

Putting Out the Planetary Fire

An Introduction to Climate Change and Advocacy

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Visit <http://www.gelfny.org> for more information about the Green Education and Legal Fund.

About the Author

Mark Dunlea has been an environmental activist since he co-founded the NY Public Interest Research Group (NYPIRG) in 1973 while a student at RPI and Albany Law School. After law school, he did community organizing with ACORN. He then spent the next three decades doing anti-poverty organizing as Executive Director of the Hunger Action Network of NYS. Mark worked on issues such as welfare rights, single-payer healthcare, homelessness, minimum wage, and food policy.

Mark left Hunger Action in 2014 to become a full-time climate activist. For 350NYC, he helped coordinate the successful campaign to divest both the city and state pension funds from fossil fuels. He was on the coordinating committee of the People's Climate Movement, which organized a 400,000-person rally in NYC in 2014. He has been active with Extinction Rebellion and was arrested three times at climate protests in observance of his 65th birthday.

He was among the first advocates in NYS for a carbon tax, getting to 100% renewable-energy use nationally by 2030, stopping the production of new fossil fuels, and developing offshore wind off of Long Island. In 1985, he authored one of the first reports exposing the dangers of garbage incineration.

As the campaign manager for the Green Party's NY gubernatorial campaign in 2010, Mark helped launch the first call for a Green New Deal. He is a co-founder of the Green Party of NY and in 2016 was the national manager Jill Stein's presidential campaign. Mark was the 2018 Green Party candidate for NYS Comptroller.

He is a member of Common Farms, an intentional community based on sustainability in Poestenkill, NY, where in 1985 he and his wife, Judith Enck, built their own passive-solar home. Mark is a former member of the Poestenkill Town Board. He is a radio producer with the Sanctuary for Independent Media in Troy and has worked in community radio for more than 20 years. He is author of the novel *Madame President: The Unauthorized Biography of the First Green Party President*.

Praise for *Putting Out the Planetary Fire*

“Mark Dunlea has worked as hard as anyone in America to tamp down the fire of climate change. And because he has decades of knowledge of how to work the system from inside and out, he's been particularly effective. Now you can take advantage of all that hard-earned wisdom: this is a book for the practical organizer who wants to make a difference in the biggest fight the earth has ever seen.” **Bill McKibben, author (The End of Nature), co-founder 350.org and The Third Act.**

"This book is an excellent primer not only on climate change, its useful solutions, and false solutions we need to avoid, but also on how to implement the good solutions through advocacy. I highly recommend it." **Prof. Mark Jacobson, Stanford University, Author of No Miracles Needed: How Today's Technology Can Save our Climate and Clean Our Air.**

"The climate explosion - record wildfires, droughts, floods, hurricanes, tornadoes, rising sea levels - has made Earth Day Every Day. People who know this keep telling me they want to do something but don't know how. Enter Mark Dunlea whose half a lifetime of organizing around saving the Planet from climate disruptions and other perils is poured into this book, PUTTING OUT THE PLANETARY FIRE. Accurate, easy to read with valuable groups, tools and strategies laid out, Dunlea's book takes away excuses for inaction and motivates for *action*! If you want to move from knowledge to action, this is your book." **Ralph Nader, author, citizen activist.**

“Mark Dunlea couldn't find a primer on how to fight global warming, so he put one together himself. "Putting Out the Planetary Fire" contains the information everyone needs to understand the

crisis that we're facing and -- just as important -- to become active."
Elizabeth Kolbert, Pulitzer-prize winning author of *The Sixth Extinction: An Unnatural History*.

Putting Out the Planetary Fire not only provides top-notch research, but also places advocacy high up on its agenda and goes through all the tools in the advocacy toolbox--from lobbying to rallying to direct action. I particularly appreciate the inclusion of the effects of militarism on the climate, including the need to slash the military budget, stop wars for fossil fuels, and invest the savings in a rapid transition to a clean energy future. It is time to act like it is a climate emergency, because it is! Another World is Possible if we put the common good ahead of the wealth and greed of the 1%.
Medea Benjamin. Co-founder, Code Pink.

Mark Dunlea has been widely known and respected as an exceptional social justice advocate and leading environmentalist for half a century. He and I, a Black veteran civil and human rights activist, have for years, joined in the continuing struggle against racism in all its horrific and devastating forms. Working together, we recognized environmental racism as another form of institutional racism that has been destructive in so many ways, even allowing the disposal of hazardous waste to be disproportionately placed in communities of color. This book, largely based on Mark's gained experiences, thoughts and knowledge can serve as a valuable reference and guide to promote enhanced understanding of climate change. That, in turn, will hopefully inspire many to offer solutions and take drastic actions that will ultimately save humanity, something we must do. Therefore, this book is a must read. – **Dr. Alice Green, Center for Law and Justice.**

"Mark Dunlea's comprehensive and sorely needed breakdown of the current issues at play is the new must-read for anyone trying to negotiate their way through the truth and misinformation on climate change today. Mark's dedication, breadth of knowledge, and years of

legislative and grassroots organizing experience has made him a driving force in the climate movement and he brings it all to the table in "Putting Out the Planetary Fire". The book is a wonderful resource for both the curious and the hard-core activist. It's a fire hose of knowledge we can all use to help. Thank you, Mark Dunlea."
– **Lyna Hinkel, founder, 350NYC.**

Plastic is the new coal. As the economy (very) slowly reduces the use of fossil fuels for electricity generation and transportation, fossil fuel companies are making a big bet on plastic production. The production, use and disposal of plastics is a climate killer. This compelling book covers all the bases, providing you with the information you need to take action.” – **Judith Enck, Former EPA Regional Administrator, President of Beyond Plastics and happily married to the author.**

“This book won’t gather dust on the shelf. It’s full of practical tips and tactics for climate activists. I urge everyone who cares about the future of life on our planet to buy this book and, more importantly, to use it.” – **Eric Weltman, Food and Water Watch.**

Mark Dunlea's new book provides a concise summary of planetary fire's threats to agriculture through wild swings of weather, droughts, floods and excess heat, and, importantly, of the ways that farming can contribute to mitigating the climate emergency through indigenous and organic systems, building carbon in healthier soils and food sovereignty.- **Elizabeth Henderson**, lead author, *Sharing the Harvest: A Citizen’s Guide to Community Supported Agriculture* (Chelsea Green, 2007) and co-chair of policy committee, **Northeast Organic Farming Association of New York (NOFA-NY).**

“This book is radical because it goes to the roots of the climate crisis in capitalism’s built-in drive for endless, mindless growth. It elucidates the system-changing solutions of an ecosocialist Green New Deal. It covers the practical how-to's of effective climate

action. It provides what students and climate activists need right now to understand and remedy the accelerating climate emergency.”

Howie Hawkins, 2020 Green Party nominee for President, author of Green New Deal in 2010.

“The triple threats of climate collapse, endless war and crushing inequality are all joined at the hip and off the charts. Yet bipartisan priorities are fanning planetary flames on all of them. In this critical hour, “Putting Out the Planetary Fire” provides the science, policy and needed action to remedy the climate emergency. It includes a rapid transition off fossil fuels that would eliminate a key driver of global conflict, and it ameliorates inequality through the Green New Deal, climate reparations and much more. This comprehensive, practical compendium has become my go-to resource to fight these converging fires that endanger us all. I urge you to put it to work like our lives depend on it!” **Jill Stein, Green Party presidential nominee 2016, 2012.**

"Effective advocacy on climate change requires we understand the contradictions of the past, capture fear and potential in the present, and confront the future with optimism and no illusions. Mark Dunlea is a public intellectual, a rare breed. He tells us that the financial, environmental, technological, governmental and popular dots on climate change are connected by a crooked line. His book is alive, charting the signposts of our time. The book will also yield critical insights fifty years from now. Don't just read this book, practice it, including disagreeing with it. And, fifty years from now organizing and progressive thought will be focused on a world where sustainability is assumed and democracy the tool we use to express and resolve our differences," said **Tom Sanzillo, Director of Financial Analysis, Institute for Energy Economics and Financial Analysis.**

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INTRODUCTION

CLIMATE CHANGE IS THE GREATEST THREAT TO HUMANITY

Global warming is not only inevitable — it’s already well underway.

The only question now is: how bad will it get? There are considerable differences of opinion on this.

The Secretary-General of the United Nations (UN) has repeatedly warned that the world is not acting fast enough to deal with the climate crisis: “If we continue on our current path, we will face the collapse of everything that gives us our security, food production, access to fresh water, habitable ambient temperature, and ocean food chains. The poorest — those with the least security — are certain to suffer. Our duty right now is surely to do all we can to help those in the most immediate danger.”¹

These remarks came after the UN heard testimony from leading experts, such as naturalist David Attenborough, who called climate change “the biggest threat to security that modern humans have ever faced.”

Can world leaders slash emissions to zero quickly enough to avoid total climate collapse? To keep it at a “manageable level?” Can society agree to devote the resources needed to help everyone adapt to climate change, not just the wealthy and the industrial nations?

Or will civilization as we know it unravel as hundreds of millions if not billions of people desperately struggle to obtain basic necessities

¹ <https://press.un.org/en/2021/sc14445.doc.htm>

such as food, water, land, and shelter.² Many previous civilizations have collapsed due to climate change.³

Many climate groups have called on governments to declare a climate emergency, with a level of full-scale mobilization that the U.S. did after Pearl Harbor. In the World War II emergency, President Roosevelt and the federal government took over a quarter of the nation's manufacturing capacity in order to turn industry on a dime to produce what was needed. While several thousand governments, mainly at the local level, have issued such climate emergency declarations, they have failed to be accompanied by the needed resource mobilization.⁴

That doesn't mean there's no room for hope. World leaders are finally agreeing that climate change, driven by humans burning fossil fuels, is real and they've begun to take some steps to transition to a clean energy future. And once we begin to move in the right direction, there is hope we can speed up. Young people, who will have to live on a hotter planet, are pushing their elders to do more — a lot more. They have organized some of the larger demonstrations in human history demanding climate action. And we elders remember that Nelson Mandela walked out of prison in apartheid South Africa to become his nation's leader. And the Berlin Wall in Germany eventually fell.

As I start writing this book on Labor Day 2022, a third of Pakistan is under water from unusually heavy monsoon rains and melting glaciers that followed a severe heat wave; more than a thousand people are dead. The previous month, eastern Kentucky was ravaged by a “thousand-year flood” that killed scores — though major

² <https://www.gq.com/story/climate-change-david-spratt>

³ <https://www.treehugger.com/ancient-civilizations-were-destroyed-climate-change-4869712>; <https://www.rochester.edu/newscenter/astrobiology-alien-apocalypse-can-any-civilization-make-it-through-climate-change-322232/>; <https://www.encyclopedie-environnement.org/en/climate/climate-change-and-ancient-civilizations/>

⁴ <https://climateemergencydeclaration.org/climate-emergency-declarations-cover-15-million-citizens/>

flooding also occurred two years earlier. The west coast of the U.S. is engulfed in a major heatwave, one of several that blanketed much of the U.S., China, and Europe throughout the summer, drying rivers, fueling wildfires, and disrupting food and energy production. Thousands were forced to flee a wildfire⁵ in California, even though this year has seen fewer major wildfires compared to recent years. The 22-year (and counting) drought in the western United States is the region's worst in more than 1,200 years.⁶

One climate study predicts a 125 degree “extreme heat belt” for the Mississippi river basin by 2053. Another study found that with the present rate of greenhouse gas emissions, by the end of the century areas near the equator will experience two weeks annually when temperatures are so high that it would be too dangerous for anyone to venture outdoors.⁷

A new study of “zombie” ice melting in Greenland⁸ says that it will cause sea levels to rise at least ten inches, and likely as many as thirty. The Arctic is warming four times faster than the rest of the planet⁹ – significantly faster than scientists had predicted. The world's chances of avoiding the worst ravages of climate breakdown are diminishing rapidly, according to a study by the World Meteorological Society, as we enter “uncharted territory of destruction” because of our failure to cut greenhouse gas emissions and take the actions needed to stave off catastrophe.¹⁰

The IPCC (Intergovernmental Panel on Climate Change) has noted that the climate is changing much faster than predicted.¹¹ The

⁵ <https://www.nytimes.com/2022/08/01/us/california-mill-fire.html>

⁶ <https://www.scientificamerican.com/article/ongoing-megadrought-puts-the-west-in-uncharted-waters/>

⁷ <https://insideclimatenews.org/news/02092022/study-finds-that-mississippi-river-basin-could-be-in-an-extreme-heat-belt-in-30-years/>

⁸ <https://www.smithsonianmag.com/smart-news/melting-greenland-ice-sheet-will-cause-at-least-ten-inches-of-sea-level-rise-study-finds-180980675/>

⁹ <https://www.nytimes.com/2022/08/11/climate/arctic-global-warming.html>

¹⁰ <https://www.theguardian.com/environment/2022/sep/13/world-heading-into-uncharted-territory-of-destruction-says-climate-report>

¹¹ <https://www.popsoci.com/environment/ipcc-climate-change-adaptation>

IPCC has been very clear that for the first time in the planet's history, it is the actions of a species – humans – that is driving climate change: “Global atmospheric concentrations of carbon dioxide, methane and nitrous oxide have increased markedly as a result of human activities since 1750.... The global increases in carbon dioxide concentration are due primarily to fossil fuel use and land use change, while those of methane and nitrous oxide are primarily due to agriculture.”¹²

While some level of dangerous warming is already baked into the climate system due to the existing levels of carbon dioxide and other greenhouse gases in the atmosphere, efforts to limit emissions can still prevent those changes from becoming much worse. There are still multiple scenarios open to the planet, ranging from less bad to total catastrophe. But staving off catastrophe will require reining in the fossil fuel industry and its paid army of lobbyists that corrupt the democratic process.

