Protest," *Guardian*, October 27, 2009, sec. Environment, <https://www.theguardian.com/environment/gallery/2009/oct/27/350-campaign-climate-change-protest>.

19 Bill McKibben, "350 EARTH Pulls off World's Biggest Art Project [PHOTOS & VIDEO]," *Grist*, November 29, 2010, <https://grist.org/article/2010-11-29-350-earth-pulls-off-worlds-biggest-art-project-photos-video/>.

20 Andrew Restuccia, "Greens: Climate March Breaks Record," *POLITICO*, September 21, 2014, <https://www.politico.com/story/2014/09/peoples-climate-march-nyc-111177.html>.

21 Robinson Meyer, "The Democratic Party Wants to Make Climate Policy Exciting," *Atlantic*, December 5, 2018, <https://www.theatlantic.com/science/archive/2018/12/ocasio-cortez-green-new-deal-winning-climate-strategy/576514/>.

22 Samantha Kealoha, "William Henry Hastie (1904-1976)," April 15, 2007, <https://www.blackpast.org/african-american-history/hastie-william-henry-1904-1976/>; "Quotes," Museum of Australian Democracy at Old Parliament House, accessed September 16, 2020, <https://www.moadoph.gov.au/democracy/quotes>.

23 "Cost of Election," OpenSecrets.org, accessed October 2, 2020, <https://www.opensecrets.org/elections-overview/cost-of-election?cycle=2020&display=T&infl=Y>.

24 "2020 Election to Cost \$14 Billion, Blowing Away Spending Records," OpenSecrets, October 28, 2020, <https://www.opensecrets.org/news/2020/10/cost-of-2020-election-14billion-update/>.

25 "Donor Demographics," OpenSecrets, accessed September 18, 2020, <https://www.opensecrets.org/elections-overview/donor-demographics?cycle=2018&display=A>.

26 Karl Evers-Hillstrom, "More Money, Less Transparency: A Decade under Citizens United," OpenSecrets.org, January 14, 2020, <https://www.opensecrets.org/news/reports/a-decade-under-citizens-united>.

27 Jane Mayer, "The Reclusive Hedge-Fund Tycoon Behind the Trump Presidency," *New Yorker*, March 27, 2017, <https://www.newyorker.com/magazine/2017/03/27/the-reclusive-hedge-fund-tycoon-behind-the-trump-presidency>.

28 Karl Evers-Hillstrom, "More Money, Less Transparency: A Decade under Citizens United," OpenSecrets.org, January 14, 2020, <https://www.opensecrets.org/news/reports/a-decade-under-citizens-united>.

29 Theda Skocpol and Alexander Hertel-Fernandez, "The Koch Network and the Rightward Shifts In U.S. Politics" (Harvard University, 2016), [https://scholars.org/sites/scholars/files/mpsa\\_koch\\_network.pdf](https://scholars.org/sites/scholars/files/mpsa_koch_network.pdf).

30 Megan Slack, "From the Archives: President Teddy Roosevelt's New Nationalism Speech," *whitehouse.gov*, December 6, 2011, <https://obamawhitehouse.archives.gov/blog/2011/12/06/archives-president-teddy-roosevelts-new-nationalism-speech>.

31 Carl Anderson, *One Person, No Vote*, 1st ed. (Bloomsbury Publishing, 2018), <https://www.bloomsbury.com/us/one-person-no-vote-9781635571387/>.

---

32 Ari Berman, *Give us the Ballot: The Modern Struggle For Voting Rights in America*, (New York: Farrar, Straus and Giroux, 2015).; Ari Berman, "The GOP's War on Voting Is Working," *The Nation*, June 29, 2016, <https://www.thenation.com/article/archive/the-gops-war-on-voting-is-working/>.

33 Ari Berman, "Rigged: How Voter Suppression Threw Wisconsin to Trump," *Mother Jones*, accessed December 26, 2020, <https://www.motherjones.com/politics/2017/10/voter-suppression-wisconsin-election-2016/>.

34 Karen L. Haas, clerk of the US House of Representatives, "Statistics of the Presidential and Congressional Election of November 6, 2012," Washington, February 28, 2013, 73–74, [history.house.gov/Institution/Election-Statistics/2012election/](http://history.house.gov/Institution/Election-Statistics/2012election/).

35 Christopher Ingraham, "Analysis | How Pennsylvania Republicans Pulled off Their Aggressive Gerrymander," *Washington Post*, February 6, 2018, <https://www.washingtonpost.com/news/wonk/wp/2018/02/06/how-pennsylvania-republicans-pulled-off-their-aggressive-gerrymander/>.

36 "Make Democracy Count: Ending Partisan Gerrymandering" (The Campaign Legal Center, 2016), 5, [https://campaignlegal.org/sites/default/files/CLC\\_PartisanGerrymandering\\_Report\\_FINAL.pdf](https://campaignlegal.org/sites/default/files/CLC_PartisanGerrymandering_Report_FINAL.pdf).

37 "Public Trust in Government: 1958-2019," Pew Research Center - U.S. Politics & Policy, April 11, 2019, <https://www.pewresearch.org/politics/2019/04/11/public-trust-in-government-1958-2019/>.