After the IPCC released its Sixth Assessment in 2021, UN Secretary-General António Guterres stated: “This report must sound a death knell for coal and fossil fuels before they destroy our planet. If we combine forces now, we can avert climate catastrophe. But, as the report makes clear, there is no time for delay and no room for excuses.... There must be no new coal plants built after 2021. OECD countries must phase out existing coal by 2030, with all others following suit by 2040. Countries should also end all new fossil fuel exploration and production, and shift fossil fuel subsidies into renewable energy. By 2030, solar and wind capacity should quadruple, and renewable energy investments should triple to maintain a net zero trajectory by mid-century.”¹³

Scientists have been warning about climate change for 30 years, yet little has changed. All the way back in 1988, NASA climate scientist James Hansen testified to Congress that the era of climate

¹² https://archive.ipcc.ch/publications_and_data/ar4/wg1/en/spmssp-human-and.html

¹³ <https://www.un.org/sg/en/content/secretary-generals-statement-the-ipcc-working-group-1-report-the-physical-science-basis-of-the-sixth-assessment>

change had begun.¹⁴ Initial warnings were sounded much earlier. The college magazine at Rensselaer Polytechnic Institute – from which I graduated in the early ‘70s, now half a century ago – already included stories about the threat of climate change. In 1938, Guy Callendar linked carbon dioxide increases in Earth’s atmosphere to global warming.¹⁵ In 1896, Swedish scientist Svante Arrhenius first predicted carbon dioxide levels could substantially alter Earth’s surface temperature through the greenhouse effect. In 1856, American scientist Eunice Foote documented the underlying science of today’s climate change crisis, the extraordinary power of carbon dioxide gas to absorb heat.¹⁶

The biggest challenge to surviving climate change is not technological, but political and economic.

Global warming is the by-product of less than three centuries of the Industrial Revolution. It has been driven by the desire of a few to accumulate enormous wealth and power. It is a result of capitalism, as a few rapidly exploited and depleted – largely for free – natural resources that took millions of years to create. These resources were often stolen from indigenous and other poor communities. The wealth and political power created has enabled the fossil fuel industry to inflict enormous social, health and financial harms on the rest of us.

Climate change is one of the nine planetary boundaries, the “thresholds within which humanity can survive, develop, and thrive. These nine boundaries create a safe operating limit for survival. If these boundaries are crossed, scientists say it would lead to abrupt or irreversible planetary changes that would have a large-scale impact.” The other planetary boundaries, which are also at risk of passing their

¹⁴ <https://grist.org/article/james-hansens-legacy-scientists-reflect-on-climate-change-in-1988-2018-and-2048/>

¹⁵ <https://climate.nasa.gov/evidence/>

¹⁶ <https://givingcompass.org/article/scientists-understood-physics-of-climate-change-in-the-1800s>

tipping points, include biodiversity, land use, ocean acidification, chemical pollution, and the ozone layer.¹⁷

This Book is an Introduction to Climate Change

This book assumes that like most people – including most Americans – you already understand that climate change is a serious problem. If you need that information, read the various reports from the IPCC, the thousands of academic studies, or track the global increase in extreme weather events.

I wrote this book after teaching a course on climate change and advocacy at Bennington College in the spring of 2022 and not finding a good basic introductory text on climate change. This book is a starting point for those seeking to educate themselves on climate change. The book opens the doorway to other books, studies and articles that go into much more detail.

This book draws heavily on the work of many climate scientists, groups, activists, and journalists. It is Climate 101, not new research. In many ways it is a compilation of fact sheets, and the large number of footnotes reflects the many sources the book draws upon. The goal is to give those new to climate change a good foundational understanding of the issues.

Climate Change is Both Simple and Complex

The planet is rapidly warming due to humans having burned fossil fuels for several hundred years to power the Industrial Revolution. Global warming is driving extreme weather and other changes that threaten the ability of humans to continue their present way of living, with access to land, water and food.

¹⁷ <https://www.ecomatcher.com/what-are-planetary-boundaries-and-why-are-they-significant/>; <https://www.stockholmresilience.org/research/planetary-boundaries/the-nine-planetary-boundaries>

To avoid climate chaos, we need to (as quickly as possible) stop burning fossil fuels and build a world based on clean, renewable energy from sources such as the sun and wind. We already know how to build renewables and they continue to rapidly become more efficient and cheaper. A rapid transition to a clean, renewable energy future will create many living wage jobs, stop the air pollution that kills 8 million people annually worldwide, and lower the cost of energy moving forward: a win-win for the planet and its inhabitants.

Simple, right? Figuring out *how* to do all of this is what's complex.

The world's politicians and energy leaders have mostly ignored or even disputed warnings about climate change for the last thirty years. Getting several hundred countries to agree to work together is very difficult, especially given wide disparities in wealth and prosperity.

Converting a world based on fossil fuels will not be easy. There are technological challenges in making renewable energy workable and affordable, especially since the sun does not always shine or the wind always blow. Moving renewable electricity from where it is produced to where it is needed requires a massive transformation of our transmission system. There is significant opposition to where wind and solar farms are built. Battery storage technology is still in its infancy. Decarbonizing buildings and transportation, the two biggest sources now of greenhouse gas emissions, will be a huge challenge. And trillions of dollars are at play.

Many of the key political and business leaders and decision makers will not be around to experience the worst impacts of climate change. Politicians often balk at investing in long term solutions, focusing instead on the next election. Many economists contend that the likely future negative impact on the Gross Domestic Product (3 to 4%,¹⁸ though those estimates will rise) from climate change is too low to justify major investments to retool our energy and economic

¹⁸ <https://www.nrdc.org/sites/default/files/fcost.pdf>

system. But we would do well to remember that other civilizations have collapsed when they refused to implement existing solutions because they challenged the power and wealth of the elite.

Fossil fuels are incorporated into our everyday lives more extensively than most people realize, and alternatives don't always exist. There are major industrial processes such as cement- and steel-making that require the high temperatures only presently achievable by burning fossil fuels. Even if we figure out how to solve all these challenges, we have already burned so much fossil fuels that climate change and extreme weather is already occurring. We may not be able to avoid tipping points such as ice shelves melting to raise sea levels and permafrost melting to release trapped greenhouse gases. But how do we tell the underdeveloped world that they now can't burn fossil fuels to raise their standard of living to the level that we in the developed world enjoy? How do we compensate them for foregoing that path?

A Focus on the United States – and New York

While this book does provide an overview of climate change globally, it is primarily written for an American audience. It focuses mainly on climate action at the state and national level. One reason is the U.S. has been the main driver of global warming and remains the dominant superpower, though that position is increasingly shaky.

The book focuses on the structures and limits of the American political system. While the U.S. may claim to be the birthplace of democracy with the American revolution, the rest of the world's democracies have had three centuries now to build and improve upon our system. The U.S. is one of only three democracies that does *not* employ proportional representation to create legislative bodies that reflect the political divisions among its populations. The U.S. is unique in that it has only two viable national political parties, which severely limits the range of political discourse, a significant problem in dealing with climate change. Our two-party system, combined with

corporate concentration of media ownership and our corporate-friendly campaign finance regime, gives the fossil fuel industry an outsized role in political and economic decisions.

I have been a climate activist primarily in New York, which has some unique approaches to energy. New York deregulated its electricity market in 1996 to “lower prices by more competition.” Utilities are not allowed to produce electricity; that’s done instead by independent power producers. New York’s system of Renewable Energy Credits to subsidize renewable energy is also different from other states. While I try in this book to avoid projecting unique aspects of New York’s energy system onto the rest of the country, undoubtedly some of that occurs.

While this book presents basic factual information on various climate-change issues, at times it also presents my own beliefs and conclusions about the challenges we face. I understand that climate change poses an existential threat to the future of human civilization and that world leaders are not acting anywhere near fast enough. We need radical, systemic change, not incrementalism. I have always viewed myself as a progressive populist, though in recent years I have added the frame of Ecosocialism.

In this book I try to present alternative perspectives on climate issues when there is significant disagreement within the climate movement, such as on the role of nuclear power, and carbon taxes. We must each make up our own minds based on the scientific evidence, our values, and on our theories of how change occurs.

This book does not focus on providing inspirational stories about the great work that many frontline communities, organizations, and individuals are already doing to confront climate change. Others have already done that, and I list some of them in the resource section.

This book will be out of date the moment it is finished, as climate change continues to accelerate. Data collection on emissions, electricity generation and other climate issues are usually a year or two behind.

Hope or Despair?

Fossil fuels are destroying the world.

Civilization is a complex web of social and economic interactions that takes centuries to reach its peak, but once it begins to unravel, collapse can occur swiftly. Several prior collapses were due to environmental factors. Most civilizations have lasted around 300 years.¹⁹ Some scientists contend that in many cases, collapse could have been avoided, but solutions were not implemented because they threatened the power and wealth of the ruling elite. The elite chose the status quo. A paper funded by NASA found that “Collapses of even advanced civilizations have occurred many times in the past five thousand years, and they were frequently followed by centuries of population and cultural decline and economic regression.”²⁰ The study found that unsustainable resource consumption, and economic stratification that favors the elite – trends that exist worldwide today – could easily result in collapse.

How should you respond if you believe that the likely outcome of climate change is the collapse of civilization as we know it? This is the existential question that many climate activists and scientists increasingly face. How do you speak the truth without paralyzing people into hopelessness?

In his book, *The End of Ice*, climate writer Dahr Jamail addresses the issue of hope in the face of despair. He quotes Vaclav Havel, the late Czech president, poet, and dissident, who said, “Hope is not the conviction that something will turn out well but the certainty that something is worth doing no matter how it turns out.”

Jamail also described a conversation he had with a Cherokee medicine man named Stan Rushworth. “He reminded me of the difference between the colonial settler mindset of, ‘We have rights,’

¹⁹ <https://www.worldhistory.org/collection/28/the-fall-of-civilizations/>;
<https://phys.org/news/2020-10-history-societies-collapse-leaders-undermine.html>;
<https://dgrnewsservice.org/civilization/patterns-of-civilization-collapse/>

²⁰ <https://www.sciencedirect.com/science/article/pii/S0921800914000615>

versus the indigenous philosophy of, ‘We’re all born onto the planet with obligations, an obligation to take care of, and be a steward of, the planet; and an obligation to serve future generations and make my decisions based on what’s going to take the best care of them. And so, no matter how dire things look today, if I get up and I ask myself, ‘OK, how can I be of best service today to the planet and to the children?’ Then I have my work cut out for me, and there is no shortage of things to do. And I am morally obliged to do everything in my power possible to try to help somehow, whatever that’s going to look like.”²¹

Our understanding of climate and weather continues to evolve. As the world prepared for COP27 in November 2022, three UN agencies released reports saying that the world was close to irreversible climate breakdown, saying that the ongoing weak response by governments across the planet meant the crossing the 1.5-degree threshold was inevitable.²²

Yet in the same week, David Wallace-Wells, dubbed the prophet of climate doom due to some of his prior articles, provided some hope. He noted that while the politicians had continued to blow the opportunity to act in time to keep global warming at lower levels, the “worst-case temperature scenarios that recently seemed plausible now look much less so.”²³ The main question was not whether the human species could survive global warming but how well will politicians and the wealthy respond in order to reduce the level of human suffering and social upheaval.

“The world was on track to heat up by 4 degrees Celsius on average by 2100 before the Paris Agreement was signed, and we are now on track to warm up by 2.1 to 2.9 degrees Celsius. That’s still

²¹ <https://theintercept.com/2019/05/04/climate-change-book-end-of-ice/>

²² <https://www.theguardian.com/environment/2022/oct/27/world-close-to-irreversible-climate-breakdown-warn-major-studies>

²³ <https://www.nytimes.com/interactive/2022/10/26/magazine/climate-change-warming-world.html>

very bad,” reported the NY Times in November 2022 during COP27.²⁴

In 2018, the IPCC warned that we had 12 years left to take worldwide dramatic action. Other scientists felt that was too optimistic. The IPCC tends to be conservative in its estimates, as science seeks a level of proof that is often difficult to achieve in the real world, given so many overlapping causes and inputs. The IPCC’s pronouncements, particularly the summaries that the media and politicians focus on, must be agreed upon by countries heavily dominated by the fossil fuel industry such as the U.S., Saudi Arabia, Russia, and Brazil.

Many of the IPCC’s previous predictions have underestimated the speed and severity of climate change. One Harvard-based study²⁵ also released in 2018 estimated that the deadline for needed action was perhaps only five years away (that is, 2023). A number of prominent European climate researchers recently raised the fear that we have already passed the tipping point for runaway climate change, as feedback loops such as the melting of polar ice accelerate. In 2021, 13,000 researchers signed a statement warning that we are rapidly running out of time to avoid such tipping points.²⁶

The Climate Clock says we now have seven years left until our greenhouse emissions, if continued at the present rate, push us past the global warming target limit of 1.5 degree Celsius.²⁷

Some scientists have even raised the possibility of human extinction.²⁸ We are already in the midst of the sixth mass extinction of species,²⁹ which continues to accelerate. Insects and pollinators are

²⁴ <https://www.nytimes.com/2022/11/08/climate/cop27-egypt-postcard.html>

²⁵ <https://www.forbes.com/sites/jeffmcmahon/2018/01/15/carbon-pollution-has-shoved-the-climate-backward-at-least-12-million-years-harvard-scientist-says>

²⁶ <https://www.dw.com/en/climate-tipping-points-are-now-imminent-scientists-warn/a-58665256>

²⁷ <https://climateclock.world/>

²⁸ <https://scripps.ucsd.edu/news/new-climate-risk-classification-created-account-potential-existential-threats>

²⁹ <https://www.nytimes.com/2014/02/16/books/review/the-sixth-extinction-by-elizabeth-kolbert.html>

rapidly disappearing. Other species on which humans are dependent for survival – such as phytoplankton, which produce half or more of the world’s oxygen – are rapidly dying off. Unlike previous extinction events caused by natural phenomena, this extinction is driven by human activity, especially the unsustainable use of land, water and energy, and resultant climate change. 30% of all land that sustains biodiversity has been converted for food production. Agriculture is responsible for 80% of global deforestation and accounts for 70% of the planet’s freshwater use, driving the loss of habitat that affects many species.³⁰

Many humans claim we have the right to dominate the other species on the planet due to our superior intelligence, or that we are just at the top of the world’s food chain. Yet despite our intelligence, for decades our political leaders have done virtually nothing as the threat to our future existence has grown ever more apparent.

The Extinction Rebellion (XR) movement arose in England in response to the threat of extinction of the human species and the failure of governments to take that threat seriously. It describes itself as “an international movement that uses non-violent civil disobedience in an attempt to halt mass extinction and minimize the risk of social collapse.”

Recently scientists have formed their own XR group: ‘We are scientists who agree with Extinction Rebellion that it is time to take direct action to confront catastrophic climate and ecological breakdown. We further declare that overwhelming evidence shows that if global greenhouse gas emissions are not brought rapidly down to net zero and biodiversity loss is not halted, we risk catastrophic and irreversible damage to our planetary life-support systems, causing incalculable human suffering and many deaths. We note that despite the scientific community first sounding the alarm on human-caused global warming more than four decades ago, no action taken by governments thus far has been sufficient to halt the steep rise in

³⁰ <https://www.worldwildlife.org/stories/what-is-the-sixth-mass-extinction-and-what-can-we-do-about-it>

greenhouse gas emissions, nor address the ever-worsening loss of biodiversity.”³¹

System Change, not Climate Change: We Need a Revolution

Pope Francis in his Climate Encyclical pointed out that the capitalist system and its focus on profits has failed humanity. The encyclical highlighted that solving climate change requires us to solve other forms of oppression that emerge from the same mentality that leads to environmental exploitation, namely that the rich and powerful are free to oppress others. Climate change will be solved only if we make the common good our top priority.³²

In practice, this means that climate advocates need to build not only connections but unity with other social change movements. The necessary climate actions will likely only occur if there are fundamental changes in how our political and economic systems operate. Climate justice requires justice for all. Climate groups are increasingly aware of the need to provide support to other movements such as Black Lives Matter, but have not yet figured out how to effectively combine the various movements into a singular focus for change.

It is long past time that ending capitalism becomes a central demand of the climate movement. Naomi Klein made this point a decade ago in her book, *This Changes Everything: Capitalism vs. The Climate*. “We have been told the market will save us, when in fact the addiction to profit and growth is digging us in deeper every day. We have been told it’s impossible to get off fossil fuels when in fact we

³¹ <https://www.scientistsforxr.earth/about-us>

³² <https://money.cnn.com/2015/09/21/news/economy/pope-francis-capitalism/index.htm>; <https://www.washingtonpost.com/blogs/post-partisan/wp/2013/11/26/pope-franciss-stinging-critique-of-capitalism/>; https://www.vatican.va/content/francesco/en/speeches/2019/may/documents/papa-francesco_20190527_climate-change.html; <https://www.vaticannews.va/en/pope/news/2021-03/pope-francis-unesco-poverty-climate-change.html>

know exactly how to do it – it just requires breaking every rule in the “free-market” playbook: reining in corporate power, rebuilding local economies, and reclaiming our democracies.”³³

In November 2022, just prior to COP 27, Swedish climate activist Greta Thunberg called for a “system-wide transformation,” noting that the world’s current “normal” – dictated by the people in power – has caused the climate breakdown. “What we refer to as normal is an extreme system built on the exploitation of people and the planet. It is a system defined by colonialism, imperialism, oppression, and genocide by the so-called global North to accumulate wealth that still shapes our current world order.” The climate crisis “has its roots in racist, oppressive extractivism that is exploiting both people and the planet to maximize short-term profits for a few.”³⁴

Kohei Saito’s book *Capital in the Anthropocene*, the Japanese best-seller on combating climate change, makes a similar point: capitalism’s demand for unlimited profits is destroying the planet and only “degrowth” can repair the damage by slowing down industrial production and sharing wealth. That means an end to mass production and the mass consumption of wasteful goods. The climate crisis will spiral out of control unless the world applies “emergency brakes” to capitalism.³⁵

Solving climate change means embracing a world based on sustainability and equality. We also need to democratically control and plan the transition to a sustainable economy, not allow the drive for profits to determine where we build new renewable energy systems. Ecosocialism seeks to democratically plan the economy to meet everyone’s basic needs within ecological limits. Having hedge funds get rich off of renewable energy won’t solve the climate crisis.

A word of caution: just replacing capitalism (a very difficult task) with some form of public ownership of our energy and economic

³³ <https://thischangeseverything.org/book/alism-Climate/dp/1451697392>

³⁴ <https://www.msn.com/en-gb/entertainment/music/greta-thunberg-its-time-to-overthrow-the-wests-oppressive-and-racist-capitalist-system/ar-AA13Ebbv>

³⁵ <https://www.theguardian.com/world/2022/sep/09/a-new-way-of-life-the-marxist-post-capitalist-green-manifesto-captivating-japan>

systems would not be sufficient. Democratic control, a focus on the common good and a commitment to sustainability are essential. A number of socialists in the U.S. have called for the nationalization of the fossil fuel companies as a way to shut them down. But as Naomi Klein has pointed out, as of a few years ago 70% of the world's fossil fuel companies were already owned by some form of state or public entity. And countries that lean towards socialism (Europe) or profess to be communist (Russia / China) are among the world's leading carbon emitters. Socialist leaning countries such as Venezuela export their fossil fuel resources to the rest of the world to bring in funds to drive their economy.

The platform of the Green Party of the U.S. states: "We will build an economy based on large-scale green public works, municipalization, and workplace and community democracy. Some call this decentralized system 'ecological socialism, communalism, or the 'cooperative commonwealth,' but whatever the terminology, we believe it will help end labor exploitation, environmental exploitation, and racial, gender, and wealth inequality and bring about economic and social justice due to the positive effects of democratic decision making."³⁶

Futurists outline two major paths. One is to continue to build a world based on increasing economic inequality, with billionaires becoming ever more prevalent and powerful. That leads to a world of heavily fortified biospheres for the select few and competition for survival for the rest of us. The other path is one based on equality and mutuality, where every human is a respected member whose needs are to be met. That path gives us the best chance of not only survival but also for a decent living for future generations.

A clean energy revolution would end health problems from air pollution, create an enormous number of well-paying jobs, and lower future energy costs. The Green New Deal first called for in the U.S. by the Green Party in 2010 would combine a rapid ten-year transition

³⁶ https://www.gp.org/economic_justice_and_sustainability#ecosoc

to zero emissions with an Economic Bill of Rights, guaranteeing a living wage job, single payer universal health care, housing, and a college education.

The industrialized nations with their complex interdependencies and systems are especially vulnerable to quick collapse from major disruptions. Yet it is the less developed societies that are the principal victims of climate change and whose citizens and governments have far fewer resources to cope with global warming caused primarily by the industrial North and the Industrial Revolution. This is why the call for environmental justice is so central to the climate movement.

In America, we have moved from being the center of climate denial under Trump to an administration more marked by climate delay and evasion. While the Democrats are increasingly willing to invest in the expansion of the renewable energy industry, their leadership is still unwilling to shut down the fossil fuel industry and their campaign donations. Climate change is already becoming a pretext for massive corporate subsidies for schemes (e.g., carbon sequestration and capture, blue hydrogen, biomass) focused more on increasing profits for donors than on curbing global warming.

Many hoped that the removal of Trump from the White House would allow America to win the climate battle. That hasn't happened, as the Democrats have failed once again to rise to the challenge. They "allowed" Senator Manchin and his coal holdings to block action in Congress, refusing to take any action to punish his misbehavior. The Inflation Reduction Act, finally passed in the summer of 2022, may be the biggest investment ever by the U.S. in renewable energy and climate mitigation, but it was one-tenth of what Biden initially proposed – which itself was far less than what is actually needed.³⁷

With some limited exceptions, Biden has failed to use his executive powers to take comprehensive climate action, for instance as outlined at climatepresident.org. Despite his campaign promises, Biden increased the number of permits for oil and gas drilling on

³⁷ <http://gelfny.org/news-blog/democrats-climate-budget-bill-is-too-little-too-late/>

federal land.³⁸ He used the invasion of Ukraine to promote fossil fuels and has refused to address the price gouging driving inflation. Virtually nothing more than talk and press releases happened at the COP26 six-year follow-up to the Paris climate accords.

We need somehow to end the polarization of American society – a problem that is plaguing many other nations as well. We are not going to solve climate change if half the country opposes acting. Solving climate change requires us to create a future where everyone feels that their needs are being met, and that they are an important and integral part of our society. It means we must find common ground with those with whom we disagree. People must believe that the call for a Just Transition includes them.

After the recent dire IPCC report, the Secretary-General of the United Nations said it was now or never for climate action, saying “This abdication of leadership is criminal. The world’s biggest polluters are guilty of arson of our only home.” The IPCC concluded that any further delay would force humanity to miss the “brief and rapidly closing window of opportunity to secure a livable and sustainable future for all.”³⁹

There is no time left for incrementalism.

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The book has close to a thousand footnotes since it draws so heavily on the work of so many, including climate journalists.

³⁸ <https://www.npr.org/2021/07/13/1015581092/biden-promised-to-end-new-drilling-on-federal-land-but-approvals-are-up>

³⁹ [U.N. climate change report warns of ‘dangerous and widespread disruption’ - The Washington Post](#)

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Green Education and Legal Fund

Green Education and Legal Fund Inc. is a 501(c)(3) nonprofit dedicated to promoting the green values of nonviolence, ecology, grassroots democracy, and social and economic justice.

GELF has helped with issues such as calling to shut down the Indian Point nuclear power plant, promoting composting and waste reduction, promoting safe handling of toxic wastes, opposing genetic engineering of our food system, mobilizing opposition to the Keystone XL pipeline, and supporting full public campaign finance reform.

GELF's prime focus in the last decade has been climate change.

Mark

Green Education and Legal Fund

CHAPTER 1

CLIMATE CHANGE BASICS

What is climate change?