38 Justin Blum and Dana Milbank, "Document Says Oil Chiefs Met With Cheney Task Force," *Washington Post*, November 16, 2005, <http://www.washingtonpost.com/wp-dyn/content/article/2005/11/15/AR2005111501842.html>

39 "Oil & Gas" OpenSecrets, accessed, February 12, 2021, <https://www.opensecrets.org/industries/indus.php?ind=e01>

40 "Oil & Gas" OpenSecrets, accessed, February 12, 2021, <https://www.opensecrets.org/industries/indus.php?ind=e01>

41 "Fact Sheet: Fossil Fuel Subsidies: A Closer Look at Tax Breaks and Societal Costs," Environmental and Energy Study Institute, July 29, 2019, <https://www.eesi.org/papers/view/fact-sheet-fossil-fuel-subsidies-a-closer-look-at-tax-breaks-and-societal-costs>.

42 Justin Gillis, "When Utility Money Talks," *New York Times*, August 2, 2020, sec. Opinion, <https://www.nytimes.com/2020/08/02/opinion/utility-corruption-energy.html>.

43 Mark Williams, "After Months of Contentious Debate, Ohio Nuclear Bailout Bill Becomes Law," *Columbus Dispatch*, July 23, 2019, <https://www.dispatch.com/business/20190723/after-months-of-contentious-debate-ohio-nuclear-bailout-bill-becomes-law>.

44 Giulia McDonnell Nieto del Rio, "Powerful Ohio Republican Is Arrested in \$60 Million Corruption Scheme," *New York Times*, July 22, 2020, sec. U.S., <https://www.nytimes.com/2020/07/21/us/larry-householder-ohio-speaker-arrested.html>.

45 Jennifer Edwards Baker, "Ohio AG Returns to Court to Shut down 'HB6 Piggybank,'" Fox 19, January 14, 2021, <https://www.fox19.com/2021/01/14/ohio-ag-returns-court-shut-down-hb6-piggybank/>.

---

46 Michelle Lewis, "EGEB: Arizona Utility Who Fought Green Energy Drops Fossil Fuels," Electrek, January 23, 2020, <https://electrek.co/2020/01/23/egeb-arizona-public-service-fossil-fuels-green-energy-ford-everledger-lithium-ion-batteries/>.

47 Personal Communication with the staff at Corporate Accountability, Ari Rubenstein, Sriram Madhusoondanan, Patti Lynn, Emails, November 2020

48 Pippa Norris, Holly Ann Garnett, and Max Grömping, "Electoral Integrity in the 2018 American Elections" (Electoral Integrity Project, May 2019), 7, <https://www.electoralintegrityproject.com/peius2018>.

49 Martin Gilens and Benjamin I. Page, "Testing Theories of American Politics: Elites, Interest Groups, and Average Citizens," *Perspectives on Politics* 12, no. 3 (September 2014): 564–81, <https://doi.org/10.1017/S1537592714001595>.

50 Pippa Norris and Max Grömping, "Electoral Integrity Worldwide" (Electoral Integrity Project, May 2019), 6, <https://www.electoralintegrityproject.com/the-year-in-elections-2019>.

51 "Founders Online: The Report of a Constitution or Form of Government for the Commonwealth of Massachusetts, 28-31 October 1779," accessed September 23, 2020, <http://founders.archives.gov/documents/Adams/06-08-02-0161-0002>.

52 Erich Fromm, *The Anatomy of Human Destructiveness* (New York, New York: Open Road Integrated Media, 1973), 555.

53 Guy Winch, "Loneliness Poses Greater Public Health Threat Than Obesity," Psychology Today, August 23, 2017, <https://www.psychologytoday.com/blog/the-squeaky-wheel/201708/loneliness-poses-greater-public-health-threat-obesity>.

54 World Bank Development Research Group, "Gini Index (World Bank Estimate) | Data," accessed September 21, 2020, [https://data.worldbank.org/indicator/SI.POV.GINI?end=2018&most\\_recent\\_value\\_desc=false&start=1967](https://data.worldbank.org/indicator/SI.POV.GINI?end=2018&most_recent_value_desc=false&start=1967).

55 Lawrence Mishel and Julia Wolfe, "CEO Compensation Has Grown 940% since 1978: Typical Worker Compensation Has Risen Only 12% during That Time" (Economic Policy Institute, August 14, 2019), <https://files.epi.org/pdf/171191.pdf>.

56 Martha Ross and Nicole Bateman, "Low-Wage Work Is More Pervasive than You Think, and There Aren't Enough 'Good Jobs' to Go Around," Brookings, November 21, 2019, <https://www.brookings.edu/blog/the-avenue/2019/11/21/low-wage-work-is-more-pervasive-than-you-think-and-there-arent-enough-good-jobs-to-go-around/>.

57 Megan Leonhardt, "Americans Now Spend Twice as Much on Health Care as They Did in the 1980s," CNBC, October 9, 2019, <https://www.cnbc.com/2019/10/09/americans-spend-twice-as-much-on-health-care-today-as-in-the-1980s.html>.