“Climate change” refers to long-term shifts in temperatures and weather patterns. It is also called global warming, the ongoing increase in global average temperature. “Anthropogenic climate change” is climate change caused by human activities.⁴⁰

“Global atmospheric concentrations of carbon dioxide, methane and nitrous oxide have increased markedly as a result of human activities since 1750 ... The global increases in carbon dioxide concentration are due primarily to fossil fuel use and land use change, while those of methane and nitrous oxide are primarily due to agriculture.”⁴¹

The United Nations notes that “since the 1800s, human activities have been the main driver of climate change, primarily due to burning fossil fuels like coal, oil, and gas.... Greenhouse gas emissions act like a blanket wrapped around the Earth, trapping the sun’s heat, and raising temperatures.... Examples of greenhouse gas emissions that are causing climate change include carbon dioxide and methane. These come from using gasoline for driving a car or coal for heating a building, for example. Clearing land and forests can also release carbon dioxide. Landfills for garbage are a major source of methane

⁴⁰ [https://geo.libretexts.org/Bookshelves/Geology/Book%3A_An_Introduction_to_Geology_\(Johnson_Affolter_Inkenbrandt_and_Mosher\)/](https://geo.libretexts.org/Bookshelves/Geology/Book%3A_An_Introduction_to_Geology_(Johnson_Affolter_Inkenbrandt_and_Mosher)/)

⁴¹ https://archive.ipcc.ch/publications_and_data/ar4/wg1/en/spmssp-human-and.html

emissions. Energy, industry, transport, buildings, agriculture, and land use are among the main emitters.”⁴²

The Intergovernmental Panel on Climate Change (IPCC) is the United Nations body for assessing the science related to climate change. The IPCC prepares comprehensive Assessment Reports about the state of scientific, technical, and socio-economic knowledge on climate change, its impacts and future risks, and options for reducing the rate at which climate change is taking place.

In 2019 the IPCC reported that levels of carbon dioxide in the atmosphere were higher than at any time in at least two million years. The Earth’s average surface temperature has increased faster since 1970 than in any other 50-year period over at least the last 2,000 years. Between 2011 and 2020, the annual average area of sea ice coverage in the Arctic reached its lowest level since at least 1850. And the global average sea level has risen faster since 1900 than over any preceding century in at least the last 3,000 years.

Other key findings from the IPCC are:

“It is unequivocal that human influence has warmed the atmosphere, ocean, and land. Widespread and rapid changes in the atmosphere, ocean, cryosphere, and biosphere have occurred.”

“Continued global warming is projected to further intensify the global water cycle, including its variability, global monsoon precipitation and the severity of wet and dry events.”

“Many changes due to past and future greenhouse gas emissions are irreversible for centuries to millennia, especially changes in the ocean, ice sheets and global sea level.”⁴³

Methane is 80 times more potent short-term (20 years) as a greenhouse gas compared to carbon.⁴⁴ Leaks from natural gas pipelines are a major source of methane. Many have promoted natural gas as a bridge fuel to a clean energy future, and until recently, the

⁴² <https://www.un.org/en/climatechange/what-is-climate-change>

⁴³ <https://www.nrdc.org/stories/ipcc-weve-already-warmed-planet-catastrophic-effect-level-catastrophe-us>

⁴⁴ <https://unece.org/challenge>

problems with methane have been downplayed. It is now clear that, rather than a bridge, natural gas is a gangplank to a climate disaster.⁴⁵

The United States has been the Principal Culprit of Greenhouse Gas Emissions

While China has surpassed the U.S. as the largest annual emitter of greenhouse gases, the U.S. still is the leader in terms of cumulative emissions.⁴⁶

The United States has been burning coal, oil, and natural gas far longer than China. As of 2017, the U.S., with just over 4 percent of the world's population, was responsible for almost a third of the excess carbon dioxide in the atmosphere. China was responsible for less than a sixth. The 28 countries of the European Union cumulatively came in just behind the United States.⁴⁷

We in the U.S. still emit the most carbon dioxide per capita among the industrial nations, at 14.2 metric tons, but those emissions have been dropping since the early 1970s. China emitted 7.4 metric tons per capita in 2020, higher than the European Union at 5.8 metric tons but lower than Japan's 8.1 metric tons. Russia had 10.8 metric tons of carbon dioxide emissions per capita.⁴⁸

A 2022 study by the Center for Global Development found that “developing” countries were responsible for 63% of yearly carbon emissions. Increased carbon emissions were particularly attributable to economic growth in the developing countries of Asia. China and

⁴⁵ <https://www.nytimes.com/2013/07/29/opinion/gangplank-to-a-warm-future.html>

⁴⁶ <https://world101.cfr.org/global-era-issues/climate-change/who-releases-most-greenhouse-gases>

⁴⁷ <https://www.nytimes.com/interactive/2017/06/01/climate/us-biggest-carbon-polluter-in-history-will-it-walk-away-from-the-paris-climate-deal.html>

⁴⁸ <https://www.instituteforenergyresearch.org/international-issues/chinas-carbon-dioxide-emissions-more-than-twice-those-of-the-u-s>

India are both classified as developing countries, as well as South Korea.⁴⁹

Sources of Global Greenhouse Gas emissions

(billion tons of CO₂e⁵⁰; 2018 figures)⁵¹

Burning Fossil Fuels	40 billion tons
Manufacturing electricity	15
Transportation	10
Heating industrial materials	5
Natural gas leaks	4
Industrial byproducts	3
Heating buildings	3
Agriculture	7 billion tons
Cattle and sheep	3
Fertilizers	3
Rice	1
Other	8 billion tons
Deforestation	5
Landfills and sewage	1.5
F-gases ⁵²	1.5
TOTAL	55 billion tons

⁴⁹ <https://www.cgdev.org/media/developing-countries-are-responsible-63-percent-current-carbon-emissions>; <https://phys.org/news/2022-11-corruption-fuels-carbon-dioxide-emissions.html>

⁵⁰ Carbon dioxide equivalent or CO₂e means the number of metric tons of CO₂ emissions with the same global warming potential as one metric ton of another greenhouse gas. EPA Carbon Footprint Calculator Tool, available at <https://www3.epa.gov/carbon-footprint-calculator/tool/definitions/co2e.html>

⁵¹ Fight the Fire, https://theecologist.org/sites/default/files/2021-02/Fight_the_Fire_0.pdf, p. 38

⁵² Fluorinated gases, developed to replace freon and other substances that can damage Earth's ozone layer, are themselves powerful greenhouse gases, with an even higher warming potential than CO₂.

Carbon Footprint by Country 2022⁵³**Top 10 CO₂-emitting countries in the world**

(metric tons)

China	11,680.42
United States	4,535.30
India	2,411.73
Russia	1,674.23
Japan	1,061.77
Iran	690.24
Germany	636.88
South Korea	621.47
Saudi Arabia	588.81
Indonesia	568.27

Top 15 Countries with the Highest CO₂ Emissions per Capita

(metric tons)

Palau	55.29
Qatar	35.64
Trinidad and Tobago	21.97
Bahrain	21.60
Kuwait	20.91
United Arab Emirates	20.70
Brunei Darussalam	17.95
Saudi Arabia	16.96
Oman	16.9
Australia	15.22
Canada	14.43
Kazakhstan	14.22
United States	13.68

⁵³ <https://worldpopulationreview.com/country-rankings/carbon-footprint-by-country>

Turkmenistan	13.37
Luxembourg	13.24

Countries With Highest Use of Renewable Energy

Here are the places with the highest shares of primary energy from renewable sources as of 2019, along with the change in this amount in percentage points since 1965.⁵⁴

Iceland	79.08%	(+55.25)
Norway	66.18%	(-0.32)
Brazil	45.02%	(+18.70)
Sweden	42.24%	(+8.70)
New Zealand.....	35.40%	(-2.48)
Austria	33.70%	(+9.76)
Switzerland.....	30.64%	(-6.93)
Ecuador.....	30.39%	(+22.36)
Denmark	30.16%	(+30.12)
Canada	27.64%	(+3.66)
(#42) United States.....	8.71%	(+4.66)

Environment America maintains a chart showing progress in each state in the U.S. in developing renewable electricity.⁵⁵

Major Sources of Greenhouse Gas Emissions in the U.S.

Much of the public discussion around creating a clean energy future focuses on the electricity sector. However, the production of electricity is a relatively small source of greenhouse gas emissions. The mix of emission sources varies from state to state and from nation to nation. For instance, in New York State, buildings account for 32%

⁵⁴ <https://solarpower.guide/solar-energy-insights/countries-largest-shares-renewable-energy-solar>

⁵⁵ <https://environmentamerica.org/resources/states-and-cities-going-renewable/>

of emissions, transportation 28%, and electricity 13%.⁵⁶ Here is an overview from the federal EPA of greenhouse gas emissions in the U.S.⁵⁷:

Transportation (27% of 2020 greenhouse gas (GHG) emissions) – Transportation accounts for the largest share of greenhouse gas emissions. Emissions primarily come from burning fossil fuel for our cars, trucks, ships, trains, and planes. Over 90% of the fuel used for transportation is petroleum based, which includes primarily gasoline and diesel.

Electricity production (25% of 2020 GHG emissions) – Electric power is second largest share of greenhouse gas emissions. Approximately 60% of our electricity comes from burning fossil fuels, mostly coal and natural gas.

Industry (24% of 2020 GHG emissions) – Industrial emissions primarily come from burning fossil fuels for energy, as well as greenhouse gas emissions from certain chemical reactions necessary to produce goods from raw materials.

Commercial and residential buildings (13% of 2020 GHG emissions) – Emissions from businesses and homes arise primarily from fossil fuels burned for heat, the use of certain products that contain greenhouse gases, and the handling of waste.

Agriculture (11% of 2020 GHG emissions) – Emissions from agriculture come from livestock such as cows, agricultural soils, and rice production.

⁵⁶ Table ES.3, https://www.dec.ny.gov/docs/administration_pdf/ghgsumrpt21.pdf

⁵⁷ <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions>

Land use and forestry (13% of 2020 GHG emissions) – Land areas can act as a sink (absorbing CO₂ from the atmosphere) or a source of GHG emissions. In the U.S. since 1990, managed forests and other lands are a net sink.

Electricity production is the easiest to move to 100% renewable energy. The general goal is to reduce energy use as much as possible and then electrify everything that remains. A challenge is that some industrial processes, particularly cement making, require high temperatures that have proven difficult to commercially generate without burning fossil fuels. Cement alone accounts for 8% of worldwide CO₂ emissions.⁵⁸ This is a major reason why governments have tended to set long term emission goals (by 2050) as net zero rather than real zero.

We Need to Keep Global Warming Below 1.5 Degrees

Lowering the target for global warming to try to keep it to 1.5 degrees Celsius was the big win for the developing world against the U.S. and other industrial nations at the 2015 Paris Climate Summit that sought to keep a 2-degree goal. The final agreement was to keep warming “well below 2 degrees” while also agreeing to “aim to limit the increase to 1.5 degrees C, since this would significantly reduce risks and the impacts of climate change.”⁵⁹ Since Paris 1.5 degrees has increasingly become the target.

1.5° C of warming will still expose millions of people to more extreme climates, rising sea levels, and more frequent weather-related disasters including heatwaves, drought, flooding, and wildfires. Additional increases in average temperature will make their severity and frequency worse. The negative impacts from global warming are

⁵⁸ <https://www.pbs.org/newshour/show/can-concrete-a-major-co2-emitter-be-made-greener>

⁵⁹ <https://www.dw.com/en/ipcc-tackles-15-degree-celsius-climate-target/a-19475794>

hitting the world's poorest and most vulnerable communities hardest, partially because they tend to be closer to the equator where the temperature rise will be greater.

“With an average temperature rise of more than 1.5° C, all climate impacts become more severe, including extreme temperature, droughts, water and food scarcity, and biodiversity loss. This is partly due to ‘tipping points’ – where climate change causes damage to the natural systems that help to stabilize temperatures, resulting in accelerated warming. If the average global temperature were to rise by 2° C, for example, the IPCC has predicted that 37 per cent of the world’s population would be exposed to at least one deadly extreme-heat event every five years, compared to 14 per cent in a 1.5° C scenario. That’s an extra 1.7 billion people affected with just half a degree of further warming. This is just one illustration of why every decimal point matters in the fight to stay within 1.5° C.”⁶⁰

“With a 1.5° C rise, about 4% of Earth’s terrestrial land area is projected to undergo a transformation of ecosystems from one type to another. With a 2° C global temperature rise, about 13% is projected to undergo a shift. With a 2° C increase, compared with a 1.5° C increase, the number of heat-related deaths and the number of people infected with vector-borne diseases such as malaria and dengue fever are projected to increase.”⁶¹

It’s difficult to predict what our world will look like with 2.5° C or more of warming, but large areas could become uninhabitable for humans.

Some scientists have also raised warnings about a possible “hothouse effect.” “Self-reinforcing feedbacks could push the Earth System toward a planetary threshold that, if crossed, could prevent stabilization of the climate at intermediate temperature rises and cause

⁶⁰ <https://www.tearfund.org/stories/2021/10/why-1-5-degrees-the-crucial-climate-target-explained>; <https://yaleclimateconnections.org/2021/08/1-5-or-2-degrees-celsius-of-additional-global-warming-does-it-make-a-difference/>

⁶¹ <https://yaleclimateconnections.org/2021/08/1-5-or-2-degrees-celsius-of-additional-global-warming-does-it-make-a-difference/>

continued warming on a ‘Hothouse Earth’ pathway even as human emissions are reduced. Crossing the threshold would lead to a much higher global average temperature than any interglacial in the past 1.2 million years and to sea levels significantly higher than at any time in the Holocene.”⁶²

Those in the developing world will be the principal victims of climate change that has largely been caused by the Global North. Climate reparations by the industrial polluters are needed to pay for the damage we are causing.⁶³ In addition, action must be taken to enable developing countries to raise their people’s standard of living now that the path of burning fossil fuels to drive one’s economy is foreclosed to them. How do they catch up? (See chapter on reparations.)