58 Ibid.

59 Miket, "Quote of the Day (Theodore Roosevelt, on 'Malefactors of Great Wealth')," A Boat Against the Current (blog), October 27, 2008, <http://boatagainstthecurrent.blogspot.com/2008/10/quote-of-day->

---

theodore-roosevelt-on.html.; George F. Parker, "President Roosevelt as an Author," *English Illustrated Magazine*, June 1904, <https://search.proquest.com/docview/3251019/abstract/B3C4ED0462F34309PQ/1>.

60 Isabel V. Sawhill and Christopher Pulliam, "Six Facts about Wealth in the United States," Brookings, June 25, 2019, <https://www.brookings.edu/blog/up-front/2019/06/25/six-facts-about-wealth-in-the-united-states/>.

61 Robert Reich, *Supercapitalism: The Transformation of Business, Democracy, and Everyday Life* (New York: Vintage Books, 2008), 7-14, 36-39.

62 Danielle Kurtzleben, "Chart: US Corporations' Shrinking Tax Burden," *Vox*, July 25, 2014, <https://www.vox.com/2014/7/25/5936837/chart-us-corporations-declining-tax-burden-inversions-corporate-tax>.

63 "Public Power," American Public Power Association, accessed September 21, 2020, <https://www.publicpower.org/public-power>.

64 NRECA, "Electric Co-Op Facts & Figures," America's Electric Cooperatives, June 23, 2020, <https://www.electric.coop/electric-cooperative-fact-sheet/>.

65 Kate Aronoff, "A Moderate Proposal: Nationalize the Fossil Fuel Industry," *New Republic*, March 17, 2020, <https://newrepublic.com/article/156941/moderate-proposal-nationalize-fossil-fuel-industry>.

66 Michael Tomasello et al., *Why We Cooperate* (Cambridge, United States: MIT Press, 2009): 63, <http://ebookcentral.proquest.com/lib/vand/detail.action?docID=3339065>.

67 Ibid.

68 James K. Rilling et al, "A Neural Basis for Social Cooperation," *Neuron* 35, no. 2 (July 18, 2002): 395-405, [https://doi.org/10.1016/S0896-6273\(02\)00755-9](https://doi.org/10.1016/S0896-6273(02)00755-9); Natalie Angier, "Why We're So Nice: We're Wired to Cooperate (Published 2002)," *New York Times*, July 23, 2002, <https://www.nytimes.com/2002/07/23/science/why-we-re-so-nice-we-re-wired-to-cooperate.html>.

69 Adam Smith, *Theory of Moral Sentiments*, (London: Printed for A. Millar, and A. Kincaid and J. Bell, 1759) 64, 127.; Frances Moore Lappé, *Rediscovering America's Values*, (Ballantine Books, 1989) 245.

70 Barry Bergman, "Monkeys for Equal Pay (and Every Cat for Itself)," *Berkeley News*, March 11, 2015, <https://news.berkeley.edu/2015/03/11/frans-de-waal-greater-good/>.

71 Pippa Norris and Max Grömping, "Electoral Integrity Worldwide" (Electoral Integrity Project, May 2019), 6, <https://www.electoralintegrityproject.com/the-year-in-elections-2019>.

72 George Lakey, *Viking Economics: How the Scandinavians Got It Right-and How We Can, Too*, Penguin Random House, 2016.

73 Jesse Colombo, "Why Has The U.S. CEO-To-Worker Pay Ratio Increased So Much?," *Forbes*, August 31, 2019, <https://www.forbes.com/sites/jessecolombo/2019/08/31/why-has-the-u-s-ceo-to-worker-pay-ratio-increased-so-much/>; Nina Berglund, "Executive Pay 'Low' in Norway," *NewsinEnglish.no*, May 29, 2013, <https://www.newsinenglish.no/2013/05/29/executive-pay-low-in-norway/>.

---

74 Frank Martela et al., "The Nordic Exceptionalism: What Explains Why the Nordic Countries Are Constantly Among the Happiest in the World," (World Happiness Report, March 20, 2020), 130, <http://worldhappiness.report/>.

75 Richard G. Wilkinson and Kate Pickett, *The Spirit Level: Why Greater Equality Makes Societies Stronger*, (New York: Bloomsbury Press, 2010) 66-69, 73-102, 129-156.; "The Spirit Level," The Equality Trust, accessed November 6, 2020, <https://www.equalitytrust.org.uk/resources/the-spirit-level>.

76 Robert Barnes, "Supreme Court Strikes Arizona's 'Matching Funds' for Publicly Financed Candidates," *Washington Post*, June 27, 2011, sec. Politics, [https://www.washingtonpost.com/politics/supreme-court-strikes-arizona-system-of-matching-funds-to-publicly-financed-candidates/2011/06/26/AG92xenH\\_story.html](https://www.washingtonpost.com/politics/supreme-court-strikes-arizona-system-of-matching-funds-to-publicly-financed-candidates/2011/06/26/AG92xenH_story.html).

77 "Democracy Voucher Program," Seattle.gov, accessed September 30, 2020, <https://www.seattle.gov/democracyvoucher/about-the-program>.; Tom James, "Seattle Campaign Finance Program Gives Voters \$100 to Donate," AP NEWS, June 19, 2018, <https://apnews.com/article/30a65697ca2b4491ba98b9ee0b6131b3>.

78 Jamie Galbraith, "Galbraith: The Role of Fraud in the Financial Crisis," *Economist's View*, May 5, 2010, <https://economistsview.typepad.com/economistsview/2010/05/the-role-of-fraud-in-the-financial-crisis.html>.

79 Benjamin Landy, "A Tale of Two Recoveries: Wealth Inequality After the Great Recession," The Century Foundation, August 28, 2013, <https://tcf.org/content/commentary/a-tale-of-two-recoveries-wealth-inequality-after-the-great-recession/>.

80 Linda Qiu, "Sanders: African-Americans Lost Half Their Wealth Because of Wall Street Collapse," PolitiFact, February 11, 2016, <https://www.politifact.com/factchecks/2016/feb/12/bernie-sanders/sanders-african-american-lost-half-their-wealth-be/>.

81 "SB 636, the Ballot DISCLOSE Act," California Clean Money Campaign, accessed September 30, 2020, <http://www.caclean.org/>

82 Melissa Bateson, Daniel Nettle, and Gilbert Roberts, "Cues of Being Watched Enhance Cooperation in a Real-World Setting," *Biology Letters* 2, no. 3 (June 27, 2006): 412-14, <https://doi.org/10.1098/rsbl.2006.0509>.

83 Bill Hathaway, "Infants Prefer Individuals Who Punish Those Not like Themselves, Yale Researchers Find," *YaleNews*, March 12, 2013, <https://news.yale.edu/2013/03/12/infants-prefer-individuals-who-punish-those-not-themselves-yale-researchers-find>.

84 "All Are Responsible," *Evolve*, August 8, 2018, <http://evolve.reconstructingjudaism.org/all-are-responsible>.

85 Eric Westervelt, "Stumbling Upon Miniature Memorials To Victims Of Nazis," NPR.org, May 31, 2012, <https://www.npr.org/2012/05/31/153943491/stumbling-upon-miniature-memorials-to-nazi-victims>.

86 "Donald J. Trump on Twitter," Twitter, accessed October 9, 2020, <https://twitter.com/realDonaldTrump/status/752110630031749120>.



---

87 Pippa Norris and Max Grömping, "Electoral Integrity Worldwide" (Electoral Integrity Project, May 2019), 6, <https://www.electoralintegrityproject.com/the-year-in-elections-2019>.

88 Ruth Igielnik, "70% of Americans Say U.S. Economic System Unfairly Favors the Powerful," Pew Research Center, accessed October 9, 2020, <https://www.pewresearch.org/fact-tank/2020/01/09/70-of-americans-say-u-s-economic-system-unfairly-favors-the-powerful/>.

89 Michael Johnston, "The Supreme Court's New Definition of Corruption Is out of Step with What Americans Think," *Washington Post*, accessed November 6, 2020, <https://www.washingtonpost.com/news/monkey-cage/wp/2016/07/20/defining-corruption-is-inherently-political-why-do-we-think-the-supreme-court-will-solve-it/>.

90 Greg Stohr, "Bloomberg Poll: Americans Want Supreme Court to Turn Off Political Spending Spigot," *Bloomberg*, September 28, 2015, <https://www.bloomberg.com/news/articles/2015-09-28/bloomberg-poll-americans-want-supreme-court-to-turn-off-political-spending-spigot>.

91 Lydia Saad, "Half in U.S. Support Publicly Financed Federal Campaigns," *Gallup*, June 24, 2013, <https://news.gallup.com/poll/163208/half-support-publicly-financed-federal-campaigns.aspx>.

92 Ruth Igielnik, "70% of Americans Say U.S. Economic System Unfairly Favors the Powerful," Pew Research Center, January 9, 2020, <https://www.pewresearch.org/fact-tank/2020/01/09/70-of-americans-say-u-s-economic-system-unfairly-favors-the-powerful/>. ; Lewis Jacobson, "Polls Show Most Democrats, Many Americans Back Key Bernie Sanders' Policies," *PolitiFact*, February 25, 2020, <https://www.politifact.com/factchecks/2020/feb/25/pete-buttigieg/polls-show-most-democrats-many-americans-back-key-/>. ; Leslie Davis and Hannah Hartig, "Two-Thirds of Americans Favor Raising Federal Minimum Wage to \$15 an Hour," Pew Research Center, July 30, 2019, <https://www.pewresearch.org/fact-tank/2019/07/30/two-thirds-of-americans-favor-raising-federal-minimum-wage-to-15-an-hour/>.

93 John Gramlich and Katherine Schaeffer, "7 Facts about Guns in the U.S.," Pew Research Center, July 22, 2019, <https://www.pewresearch.org/fact-tank/2019/10/22/facts-about-guns-in-united-states/>.

94 Frank Newport, "Americans Still Say Upper-Income Pay Too Little in Taxes," *Gallup*, April 15, 2016, <https://news.gallup.com/poll/190775/americans-say-upper-income-pay-little-taxes.aspx>.; "Federal Tax System Seen in Need of Overhaul," Pew Research Center U.S. Politics & Policy, March 19, 2015, <https://www.pewresearch.org/politics/2015/03/19/federal-tax-system-seen-in-need-of-overhaul/>.