We are Not Doing a Good Job of Meeting the 1.5-Degree Target

Average global temperatures are now between 1.1-1.2° C higher than pre-industrial. Eight of the 10 warmest years on our planet occurred in the last decade.⁶⁴ The UN weather agency has warned that it is increasingly likely that the annual average global temperature will rise beyond 1.5° C above pre-industrial levels in at least one of the next five years.⁶⁵ Other bodies such as the World Meteorological Organization have said that the odds of exceeding the limit short term are quite a bit higher.

In October 2022, the IPCC said to stay within the 1.5 C limit, total GHG emissions need to fall 43% by 2030, compared with 2019 levels. However, based on existing government pledges, the world is headed toward a 10.6% increase in annual emissions by 2030 over

⁶² <https://theconversation.com/hothouse-earth-heres-what-the-science-actually-does-and-doesnt-say-101341>; <https://www.pnas.org/doi/10.1073/pnas.1810141115>

⁶³ <https://yaleclimateconnections.org/2021/08/1-5-or-2-degrees-celsius-of-additional-global-warming-does-it-make-a-difference/>

⁶⁴ <https://www.nhm.ac.uk/discover/news/2022/january/last-eight-years-have-been-the-hottest-on-record.html>

⁶⁵ <https://news.un.org/en/story/2021/05/1092842>

2010 levels, with a temperate rise of 2.5° C (4.5° F). According to a report released in November 2022 by the Global Carbon Project, emissions from fossil fuels in 2022 are expected to reach 37.5 billion tons of carbon dioxide, the highest ever recorded.⁶⁶

Deadly heat waves, droughts, wildfires, tropical cyclones, severe flooding events, and other disasters have become more common. “In 2019, storms, floods and other extreme weather events displaced more than 13 million people across Asia and Africa. Rising heat and drought are killing crops and trees, putting millions worldwide at increased risk of hunger and malnutrition, while mosquitoes carrying diseases like malaria and dengue are spreading into new areas. Roughly half the world’s population currently faces severe water scarcity at least part of the year.”⁶⁷

The American Meteorological Society’s most recent state of the climate report found the atmospheric concentration of heat-trapping carbon dioxide grew at the fifth-fastest rate on record in 2021 to reach its highest point in 800,000 years.⁶⁸

Other scientists find the IPCC overly optimistic with reduction targets that are too slow to keep global warming in check.

A recent study published in the journal *Science* finds that even the most aggressive goals of reducing greenhouse gas emissions won’t be sufficient to avoid several major climate change tipping points (like the melting of the permafrost, collapse of ice shelves), in which rising temperatures cause irreversible damages that in turn cause more global warming.⁶⁹

⁶⁶ <https://www.washingtonpost.com/climate-environment/2022/12/05/carbon-emissions-peak-record-2022/>; <https://gizmodo.com/un-report-climate-change-2-degrees-warming-1849704926>; <https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipcc-special-report-on-global-warming-of-1-5c-approved-by-governments/>;

⁶⁷ <https://www.nytimes.com/2022/02/28/climate/climate-change-ipcc-report.html>

⁶⁸ <https://www.ametsoc.org/index.cfm/ams/publications/bulletin-of-the-american-meteorological-society-bams/state-of-the-climate/>

⁶⁹ <https://www.science.org/doi/10.1126/science.abn7950>

How Fast Can We Get to Zero Emissions, 100% Renewable Energy?

Scientists differ widely in their estimations as to how fast we can move to 100% renewable energy and zero emissions. Many point out that the biggest obstacles are political, not technological.⁷⁰

I have always argued that we need to focus on how fast we have to cut emissions to avoid climate collapse. Once that date is set, we then need to devote the necessary resources to achieving it, even though it might presently seem impractical. After all, we are facing a climate crisis that poses an existential threat to the future of life on the planet.

It is generally agreed that the last 10 to 15% of emissions will be the hardest to eliminate, and therefore we should focus on a much faster timeline for the initial 80% to 90% reduction in emissions.

One issue is whether it is even possible to get to zero emissions since some industrial processes such as cement and aluminum manufacturing require temperatures higher than thought feasible from renewable electricity (though some recent experiments suggest otherwise⁷¹). Thus, in recent years the term “net zero emissions” has become more common, with some limited use of fossil fuels being offset by ways of removing carbon from the atmosphere.⁷²

The IPCC, the groups of scientists convened by the United Nations to guide them on climate science, is considered the gold standard on such issues. In October 2022, the IPCC said that to stay within the 1.5° C warming threshold, greenhouse gas emissions must peak by 2025, reduce by 45% by 2030, and reach net zero by 2050. However, the IPCC acknowledges that such emission cuts will not be adequate to keep global warming below 1.5°. Thus, the IPCC also

⁷⁰ <https://en.reset.org/biggest-barriers-renewable-energies-are-political-new-report-states-05232021/>

⁷¹ <https://cordis.europa.eu/article/id/421794-the-next-solar-revolution-could-power-cement-production-with-sunlight>

⁷² <https://www.un.org/en/climatechange/net-zero-coalition>

calls for significant carbon removal from the atmosphere.⁷³ Unfortunately, decades of research and tens of billions of dollars invested have failed to show that carbon capture technologies are feasible (see chapter on false climate solutions.)

On September 23, 2019, Swedish climate activist Greta Thunberg in her speech at the UN criticized the IPCC for its GHG emissions-reduction goals: “The popular idea of cutting our emissions in half in 10 years only gives us a 50% chance of staying below 1.5 degrees [Celsius], and the risk of setting off irreversible chain reactions beyond human control. Fifty percent may be acceptable to you. But those numbers do not include tipping points, most feedback loops, additional warming hidden by toxic air pollution or the aspects of equity and climate justice. They also rely on my generation sucking hundreds of billions of tons of your CO₂ out of the air with technologies that barely exist. So, a 50% risk is simply not acceptable to us — we who have to live with the consequences.”⁷⁴

The IPCC’s 6th Assessment Report released on March 20, 2023, once again stressed that the world’s governments are not acting fast enough to cut emissions, with the global warming target of 1.5 degrees C likely be exceeded within the next decade. Other scientists, however, raised concerns that fossil fuel interests and their government supporters had once again watered down the “science” and the seriousness of the problem. Several nations lobbied to weaken or remove references to the environmental costs of burning fossil fuels and consuming meat, as well as adding language that bolsters support for controversial carbon capture technology while understating the benefits of renewable energy.⁷⁵

The IPCC report did send the clearest message to date, that because of the slow response in cutting emissions, it’s time to

⁷³ https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Headline-statements.pdf

⁷⁴ <https://www.npr.org/2019/09/23/763452863/transcript-greta-thunbergs-speech-at-the-u-n-climate-action-summit>

⁷⁵ <https://insideclimatenews.org/news/28032023/corporate-interests-watered-down-the-latest-ipcc-climate-report-investigations-find/>

prioritize adaptation to a world being transformed by climate change and in a way that do ways that do not exacerbate already deep inequalities.⁷⁶

The leading scientist documenting the feasibility of a fast transition to 100% clean renewable energy is Professor Mark Jacobson of Stanford University. I highly recommend his book *No Miracles Needed: How Today's Technology Can Save Our Climate and Clean Our Air*.⁷⁷ It lays out in detail the various steps how the world can transition to 100% clean renewable wind, water, and solar (WWS) and storage for all energy purposes.

In 2009, Prof. Jacobson co-authored a report saying that the world could meet zero greenhouse gas emissions by 2030. He and several Cornell professors put out a similar 2030 timeline study for New York during the fight to halt fracking for gas. Since then, he has written many studies for individual countries, though he often now uses 2050 as his “final” target date.⁷⁸ (Prof. Jacobson does have a fair number of critics, and his studies are more about plugging official government data into his spreadsheets than a detailed analysis of the steps needed, with timelines, actions, etc.⁷⁹)

When I asked Prof. Jacobson in 2015 – when I was drafting legislation intended to move New York to 100% renewable energy – as to what was the proper timeline, he said he has always been clear

⁷⁶ <https://capitalandmain.com/the-world-will-miss-the-climate-change-target-time-to-prepare>

⁷⁷ *No Miracles Needed: How Today's Technology Can Save Our Climate and Clean Our Air*. Cambridge University Press, 2023; audio, <https://podglomerate.com/?episode=no-miracles-needed-mark-jacobson-on-how-todays-technology-can-save-our-climate-and-clean-our-air>

⁷⁸ <https://www.scientificamerican.com/article/a-path-to-sustainable-energy-by-2030/>; <https://web.stanford.edu/group/efmh/jacobson/Articles/I/NewYorkWWSEnPolicy.pdf>

⁷⁹ <https://blogs.scientificamerican.com/plugged-in/landmark-100-percent-renewable-energy-study-flawed-say-21-leading-experts/>; <https://www.renewableenergyworld.com/wind-power/a-decidedly-impartial-review-of-mark-jacobsons-100-clean-renewable-energy-and-storage-for-everything/>

than 2030 is technologically feasible but that he adds 20 years to give politicians and business leaders “wiggle room.” Since politicians always add wiggle room anyway, we wrote our bill with a 2030 timeline.

Jacobson’s August 2022 study outlines how 145 countries (representing 99.7% of world fossil fuel use) could meet 100% of their business-as-usual energy needs with wind, water, solar and energy storage. While the upfront cost would be \$73 trillion, the costs would be recovered within 6 years through reduced health care and other costs associated with climate change. The timetable is “ideally by 2035, but by no later than 2050, with at least 80% by 2030.” He estimated that such a transition would create 28 million more jobs than it would eliminate.⁸⁰

A British think tank in 2016 said that fossil fuels could be eliminated worldwide within a decade.⁸¹

A study by the University of California at Berkeley concluded we could get to 90% zero-carbon power by 2035 with wind, solar, hydropower and nuclear power – at no extra cost to consumers.⁸²

In November 2022 the Department of Energy outlined “four major viable paths [for the U.S.] to a net zero emissions ‘clean electricity’ power system by 2035 in which benefits exceed costs.” The net zero target meant a 90% reduction in emissions.⁸³ A similar study by the Union of Concerned Scientists found that that the 24 states in the Climate Alliance can meet 100% of their electricity consumption with renewable energy by 2035, even with the strong increases in demand that would come from the electrification of transportation and heating.⁸⁴

⁸⁰ <https://www.pv-magazine.com/2022/08/08/study-finds-100-renewables-would-pay-off-within-six-years/>; [https://www.cell.com/one-earth/fulltext/S2590-3322\(19\)30225-8#%20](https://www.cell.com/one-earth/fulltext/S2590-3322(19)30225-8#%20)

⁸¹ <https://phys.org/news/2016-04-fossil-fuels-phased-worldwide-decade.html>

⁸² <https://na.panasonic.com/us/green-living/us-could-shift-90-percent-renewable-energy-2035-no-extra-cost>

⁸³ <https://www.utilitydive.com/news/us-can-reach-100-clean-power-by-2035-doe-finds-but-tough-reliability-and/635874/>

⁸⁴ <https://www.ucsusa.org/resources/road-100-percent-renewables>

Some climate scientists have also stressed that in order to meet the IPCC's goal of a 50% chance of keeping global warming below the 1.5° C target, the wealthy industrial developed countries must cut emissions faster than the developing world. A study by the Tyndall Centre for Climate Change Research said that the wealthiest countries need to phase out their domestic production of fossil fuels by 2034 and provide significant finance to developing countries, which would have a 2050 goal.⁸⁵

How Much will the Renewable Energy Transition Cost?

While it will cost a lot of money to transition to a clean energy future, it will be a lot less than the increased costs associated with climate change and extreme weather if we fail to act.

The estimates of the transition costs vary widely, in part because the various researchers take different approaches to their calculations. A major issue is the significant amount of money the world is already spending to provide energy and how much of those expenditures can pay for the clean energy transition. And the cost of renewable energy has fallen much faster than was predicted.⁸⁶

Converting the entire U.S. power grid to 100% renewable energy in the next decade would cost an estimated \$4.5 trillion, according to the energy research firm Wood Mackenzie. This represents the cost of replacing all fossil fuels and nuclear power with hydroelectricity, biomass, geothermal, wind, and solar. The price tag would be \$4 trillion if nuclear were continued.⁸⁷

A 2022 report by New York State (partly at my request) as part of its recent climate scoping plan estimated that the cost to transition the entire economy to net zero emissions by 2050 would be \$3 trillion.