95 Cary Funk and Meg Hefferon, "U.S. Public Views on Climate and Energy," Pew Research Center Science & Society, November 25, 2019, <https://www.pewresearch.org/science/2019/11/25/u-s-public-views-on-climate-and-energy/>.

96 Robinson Meyer, "Voters Really Care About Climate Change," *Atlantic*, February 21, 2020, <https://www.theatlantic.com/science/archive/2020/02/poll-us-voters-really-do-care-about-climate-change/606907/>.

97 George Pillsbury Rapoport Miles, "Not a Typo: States Made 2019 a Historic Year for Election Reform," *American Prospect*, January 14, 2020, <https://prospect.org/api/content/f6ec7ccc-3656-11ea-98ec-1244d5f7c7c6/>.

98 Ciara Torres-Spelliscy, "Why Is Chevron Spending Millions on a Municipal Election?," Brennan Center for Justice, July 21, 2014, <https://www.brennancenter.org/our-work/analysis-opinion/why-chevron-spending->



---

millions-municipal-election.; “U.S. Census Bureau QuickFacts: Richmond City, California,” accessed October 29, 2020, <https://www.census.gov/quickfacts/richmondcitycalifornia>.

99 Susie Cagle, “Richmond v Chevron: The California City Taking on Its Most Powerful Polluter,” *Guardian*, October 9, 2019, sec. Environment, <https://www.theguardian.com/environment/2019/oct/09/richmond-chevron-california-city-polluter-fossil-fuel>.

100 Carolyn Jones, “Chevron’s \$3 Million Backfires in Richmond Election,” *SFGate*, November 6, 2014, <https://www.sfgate.com/bayarea/article/Chevron-s-3-million-backfires-in-Richmond-5873779.php>.

101 Lina Valasco and James Atencio, “Planning Commission Agenda Report” (City of Richmond Planning and Building Services Department, July 18, 2019), [https://nocoalinoakland.info/wp-content/uploads/2019/07/PC\\_3\\_PLN19-191\\_Coal-and-Petroleum-Coke-Regulations\\_07\\_18\\_2019.pdf](https://nocoalinoakland.info/wp-content/uploads/2019/07/PC_3_PLN19-191_Coal-and-Petroleum-Coke-Regulations_07_18_2019.pdf).

102 Cameron Nielsen, “Urban Farmers in Richmond Are Helping in the Fight against Food Insecurity,” *Richmond Confidential*, November 5, 2020, <https://richmondconfidential.org/2020/11/05/urban-farmers-in-richmond-are-helping-in-the-fight-against-food-insecurity/>.

103 “Maine Clean Elections,” *Maine Citizens for Clean Elections*, accessed February 22, 2021, <https://www.maineclanelections.org/cleanelections>.

104 Adam Skaggs and Mark Ladov, “Arizona Free Enterprise and the Future of Public Financing,” *Brennan Center for Justice*, July 12, 2011, <https://www.brennancenter.org/our-work/research-reports/arizona-free-enterprise-and-future-public-financing..>

105 Dan Neumann, “Rep. Maxmin Says ‘a Better Politics’ Needed after Floor Harassment by Republicans,” *Beacon*, June 7, 2019, <https://mainebeacon.com/rep-maxmin-says-a-better-politics-needed-after-floor-harassment-by-republicans/>.

106 “Rollcall Details for House Roll-Call #182 LD 1282 (HP 924),” *State of Maine Legislature*, accessed October 9, 2020, <http://legislature.maine.gov/LawMakerWeb/rollcall.asp?ID=280072524&chamber=House&serialnumber=182>.

## Into Action

1 “About 350,” *350.org*, Accessed September 2020, <https://350.org/about/>.

2 “350 Celebrates: A Decade of Action,” *350.org*, Accessed September 2020, <https://350.org/10-years/>.

3 *Ibid.*

4 “Who We Are,” *Amnesty International*, accessed September 23, 2020, <https://www.amnesty.org/en/who-we-are/>.

5 “The World Is Watching: Mass Violations by U.S. Police of Black Lives Matter Protesters’ Rights,” *Amnesty International USA*, accessed September 14, 2020, <https://www.amnestyusa.org/worldiswatching/>.

---

6 “Urgent Action Victory! Pro-Democracy Activist Released (Guinea: UA 64.20),” Amnesty International USA, Accessed September 15, 2020, <https://www.amnestyusa.org/victories/urgent-action-victory-pro-democracy-activist-released-guinea-ua-64-20/>.

7 “BlueGreen Alliance,” BlueGreen Alliance, accessed December 22, 2020, <https://www.bluegreenalliance.org/>.

8 “In First-Ever Presidential Endorsement, BlueGreen Alliance Announces Support For Joe Biden For President and Kamala Harris for Vice President,” BlueGreen Alliance, August 26, 2020, <https://www.bluegreenalliance.org/the-latest/in-first-ever-presidential-endorsement-bluegreen-alliance-announces-support-for-joe-biden-for-president-and-kamala-harris-for-vice-president/>.

9 “New Online Tool Launches to Shine Spotlight On Workers Left Unsafe During COVID-19,” BlueGreen Alliance, May 28, 2020, <https://www.bluegreenalliance.org/the-latest/new-online-tool-launches-to-shine-spotlight-on-workers-left-unsafe-during-covid-19/>.

10 “About the Center,” Center for Biological Diversity, accessed December 22, 2020, <https://www.biologicaldiversity.org/about/>.

11 “People vs. Pipelines: A Week of Stunning Victories,” The Center for Biological Diversity, July 9, 2020, <https://www.biologicaldiversity.org/publications/earthonline/endangered-earth-online-no1044.html>.

12 “Appeals Court Victory Maintains Protections for Yellowstone Grizzlies,” Center for Biological Diversity, accessed September 24, 2020, <https://biologicaldiversity.org/w/news/press-releases/appeals-court-victory-maintains-protections-yellowstone-grizzlies-2020-07-08/>.

13 “About Ceres,” Feeding Ourselves Thirsty, accessed December 22, 2020, <https://feedingourselfsthirsty.ceres.org/about-ceres>.

14 “Ceres Welcomes Climate Risk Report from Subcommittee of CFTC, as Calls to Regulate Climate Change as a Systemic Financial Risk Grow Louder,” Ceres, September 9, 2020, <https://www.ceres.org/news-center/press-releases/ceres-welcomes-climate-risk-report-subcommittee-cftc-calls-regulate>.

15 “Ceres Brings the Voice of Business to Congress in Push for Climate Solutions,” Ceres, accessed September 12, 2020, <https://www.ceres.org/news-center/blog/ceres-brings-voice-business-congress-push-climate-solutions>.

16 “Core Values,” Corporate Accountability Network, Accessed September 2020, <https://citizensclimatelobby.org/about-ccl/values/>.

17 “CCL Statistics,” CCL Community, accessed March 22, 2021, <https://community.citizensclimate.org/tools/ccl-stats>.

Steve Valk, “Grassroots Advocates Join Virtual Climate Conference & Lobby Effort,” Citizens’ Climate Lobby, June 19, 2020, <https://citizensclimatelobby.org/grassroots-advocates-join-virtual-climate-conference-lobby-effort/>; “3,700 Climate Advocates Gather Online to Plan Push for Carbon Price in 2021,” Citizens’ Climate Lobby, December 9, 2020, <https://citizensclimatelobby.org/3700-climate-advocates-gather-online-to-plan-push-for-carbon-price-in-2021/>.

---

18 Theodore E. Deutch, "Cosponsors - H.R.763 - 116th Congress (2019-2020): Energy Innovation and Carbon Dividend Act of 2019," webpage, January 25, 2019, <https://www.congress.gov/bill/116th-congress/house-bill/763/cosponsors>.

19 "Who We Are," Corporate Accountability, accessed December 22, 2020, <https://www.corporateaccountability.org/who-we-are/>.

20 Alyssa Weinman, "Robust Coalition Defeats Aggressive Water Privatization Push in Providence," Corporate Accountability, April 10, 2019, <https://www.corporateaccountability.org/blog/providence-water-victory/>.

21 Ibid.

22 "What Is Data for Progress?," Data For Progress, accessed December 22, 2020, <https://www.dataforprogress.org/about>.

23 Charles Schumer, "Taking Politics Out of Unemployment Insurance," Data For Progress, July 1, 2020 ; Elizabeth Warren, "A Wealth Tax on Ultra-Millionaires Is a Winning Strategy for Democrats," Data for Progress, March 1, 2021, <https://www.dataforprogress.org/blog/2021/2/22/warren-wealth-tax-winning-strategy>; Bernie Sanders, "The American People Are Clear: Democrats Must Raise the Minimum Wage to \$15 an Hour," Data For Progress, January 26, 2021, <https://www.dataforprogress.org/blog/2021/1/26/the-american-people-are-clear-democrats-must-raise-the-minimum-wage-to-15-an-hour?rq=bernie>.

24 Ethan Winter, "Memo: Black Voters Want to Revolutionize Policing in the United States," Data For Progress, June 19, 2020, <https://www.dataforprogress.org/memos/black-voters-want-to-revolutionize-policing>.

25 Julian Brave NoiseCat, "What a Joe Biden Cabinet Pick Might Mean for Native Americans—and Democrats," POLITICO, November 30, 2020, <https://www.politico.com/news/magazine/2020/11/30/deb-haaland-native-americans-interior-biden-440916>.

26 "About Democracy Initiative," Democracy Initiative, April 1, 2016, <http://www.democracyinitiative.org/about-democracy-initiative>.

27 "Promote the Vote - Let's Make Voting a Sure Thing.," Promote the Vote Michigan, accessed September 14, 2020, <https://promotethevotemi.com/>.

28 "Victory for DC Fair Elections!," Democracy Initiative, October 30, 2017, <http://www.democracyinitiative.org/take-action/victory-dc-fair-elections>.

29 "About Demos," Demos, accessed December 22, 2020, <https://www.demos.org/about>.

30 "Frontlines Climate Justice Executive Action Platform," Demos, accessed September 24, 2020, <https://www.demos.org/policy-briefs/frontlines-climate-justice-executive-action-platform>.