⁸⁵ <https://research.manchester.ac.uk/en/publications/phaseout-pathways-for-fossil-fuel-production-within-paris-complia>

⁸⁶ <https://www.forbes.com/sites/christinero/2022/09/14/renewable-energy-costs-have-dropped-much-faster-than-expected-but-theres-a-catch/?sh=2a32370d3164>

⁸⁷ <https://e360.yale.edu/digest/shifting-u-s-to-100-percent-renewables-would-cost-4-5-trillion-analysis-finds>

However, they assumed that 90% of the costs would come from existing expenditures for energy, leaving \$300 billion to be raised over 30 years. The additional costs would be offset by the \$400 to \$420 billion in benefits from “avoiding economic impacts of damages caused by climate change and the improvements in public health.”⁸⁸

As noted above, Jacobson estimates that a global effort to transition to 100% renewable energy by 2050 would cost \$73 trillion upfront, including \$7.8 trillion for the U.S. — but the expense will pay for itself in under seven years.⁸⁹

The International Energy Agency estimates that to get to net zero emission (NZE) by 2050 would require “expanding annual investment in energy from just over USD 2 trillion globally on average over the last five years to almost USD 5 trillion by 2030 and to USD 4.5 trillion by 2050. Total annual capital investment in energy in the NZE (rises from around 2.5% of global GDP in recent years to about 4.5% in 2030 before falling back to 2.5% by 2050.”⁹⁰

The IEA noted that “most of this increase in investment comes from private sources, mobilized by public policies that create incentives, set appropriate regulatory frameworks and reform energy taxes. However, direct government financing is also needed to boost the development of new infrastructure projects and to accelerate innovation in technologies.... The large increase in capital investment in the NZE is partly compensated for by lower operating expenditures. The clean technologies that play an increasing role in the NZE are characterized by much lower operating costs.”⁹¹

⁸⁸<https://climate.ny.gov/-/media/project/climate/files/Appendix-G.pdf> , p.8

⁸⁹ <https://e360.yale.edu/digest/the-global-price-tag-for-100-percent-renewable-energy-73-trillion>; [https://www.cell.com/one-earth/fulltext/S2590-3322\(19\)30225-8#%20](https://www.cell.com/one-earth/fulltext/S2590-3322(19)30225-8#%20)

⁹⁰ https://iea.blob.core.windows.net/assets/deebef5d-0c34-4539-9d0c-10b13d840027/NetZeroby2050-ARoadmapfortheGlobalEnergySector_CORR.pdf

p. 81

⁹¹ Ibid, p. 82

Why is the Number “350” so Important?

350.org, founded in 2008 by author Bill McKibben and students such as May Boeve at Middlebury College in Vermont, has been one of the most important groups mobilizing the public worldwide to demand action on climate. They are perhaps best known for launching the campaign to divest college, religious and public pension funds from fossil fuels, and being one of the lead organizers of the 400,000 People’s Climate March in NYC in 2014.⁹² And their name is taken from the maximum “safe” concentration of carbon dioxide in the atmosphere – 350 parts per million.

As humanity evolved over the past several hundred thousand years, atmospheric CO₂ levels ranged between 200 and 300 ppm. The preindustrial level of CO₂ before the Industrial Revolution was about 280 ppm.⁹³

Atmospheric concentrations of CO₂ must be reduced from current levels of around 420 ppm to at most 350 ppm to avoid dangerous climate change and provide a good chance of limiting future warming to 1.5° C.⁹⁴ Unfortunately, that number has steadily increased since 350.org was founded. It hit 415 ppm in 2021.⁹⁵

Climate Change Drives Extreme Weather⁹⁶

Extreme weather events that were once rare occurrences are now increasingly commonplace. 100-year weather events may happen every 5 to ten years; 1,000-year events may occur every few decades. While we cannot pinpoint climate change as a cause of any particular

⁹² www.350.org

⁹³ <https://climate.mit.edu/ask-mit/what-ideal-level-carbon-dioxide-atmosphere-human-life>

⁹⁴

https://www.biologicaldiversity.org/programs/climate_law_institute/350_or_bust/pdfs/CLI_350_factsheet.pdf

⁹⁵ <https://news.un.org/en/story/2022/10/1129887>

⁹⁶ <https://earthjustice.org/features/how-climate-change-is-fueling-extreme-weather>

extreme weather event, it has been shown to make extreme events more frequent, and more destructive.⁹⁷

Global warming is swinging the pendulum out wider on the weather we experience, while making it more intense. Heat provides more energy to storms, so hurricanes warmed by the ocean waters grow to categories 3, 4 and 5 rather than staying at category 1 levels. As regions such as California and Australia grow hotter and drier, wildfires are growing in size, ferocity, and speed. Heat waves are growing in frequency, intensity, and length.

Warmer air increases evaporation, putting more water vapor into the air for storms to sweep up and turn into rain or snow. In upstate New York where I live, it is expected that while the amount of rainfall will remain relatively the same, rainstorms will be less frequent but more intense. Our environment – plants, soil – are not adapted to absorbing 2 inches of rainfall at a time, so we can expect more erosion and flooding which will harm our food supply. While winters overall are getting milder, individual storms are getting more intense both from stronger winds and increased water vapor leading to heavier snowfall.

The number of weather events causing more than \$1 billion in damages is increasing. In 2021, National Oceanic and Atmospheric Administration reported that wildfires, hurricanes, tornadoes and a winter storm and cold wave were among 20 weather and climate disasters that cost \$1 billion or more in the U.S., totaling \$145 billion and killing 688 people.⁹⁸

Climate Change Hastens the Global Spread of Diseases

A major problem with human driven climate change is that it is occurring much faster than changes driven by nature – faster than

⁹⁷ <https://education.nationalgeographic.org/resource/influence-climate-change-extreme-environmental-events>

⁹⁸ <https://www.npr.org/2022/01/11/1072077479/extreme-weather-in-u-s-cost-688-lives-and-145-billion-noaa>

species including humans can adapt and evolve. There are limits to how fast trees and plants can move (shift) to respond to changing temperatures.

Insects that cause diseases in humans, animals, trees, and plants can rapidly move to thrive in new biospheres with higher temperature,⁹⁹ faster often than their natural predators that keep them in check are able to move. Insect biology, climate quirks, and public health preparedness will influence whether outbreaks occur. The spread of Lyme disease and malaria are examples of this.¹⁰⁰

Human Extinction is the Worst-Case Scenario

While human extinction is a slight possibility, scientists in an August 2022 study warned that the risk of global societal collapse or human extinction has been “dangerously underexplored. Facing a future of accelerating climate change while blind to worst-case scenarios is naïve risk management at best and fatally foolish at worst.” The authors stated that there are “ample reasons” to suspect global heating could result in an apocalyptic disaster and called for the world to start preparing for the possibility, starting with the IPCC issuing a special report. Climate breakdown could trigger other catastrophic risks, such as international wars or infectious disease pandemics, and worsen existing vulnerabilities such as poverty, crop failures and lack of water. The IPCC should especially examine famine, extreme weather, war, and disease.¹⁰¹

Since the turn of the century, global deaths attributed to air pollution have increased by more than half. Air pollution was responsible for an estimated 9 million deaths around the world in 2019. 4.5 million deaths were the result of outdoor air pollution, emitted by vehicles and industrial sources like power plants and

⁹⁹ <https://www.fs.usda.gov/ccrc/topics/insect-disturbance-and-climate-change>

¹⁰⁰ <https://www.pnas.org/doi/10.1073/pnas.2200481119>

¹⁰¹ <https://www.theguardian.com/environment/2022/aug/01/climate-endgame-risk-human-extinction-scientists-global-heating-catastrophe>

factories. Poorer countries bear a disproportionate share of the impacts of pollution deaths.¹⁰²

Curbing Climate Change Starts with Stopping the Burning of Fossil Fuels

While the world needs to rapidly transition to a clean energy future – wind, solar, battery storage, conservation, regenerative agriculture – the single most important step is to cut greenhouse gas emissions, getting to real zero as soon as possible. While this may seem an obvious point, it often is pushed to the side by governments, which then can find that emissions fail to decline as much as expected even as the percentage of renewable energy significantly increases. Germany is perhaps the best-known example.¹⁰³

The Fossil Fuel Industry is Impeding action on Climate Change: Money Talks in Politics.

According to one study, the oil and gas industry made an estimated \$2.8 billion a day in pure profit for the last 50 years. That vast wealth “is providing the power to ‘buy every politician, every system’ and delay action on the climate crisis.”¹⁰⁴

A campaign contribution has long been the best investment that Wall Street can make. For every dollar the fossil fuel industry contributes to American politicians, they receive \$119 in federal exploration and production subsidies.¹⁰⁵

Donald Trump was the largest recipient of campaign donations from the oil and gas industry in the 2020 presidential election, receiving \$3.8 million. Of the top five beneficiaries, only one was a

¹⁰² <https://insideclimatenews.org/news/17052022/outdoor-air-pollution-health/>

¹⁰³ <https://www.forbes.com/sites/jamesconca/2017/10/10/why-arent-renewables-decreasing-germanys-carbon-emissions>

¹⁰⁴ <https://www.theguardian.com/environment/2022/jul/21/revealed-oil-sectors-staggering-profits-last-50-years>

¹⁰⁵ <https://priceofoil.org/fossil-fuel-industry-influence-in-the-u-s/>

Democrat – presidential candidate Joseph Biden. In total, fossil fuel contributions to the GOP were \$63.6 million during that election cycle.¹⁰⁶ Researchers have found a correlation between an increase in anti-environment votes and an increase in contributions.¹⁰⁷

In the closest federal races in the 2022 mid-term elections, “the oil and gas industry [] spent an estimated average of \$4.3 million per Senate seat and \$490,000 per House seat through direct contributions, funding for party committees, and funding for super PACs. Twenty oil & gas companies and industry trade associations contributed more than \$52 million to right-wing super PACs and party fundraising committees, and more than \$4 million to candidate PACs.” (These numbers will increase once post-election campaign filings are made.)¹⁰⁸

During the 2017-2018 midterm election cycle, corporations, individuals, and trade groups in the fossil fuel industry spent \$265,773,915 in lobbying and \$93,392,002 in contributions to national-level candidates, parties, and outside groups, bringing the total spending to \$360 million in two years. That’s \$500,000 per day. During the same period, renewable energy companies spent \$26 million. For every dollar spent on behalf of wind, solar, or hydroelectric energy interests, \$13.70 was spent by fossil fuel interests.¹⁰⁹

In addition to campaign contributions, there is a revolving door between the fossil fuel companies, the regulatory agencies, and elected offices, as individuals move back and forth between the private and public sector.¹¹⁰ Be a friend to the fossil fuel industry as a

¹⁰⁶ <https://www.statista.com/statistics/788056/us-oil-and-gas-lobbying-spend-by-party/>

¹⁰⁷ <https://www.theguardian.com/environment/2020/feb/24/oil-gas-industry-us-lawmakers-campaign-donations-analysis>

¹⁰⁸ <https://www.greenpeace.org/usa/research/big-oil-money-looms-large-in-competitive-elections/>

¹⁰⁹ <https://yaleclimateconnections.org/2020/01/fossil-fuel-political-giving-outdistances-renewables-13-to-one/>

¹¹⁰ <https://therevolvingdoorproject.org/amid-climate-crisis-biden-stacks-administration-with-fossil-fuel-industry-allies/>

regulator or elected official and there will be a high paying job as a consultant or lobbyist waiting for you on departure. Many “monetize” their time as public servants.

While scientists have sounded the alarm for decades, the fossil fuel industry mounted an aggressive disinformation campaign casting doubt about the science of climate change and played into the American media’s propensity for on-the-one-hand/on-the-other-hand reporting. So, while the overwhelming scientific consensus was that the burning fossil fuels was driving climate change, the American media tended to give 50% of the airtime to the “less than 1 percent who profess to be skeptics.”¹¹¹

ExxonKnews has documented that “Scientists and executives at fossil fuel companies such as Exxon knew since as early as 1968 that burning fossil fuels would raise global temperatures, which could lead to ‘catastrophic’ consequences.”¹¹²

The Union of Concerned Scientists point out the executives at fossil fuel companies “chose to downplay and distort the evidence of climate change, engaging in a decades-long campaign against climate action. Their tactics included everything from counterfeit science, to the harassment of scientists, to manufactured uncertainty with no scientific basis. Even today, industry trade groups and associations spread disinformation on climate change, while corporate lobbyists influence politicians and regulators—all with the financial backing and support of major fossil fuel companies.”¹¹³

Such deceptions have prompted a wave of lawsuits in the last decade against fossil fuel companies. A 50-page brief filed in the 2020 lawsuit by the District of Columbia details academic studies and media reports to show how the oil industry was warned about the risks from burning fossil fuels beginning in the late 1950s. One example was an October 1989 Shell report warning that “climate-fueled

¹¹¹ <https://truthout.org/articles/the-dirty-business-of-coal-how-our-addiction-to-an-18th-century-energy-source-is-killing-us/>

¹¹² <https://climateintegrity.org/lie-brary/they-knew>

¹¹³ <https://www.ucsusa.org/climate/accountability>

migration could swamp borders in the United States, Soviet Union, Europe, and Australia.”¹¹⁴

¹¹⁴ <https://www.desmog.com/2023/04/13/bombshell-1989-shell-memo-features-in-new-court-filing-alleging-climate-deception/>

CHAPTER 2

TRANSITIONING TO A CLEAN ENERGY FUTURE

This chapter outlines the many ways society can develop clean, renewable energy. It primarily focuses on electricity. It provides a quick explanation of how solar and wind power work, and outlines some of the barriers and challenges with these energy sources, including siting and finances. It summarizes the ways governments can promote clean, renewable energy.

A key point of debate is how fast can we move to 100% clean renewable energy with zero emissions. The mainstream answer is usually to target 2050 – and many now talk about “net zero,” which would allow about 15% of present emissions to continue, in order to essentially exempt some industrial processes such as cement manufacture as well as some transportation issues.

I prefer to frame the issue as to how fast do we need to move in order to avoid climate collapse – that is, keeping global warming below 1.5° C. It is important to note that the emissions reduction timelines advanced by the IPCC (40% by 2030) are not adequate to achieve such goals, which is why they call for technological ways to remove carbon from the atmosphere even though none of those approaches are close to being viable after decades of research and tens of billions of dollars of investments.

When people ask whether a ten-year timeline to move to zero emissions is even in the realm of possibility, I asked them to reflect how long it took smart phones to become omnipresent. And I remind them that cars largely replaced horses in a ten-year period.

One of the key factors in the success of the grassroots push to ban fracking in New York was a report that actor-activist Mark Ruffalo got Cornell and Stanford professors to do showing that the state could meet 100% of its energy needs by 2030 with renewables without relying on fossil fuels. After the governor decided to ban fracking following his poor showing in the 2014 election, in which fracking was a major issue, I decided to use the study as a basis for legislation to move the state to 100% clean energy by 2030.

Stanford professor Mark Jacobson has been the leading scientist in the U.S. promoting a 100% renewable energy goal. He wrote a series of reports for The Solutions Project showing how individual states and nations could accomplish this goal, using official government statistics about the potential for various renewable energy sources (especially offshore wind on the east coast of the U.S.). However, Jacobson began using 2050 as the target date. Before I introduced my legislation, I asked him whether his real target was 2030 or 2050. He said that while he was always clear that 2030 was technologically feasible, he added 20 years to give political wiggle room on the economic and political challenges.

I kept 2030 as the timeline for my bill since politicians, especially before a final deal is cut, always extend the timeline and weaken the goal. You should never negotiate against yourself; if you weaken your position to appear more reasonable but get no agreement to pass it as written, the politicians will always further weaken it at the end. That's what we saw with the much weaker climate law New York finally adopted in 2019.

Fortunately, the push in New York for 100% renewable energy eventually became a mainstream position within the national climate movement, replacing the prior call for 80% reduction in emissions by 2050. However, over time politicians and business leaders increasingly called for net zero emissions, which actually leads to only an 85% cut. And politicians and mainstream climate groups are only slowly lowering the target date from 2050.

While Jacobson and others assert that technology already exists to transition to renewable energy, especially for electricity, challenges and the need for technological advances still remain. Industrial processes such as cement manufacture require higher temperatures not presently commercially feasible for renewables. Battery storage and transmission grids need major improvements. This chapter outlines some of the real-world challenges in moving to 100 percent renewable energy.

In February 2023, Professor Jacobson published *No Miracles Needed: How Today's Technology Can Save Our Climate and Clean Our Air*. It lays out in detail the various steps for how the world can transition to 100% clean renewable wind, water, and solar (WWS) and storage for all energy purposes. It is a great starting point for anyone trying to figure out how to make the 100% clean energy transition. It addresses the most difficult industrial processes, explaining approaches such as arc, induction, and resistance furnaces as well as dielectric and electric beam heaters.¹¹⁵

Transitioning to a Clean Energy future

The world needs to create a sustainable energy system that relies on clean, renewable energy and conservation while ending greenhouse gas emissions as rapidly as possible.

Many believe that the best strategy is beneficial electrification, reducing energy demand across all sectors – electrical production, transportation, buildings, industrial processes – as much as possible, including with conservation and efficiency, and then electrify everything that remains.

However, virtually all actions have some negative environmental impact, including the building of wind and solar energy systems. Steps must be taken in all actions to minimize the negative impacts, including looking at how the product is disposed of once its useful life

¹¹⁵ *No Miracles Needed: How Today's Technology Can Save Our Climate and Clean Our Air*, Mark Jacobson, pp. 110-116.

is ended. Projects must be carefully sited to reduce any negative environmental impact.

An Introduction to Wind and Solar Power

One of the best introductory books that explains climate change is *Fight the Fire: Green New Deals and Global Climate Jobs* by Jonathan Neale. The Ecologist provides a free downloadable copy on their website.¹¹⁶ The chapter on Wind and Solar is pages 53 to 60.

Neale explains that wind turbines are built in three parts. On top of the “tower” sits the aluminum “nacelle,” which looks like a large oval submarine. Two or three large blades are attached to the front of the nacelle. The blades turn in the wind, driving a generator in the nacelle.

Offshore wind turbines have become so large that they must be made at the port from which the ships will take them to be installed. Having access to ships and ports to transport the turbines has been a major barrier in the U.S. The development of offshore wind has also been hampered by the impact of the Jones Act, which imposes restriction on non-American ships.¹¹⁷

Offshore wind has been doing well in Europe for more than a decade, but is only beginning to take off in the U.S. The first offshore wind project (only 5 turbines) in the U.S. was for Block Island in Rhode Island. Among the best offshore wind sites in the world is off the coast of the northeastern U.S. from New York City to Massachusetts. The federal government has just begun to sell leases there, and many of the companies buying those leases are connected to European offshore wind farms. The Great Lakes also have much potential. Tornado Alley – from North Texas up through the Great

¹¹⁶ https://theecologist.org/sites/default/files/2021-02/Fight_the_Fire_0.pdf

¹¹⁷ <https://www.morganlewis.com/pubs/2021/12/jones-act-compliance-strategies-for-us-offshore-wind-construction>

Plains (Iowa, Kansas, Oklahoma) and the Dakotas – leads in onshore wind.¹¹⁸

There are three kinds of solar power – solar PV (photovoltaic), concentrated solar power, and solar thermal. Solar PV is the most important of these and is what most people mean when they refer to solar power. When sunlight hits a photovoltaic cell electrons are knocked loose and flow down a wire to the local electricity grid or a battery. Solar cells are thin slivers of silicon inside a transparent plastic or glass cell. While 90% of PV cells are currently made with silicon, scientists are experimenting to find better or cheaper alternatives.

In March 2022, the U.S. generated 18% of its electricity from wind and solar (mostly from wind), up from 5.7% in 2015.¹¹⁹ Wind and solar were the fastest-growing sources of electricity worldwide for the 17th year in a row in 2021. Many European countries generated more than 25% of their electricity from wind and solar in 2021, including Germany, Spain, and the UK. The International Energy Agency says that to reach net zero emissions, at least 20% of global electricity must be produced by wind and solar by 2025, and 70% by 2050. These two sources produced only 10% of global electricity in 2021.¹²⁰

Hydropower accounts for an additional 6.3% of electricity in the U.S.¹²¹ Nuclear accounts for about 19%.¹²²

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¹¹⁸ <https://www.eia.gov/energyexplained/wind/where-wind-power-is-harnessed.php>

¹¹⁹ Hydropower accounts for an additional 6.3% of electricity in the U.S. <https://www.energy.gov/eere/water/hydropower-basics>. Nuclear accounts for about 19%. <https://www.eia.gov/tools/faqs/faq.php?id=427&t=3>

¹²⁰ <https://electrek.co/2022/04/28/the-us-generated-a-record-18-of-its-electricity-from-wind-and-solar-in-march/>

¹²¹ <https://www.energy.gov/eere/water/hydropower-basics>

¹²² <https://www.eia.gov/tools/faqs/faq.php?id=427&t=3>

the coast of the northeastern U.S. from New York City to Massachusetts. The federal government has just begun to sell leases there. Many of the the companies buying those leases are connected to European offshore wind farms. A study in 2013 by Stanford and Cornell professors found that NY could meet all its energy needs by 2030 with renewable energy, including 40% coming from offshore wind.¹²³ The Great Lakes also have much potential.

Large-scale wind and solar farms are more cost-effective than small ones. Neale points out two reasons that make wind turbines ever larger. One, wind turbines are more efficient than smaller ones, because the amount of electricity produced increases with the square of the length of the blade. This means that, meaning if you double the length of the blade, you produce four times as much electricity. (Triple it the blade length and you get nine times more electricity.) It also pays to site turbines in areas with steady and strong, such as mountain passes and ridges and offshore sites, because t second, the amount of electricity produced increases with the cube of the wind speed:. So, double the average wind speed, and you get eight times as much electricity. Double the length of the blade and triple the wind speed and you get 216 times as much electricity. Wind farms are built in very windy places, like mountain passes and ridges. Steady, strong wind is also the appeal of offshore wind farms.¹²⁴

Hydropower

Hydropower is one of the oldest forms of renewable energy, in use for at least 2,000 years. It is one of the largest sources of renewable electricity in the U.S. and many other countries. In 2018, hydropower accounted for 70% of the world's renewable generation capacity, including more than 80% in Latin America.¹²⁵ In 2021,

¹²³

<https://web.stanford.edu/group/efmh/jacobson/Articles/I/NewYorkWWSEnPolicy.pdf>

¹²⁴ P. 56-57. Fight the Fire, op cited

¹²⁵ <https://unfccc.int/news/how-hydropower-can-help-climate-action>

hydroelectricity generation – concentrated on the West Coast and in New York – was about 6.5% of total U.S. utility-scale electricity generation,¹²⁶ and about 31.5% of all renewable electricity in the U.S.¹²⁷

Globally, the capacity factor for hydro averages 44%, though the numbers vary widely.¹²⁸

There are three main types of hydropower: impoundment dams, diversion, and pumped storage. Impoundment dams are what most of us picture when we think of hydropower: a dam that creates a reservoir, with an outlet through which water runs over turbines. “Diversion, or run-of-river hydro, is when water is simply diverted from its natural path, run through turbines, and then returned to the source. For pumped storage, during periods of low electricity demand, water is pumped uphill into a reservoir to store it for future energy needs. Then, in periods of high demand the water can be released, turning a turbine, and generating electricity to meet the demand.”¹²⁹

Environmental effects from hydropower vary widely. Impoundment dams almost inevitably cause some habitat destruction; they can also block migration routes for fish, preventing them from breeding and causing high juvenile mortality rates. Reservoirs are a major source of emissions of methane from the decomposition of biomass.¹³⁰ Dams can lead to habitat destruction. They can also block the migration of aquatic species and reduce sediment flow and nutrient

¹²⁶ <https://www.eia.gov/energyexplained/hydropower/where-hydropower-is-generated.php>

¹²⁷ <https://www.energy.gov/eere/water/hydropower-basics>

¹²⁸ https://web.archive.org/web/20120524071136/http://srren.ipcc-wg3.de/report/IPCC_SRREN_Ch05.pdf, p. 441

¹²⁹ <https://climable.org/hydro>

¹³⁰ <https://www.washingtonpost.com/news/energy-environment/wp/2016/09/28/scientists-just-found-yet-another-way-that-humans-are-creating-greenhouse-gases/>

transport.¹³¹ Impoundment reservoirs are also a major source of methane emissions from decomposing biomass.¹³²

A 2019 study by the Environmental Defense Fund concluded that “if minimizing climate impacts [is] not a priority in the design, construction and geographic placement of new hydropower facilities, we could end up generating electricity that yields more warming — especially in the near-term from decomposition of vegetation — than fossil fuels. Some hydropower reservoirs are carbon sinks, taking in more carbon through photosynthesis by organisms living in the water than they emit through decomposition, while others have carbon footprints equal to or greater than, fossil fuels.”¹³³

Hydropower, especially dams, can also have major negative land use impacts. Many communities (invariably the less affluent) have been uprooted in order to make way for dams, most noticeably in China and India. Worldwide, about 80 million people have been displaced by dam projects.¹³⁴ Hydro Quebec in Canada has been involved in fights for decades over the disruption it has caused to indigenous communities and wildlife. This also recently included struggles over the construction of transmission lines down Lake Champlain and the Hudson River to deliver electricity to New York City.¹³⁵

The effects of climate change on rainfall patterns will also impact hydropower. A 2022 study found that “by 2050, 61 percent of all global hydropower dams will be in basins with very high or extreme risk for droughts, floods, or both. By 2050, 1 in 5 existing hydropower

¹³¹ <https://theconversation.com/does-green-energy-have-hidden-health-and-environmental-costs-52484>

¹³³ <https://blogs.edf.org/energyexchange/2019/11/15/long-considered-a-clean-energy-source-hydropower-can-actually-be-bad-for-climate/>

¹³⁴ <https://www.internal-displacement.org/publications/case-study-series-dam-displacement>; <https://www.ohchr.org/en/statements/2021/11/joint-statement-human-rights-people-affected-dams-and-other-water-infrastructure>

¹³⁵ <https://www.nytimes.com/2022/05/06/climate/hydro-quebec-maine-clean-energy.html>; https://en.wikipedia.org/wiki/James_Bay_Project

dams will be in high flood risk areas because of climate change, up from 1 in 25 today.”¹³⁶

Geothermal and Heat Pumps¹³⁷

Heat pumps offer an energy-efficient alternative to furnaces and air conditioners.¹³⁸ A major advantage of a heat pump is that it moves existing thermal energy, rather than creating it. Instead of burning fossil fuels to produce warmth, a heat pump collects existing heat from the environment—either the ground, water, or air—and transfers it into a building. Conversely, for cooling, a heat pump transfers thermal energy within a building to the outside environment which functions as a heat sink.