31 "Racial Justice Groups Take Legal Action Against FL Governor Ron DeSantis Demanding Changes to Upcoming Elections Due to COVID-19 Pandemic," Demos, accessed December 22, 2020, <https://www.demos.org/press-release/racial-justice-groups-take-legal-action-against-fl-governor-ron-desantis-demanding>.

---

32 “Our Mission,” Environmental Voter Project, November 29, 2015, <https://www.environmentalvoter.org/our-mission>.

33 Alexander C. Kaufman, “The Group Raising An NRA-Style ‘Army Of Environmental Super Voters’ Is Expanding,” *HuffPost*, September 1, 2019, [https://www.huffpost.com/entry/climate-vote-2020-environmental-voter-project\\_n\\_5d689479e4b0488c0d12103e](https://www.huffpost.com/entry/climate-vote-2020-environmental-voter-project_n_5d689479e4b0488c0d12103e).

34 Ibid.

35 “Extinction Rebellion: About Us,” Extinction Rebellion, Accessed September 2020, <https://extinctionrebellion.uk/the-truth/about-us/>.

36 Reuters Staff, “Climate Activists Line London’s Trafalgar Square with Kids’ Shoes,” *Reuters*, May 18, 2020, <https://www.reuters.com/article/us-health-coronavirus-britain-climatecha-idUSKBN22U1MM>.

37 Ibid.

38 “About,” Food and Water Watch, Accessed September 2020, <https://www.foodandwaterwatch.org/about>.

39 “People Power Kicks Rick Snyder out of Harvard,” Food and Water Watch, July 13, 2019, <https://www.foodandwaterwatch.org/impact/people-power-kicks-rick-snyder-out-harvard>.

40 “Connecticut Governor Lamont Signs Fracking Waste Bill,” Food and Water Watch, July 19, 2019, <https://www.foodandwaterwatch.org/impact/connecticut-governor-lamont-signs-fracking-waste-bill>.

41 “Friends of the Earth • Truth to Power • Learn More About Us,” Friends of the Earth, accessed December 22, 2020, <http://foe.org/about-us/>.

42 “Keeping Puget Sound Clean,” Friends of the Earth, accessed September 12, 2020, <https://foe.org/impact-stories/keeping-puget-sound-clean/>.

43 “Canceling the Atlantic Coast Pipeline • Friends of the Earth,” Friends of the Earth, accessed September 12, 2020, <https://foe.org/impact-stories/canceling-the-atlantic-coast-pipeline/>.

44 “About,” Greenpeace USA, accessed September 12, 2020, <https://www.greenpeace.org/usa/about/>.

45 “2 Million People Defended the Amazon Reef — And Won,” Greenpeace USA, accessed September 12, 2020, <https://www.greenpeace.org/usa/victories/2-million-people-defended-the-amazon-reef-and-won/>.

46 “Success! Trader Joe’s Will Cut 1 Million Pounds of Plastic From Its Stores!,” Greenpeace USA, accessed September 12, 2020, <https://www.greenpeace.org/usa/victories/trader-joes-will-cut-1-million-pounds-of-plastic-from-stores/>.

47 “About,” Indigenous Environmental Network, accessed September 12, 2020, <https://www.ienearth.org/about/>.

48 “IEN and The People’s Emergency Partnership Fund Provide PPE,” Indigenous Environmental Network, accessed September 12, 2020, <https://www.ienearth.org/ien-and-the-peoples-emergency-partnership-fund-provide-ppe/>.

---

49 “Victory! No Camps On Stolen Land!,” Indigenous Environmental Network, accessed September 12, 2020, <https://www.ienearth.org/victory-no-camps-on-stolen-land/>.

50 Joan Walsh, “Indivisible Is Working Hard to Live Up to Its Name,” *Nation*, September 16, 2019, <https://www.thenation.com/article/archive/indivisible-resistance-grassroots-election-2020/>.

51 “About,” Indivisible, May 11, 2016, <https://www.facebook.com/indivisibleguide/>.

52 Eric Lach, “What Happens If Donald Trump Fights the Election Results?,” *New Yorker*, August 21, 2020, <https://www.newyorker.com/news/campaign-chronicles/what-happens-if-donald-trump-fights-the-election-results>.

53 Emily Phelps, “Indivisible Announces Ambitious Grassroots Electoral Program to Defeat Republicans in November,” Indivisible, July 27, 2020, <https://indivisible.org/statement/indivisible-announces-ambitious-grassroots-electoral-program-defeat-republicans-november>.

54 “Environmental Majority Council,” League of Conservation Voters, accessed December 22, 2020, <https://www.lcv.org/environmental-majority-council/>.

55 “LCV: Turning Environmental Values into National, State, and Local Priorities,” League of Conservation Voters, September 16, 2016, <https://www.lcv.org/mission/>.

56 Emily Samsel, “PRE-ELECTION MEMO: Our Historic \$115 Million Investment to Defeat Trump and Elect Climate and Environmental Justice Champions at All Levels,” LCV Victory Fund, October 30, 2020, <https://www.lcvvictoryfund.org/news/pre-election-memo-2020/>.

57 “Our Impact,” League of Conservation Voters, accessed December 22, 2020, <https://lcv.org/our-impact/>.

58 “About Us,” League of Women Voters, Accessed September 12, 2020, <https://www.lwv.org/about-us>.

59 “People Powered Fair Maps,” League of Women Voters, Accessed September 2020, <https://www.lwv.org/peoplepoweredfairmaps>.

60 “About Us,” VOTE411, Accessed September 12, 2020, <http://www.vote411.org/about>.

61 “Mission & Story,” March For Our Lives, accessed October 2, 2020, <https://marchforourlives.com/mission-story/>.

62 Melissa Ruggieri, “‘Us Kids’ Documentary about Parkland Shooting to Premiere at Plaza Drive-In,” *The Atlanta Journal-Constitution*, August 26, 2020, <https://www.ajc.com/life/music-blog/us-kids-documentary-about-parkland-shooting-to-premiere-at-plaza-drive-in/F7RBHHX6D5GWPFH7NUGBMDZ44Y/>.

63 Jacqueline Alemany, “March for Our Lives Marches toward November with New Campaign Ad,” *Washington Post*, August 6, 2020, <https://www.washingtonpost.com/politics/2020/08/06/march-our-lives-marches-toward-november-with-new-campaign-ad/>.

64 “Our Impact,” MoveOn: People-Powered Progress, accessed December 22, 2020, <https://front.moveon.org/our-impact/>.

---

65 “MoveOn Kicks Off \$20 Million Effort to Win Progressive Governing Majority in Nov. Elections,” MoveOn: People-Powered Progress, February 7, 2020, <https://front.moveon.org/moveon-launches-2020-election-program/>.

66 “MoveOn Members in 2019: Putting Our People Power to Work,” MoveOn: People-Powered Progress, December 31, 2019, <https://front.moveon.org/moveon-in-2019/>.

67 “The Nature Conservancy,” Nature, 2020, <https://www.nature.org/en-us/about-us/who-we-are/>.

68 Jonathan Maze, “McDonald’s Working with The Nature Conservancy, Target and Cargill on Sustainable Beef,” Restaurant Business, August 27, 2020, <https://www.restaurantbusinessonline.com/financing/mcdonalds-working-nature-conservancy-target-cargill-sustainable-beef>.

69 “American Conservation Coalition Campus Announces Sidelining Carbon Initiative,” Nature Conservancy, accessed September 14, 2020, <https://www.nature.org/en-us/newsroom/acc-sidelining-carbon-initiative/>.

70 “Our Revolution,” Our Revolution, Accessed September 2020, <https://www.ourrevolution.com>.

71 “The Revolution Report: 8-06-20,” Our Revolution, August 7, 2020, <https://ourrevolution.com/2020/08/06/the-revolution-report-8-06-20/>.

72 “About Us,” Public Citizen, accessed September 12, 2020, <https://www.citizen.org/about/>.

73 “Public Citizen, LDF File Lawsuit Against the USPS to Suspend Implementation of Postal Service Changes Ahead of the November Election,” Public Citizen, accessed September 12, 2020, <https://www.citizen.org/news/ldf-and-public-citizen-file-lawsuit-on-behalf-of-the-naacp-against-the-usps-to-suspend-implementation-of-postal-service-changes-ahead-of-the-november-election/>.

74 “Preserving Revolving Door Restrictions on Former Pentagon Officials,” Public Citizen, accessed September 12, 2020, <https://www.citizen.org/victories/story/preserving-revolving-door-restrictions-on-former-pentagon-officials/>.

75 “How We Help,” Run For Something, accessed September 24, 2020, <https://runforsomething.net/how-we-help/>.

76 “Candidate Support System,” Run For Something, accessed September 24, 2020, <https://runforsomething.net/run/candidate-support-system/>.

77 “Run for Something’s 2019–2020 Strategic Plan,” Medium, January 28, 2019, <https://medium.com/@runforsomething/run-for-somethings-2019-2020-strategic-plan-a272e5633849>.

78 “About the Sierra Club,” Sierra Club, Accessed September 2020, <https://www.sierraclub.org/about-sierra-club>.

79 “150 Coal Plants Retired | Beyond Coal,” Sierra Club, accessed March 1, 2021, <https://coal.sierraclub.org/posts/150-coal-plants-retired>; Oliver Bernstein, “Coal on the Decline -- 150 Coal Plants Set for Retirement,” Sierra Club National, October 8, 2013, <https://content.sierraclub.org/press-releases/2013/10/coal-decline-150-coal-plants-set-retirement>.

---

80 "Sierra Club Timeline," Sierra Club, July 20, 2020, <https://www.sierraclub.org/library/sierra-club-timeline>.

81 "About Sunrise Movement," Sunrise Movement, Accessed September 2020, <https://www.sunrisemovement.org/about>.

82 "'We're Done Playing by the Rules:' 20 Teens Arrested for Green New Deal Teach-in at Senate," Sunrise Movement, February 17, 2020, <https://medium.com/sunrisemvmt/for-immediate-release-7591f35ee53f>.

83 Jacob Wallace, "How Do You Organize Students Without a Campus?," *Nation*, May 18, 2020, <https://www.thenation.com/article/environment/how-do-you-organize-students-without-a-campus/>.





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