Like a refrigerator, a heat pump uses electricity, which operates a compressor, and thermodynamics to maximize thermal energy delivered per volume. In an air heat pump, outside air is blown over tubes filled with a refrigerant, warming up the refrigerant and converting it from a liquid into a gas. This gas passes through a compressor, increasing the pressure. Compressed, hot gases pass into a heat exchanger, surrounded by cool air or water. The refrigerant transfers its heat to this cool air or water, making it warm.¹³⁹

Since a heat pump transfers thermal energy rather than creating it, efficiencies exceed 100%. In fact, a well-designed ground-source or water-source geothermal system typically achieves heating

¹³⁶ <https://www.worldwildlife.org/press-releases/new-study-us-hydropower-threatened-by-increasing-droughts-due-to-climate-change>

¹³⁷ Much of this section is taken from a report done by SHARE (Sheridan Alliance for Renewable Energy). SHARE is a coalition I helped start in 2017 to successfully defeat a proposal by the Governor of New York turbines to power the State Capitol complex by adding new fracked gas to a century-old steam plant located in a low-income African American community. One of our main alternative proposals was to utilize geothermal energy study, using the nearby Hudson River – already used by the steam plant – as the heat source, <https://sharealbany.org/wp-content/uploads/2019/07/SHARE-science-report-7-11-19.pdf>, pp. 26 – 30.

¹³⁸ <https://www.energy.gov/energysaver/heat-pump-systems>

¹³⁹ <https://www.edfenergy.com/heating/advice/air-source-heat-pump-guide>

efficiencies of 300% to 500%. This means that three to five times as many BTUs of beneficial thermal energy are provided compared to the amount of electricity required to run the system.

The Biden administration has become a major proponent of heat pumps. Biden used his executive powers under the Defense Production Act to boost the domestic production of heat pumps. The Inflation Reduction Act (IRA) that finally was approved by Congress in August 2022 included \$8,000 rebates for heat pump purchases and \$200 million to train contractors on installing heat pumps and other energy efficient appliances.¹⁴⁰

While some have argued that air source heat pumps (cheaper to install than ground source) do not work well in cold temperatures, newer models are able to work in very cold temperatures.¹⁴¹ Such pumps are competitive with other heating sources, but their efficiency does decline as temperatures fall below freezing. In an air heat pump, outside air is blown over tubes filled with a refrigerant, warming up the refrigerant, and converting it from a liquid into a gas. This gas passes through a compressor, increasing the pressure. Compressed, hot gases pass into a heat exchanger, surrounded by cool air or water. The refrigerant transfers its heat to this cool air or water, making it warm.¹⁴²

Prof. Jacobson notes that high temperature heat (120 to 400 degrees Celsius) can be used to generate electricity. The first use of geothermal for electricity was in Italy in 1904. By 1911 geothermal was used for power plants. Today, the three major types of geothermal plants for electricity are dry steam, flash steam and binary. Most-high temperature rocks are found near volcanic activity.¹⁴³

¹⁴⁰ <https://www.politico.com/newsletters/power-switch/2022/08/02/heat-pumps-are-so-hot-right-now-00049206>

¹⁴¹ <https://www.consumerreports.org/heat-pumps/can-heat-pumps-actually-work-in-cold-climates-a4929629430/>

¹⁴² <https://www.edfenergy.com/heating/advice/air-source-heat-pump-guide>

¹⁴³ *No Miracles Needed*, Mark Jacobson, pp. 26-27

Ground-Source Geothermal.

Geothermal heat pumps have been in use since the late 1940s. They use the relatively constant temperature of the Earth as the exchange medium instead of the outside air temperature. A few feet below the Earth's surface the ground remains at a relatively constant temperature. Depending on latitude, ground temperatures range from 45°F (7°C) to 75°F (21°C). The ground is thus warmer than the air above it during the winter and cooler than the air in the summer.

Ground-source geothermal relies on several different techniques. One common method is to drill vertical boreholes that allow for the transfer of thermal energy to and from the Earth through circulation of a fluid in a closed loop.¹⁴⁴ Each well is usually a few hundred feet deep and may also provide thermal storage. Closed-loop geothermal wells are commonplace in systems of every size, ranging from single-family residential homes to large-scale projects in which buildings are linked together in one or more districts.

Geothermal district heating (GDH) is the use of geothermal energy to provide heat to multiple buildings and industry through a distribution network. The leading countries for GDH applications are China, Iceland, and Turkey. Iceland leads the world in GDH applications per capita. It is in its initial stage of development in the U.S. but seems poised to expand rapidly,¹⁴⁵ including at institutions such as Ball State University in Muncie, Indiana, currently the largest GDH application in the country.¹⁴⁶

In addition to greater efficiency, an advantage of ground-source geothermal heat pump technology over air-source heat pumps is that all the outdoor infrastructure is below the surface. This makes it

¹⁴⁴ Another technique involves installing a horizontal loop field within an excavated area, though this requires more land.

¹⁴⁵ <https://www.sciencedirect.com/topics/engineering/geothermal-district-heating>; and <https://www.nrel.gov/news/press/2021/new-nrel-report-details-current-state-vast-future-potential-us-geothermal-power-heat.html>

¹⁴⁶ <https://energynews.us/2022/02/07/colleges-see-untapped-potential-in-geothermal-district-energy-systems/>

invisible and highly resilient. Wells can be located within open greenspace areas and courtyards, under sidewalks, and beneath parking lots without interfering with aesthetics or creating any permanent surface impact.

Costs: Renewable Energy vs. Fossil Fuels

In 2021, Lazard reported that wind power was 71% cheaper in 2020 than in 2009, while the cost of solar energy had dropped by 90% over the same period.¹⁴⁷ In many cases, getting energy from new wind turbines and solar panels is now cheaper than getting it from existing coal and gas plants.¹⁴⁸ Lazard said that when U.S. government subsidies are included, the cost for utility-scale solar is \$27/MWh (megawatt hour) and \$25/MWh for utility-scale wind, compared to \$42/MWh for coal, \$29/MWh for nuclear and \$24/MWh for combined-cycle gas generation.¹⁴⁹

Making renewables comparable to or even cheaper than fossil fuels is key to speeding up their deployment. While the level of subsidies and tax credits provided by the government for renewables has been critical, it is also subject to changing political decisions.

Many economists feel that imposing a carbon tax on the use of fossil fuels is the most effective way to speed up the transition to renewable energy (see chapter on carbon pricing). A carbon tax would reflect the cost of the damage caused by burning fossil fuels, including the significant healthcare costs from air pollution. The International Monetary Fund estimates that the annual subsidy provided by governments to fossil fuels is nearly \$6 trillion, primarily (92%) due to the failure to charge for the health and environmental damages

¹⁴⁷ <https://environmentamerica.org/articles/its-2021-and-clean-energy-is-cheaper-than-ever/>

¹⁴⁸ <https://cleantechnica.com/2020/11/15/wind-solar-are-cheaper-than-everything-lazard-reports/>

¹⁴⁹ <https://www.lazard.com/perspective/levelized-cost-of-energy-levelized-cost-of-storage-and-levelized-cost-of-hydrogen/>

caused by burning fossil fuels.¹⁵⁰ Yet most elected officials balk at imposing a carbon tax, in large part because they worry that voters will punish them if it becomes more expensive to fuel their cars or heat their homes.

One recent study found that each ton of CO₂ pollution imposes \$185 of damage — that is more than triple the \$55 estimate used by the federal government for the social cost of carbon.¹⁵¹

The International Renewable Energy Agency tracked some \$634 billion in energy-sector subsidies in 2020, and found that around 70% were for fossil fuels, 20% for renewable power generation, 6% to biofuels and just over 3% to nuclear.¹⁵²

Renewable Energy Creates Jobs

More than 3 million Americans were employed in the clean energy sector as of 2020, compared to 1.2 million in the fossil fuel industry in 2019 (a drop of 2% from 2018). The clean energy sector added about 95,000 jobs each year from 2017 to 2019. California has the largest number of clean energy jobs, with 484,980 in 2020. Nevada saw a 38.9% increase in clean energy jobs from 2018 to 2020, the largest of any state. The clean energy median wage was \$23.89 an hour in 2019, while the median wage for all industries was \$19.14.¹⁵³

The 2022 U.S. Energy and Employment Report showed that the clean energy industry is hiring faster than the overall national economy and is paying above-average wages.¹⁵⁴

¹⁵⁰ <https://www.imf.org/en/Topics/climate-change/energy-subsidies>

¹⁵¹ <https://grist.org/regulation/the-most-influential-calculation-in-u-s-climate-policy-is-way-off-study-finds/>;

¹⁵² <https://www.nature.com/articles/d41586-021-02847-2>. It should be noted that different agencies calculate subsidies with different methods and the level of subsidies fluctuate, especially with the price of oil.

¹⁵³ <https://www.zippia.com/advice/renewable-energy-job-creation-statistics/>

¹⁵⁴ <https://www.forbes.com/sites/energyinnovation/2022/06/29/clean-energy-jobs-are-booming-making-up-for-rising-fossil-fuel-unemployment/>

Renewable energy employment worldwide reached 12 million in 2020, up from 11.5 million in 2019.¹⁵⁵ The clean energy transition is expected to generate 10.3 million net new jobs around the world by 2030, with the biggest impact coming from modernizing energy infrastructure. The IEA estimates that a full net-zero clean energy transition would create a net of 22.7 million new jobs.¹⁵⁶

Many of the jobs in the clean energy transition will come from outside the electricity sector, starting with the decarbonization of buildings including massive insulation and the transition to heat pumps and geothermal rather than gas and other fossil fuels for heating and cooling.

Compared with fossil fuel technologies, which are mechanized and capital intensive, renewable energy is more labor intensive. Solar panels need humans to install them, and wind farms need technicians to maintain them. This means more jobs are created for each unit of electricity generated from renewable sources than from fossil fuels.¹⁵⁷

Environmental Impacts of Renewable Energy

While the use of renewables significantly reduces GHG emissions compared to the use of fossil fuels, they still have some negative environmental impacts. The manufacture of renewable energy technology has some carbon footprint and can involve the use of hazardous materials. There is also the issue of what happens to the solar panels and wind turbines once they have exceeded their useful life.

A certain number of migratory birds and bats die from collisions with wind turbines, both land-based and offshore. Hydroelectric dams can lead to high methane emissions from reservoirs and block migration routes for fish. Concentrating solar plants known as “power

¹⁵⁵<https://www.irena.org/newsroom/pressreleases/2021/Oct/Renewable-Energy-Jobs-Reach-12-Million-Globally>

¹⁵⁶<https://www.weforum.org/agenda/2022/03/the-clean-energy-employment-shift-by-2030/>

¹⁵⁷<https://www.ucsusa.org/resources/benefits-renewable-energy-use>

towers” produce beams of sunlight intense enough to incinerate insects and birds. For these reasons and others, siting is often key to reducing renewables’ environmental impact.¹⁵⁸

One critique of renewable energy is that it often requires more land than fossil fuel production and can therefore cause loss of farmland and forests or disruption of wildlife. Others contend that the issue of land use for renewables is overstated, saying that land needs for renewable energy are quite modest, less than present land use for fossil fuel/nuclear fission power extraction and supply. Land use for wind farms leave much of the land available for agriculture use, and the best site for wind is often in the ocean. Concentrated solar power installations can be located in deserts. Land lost for gas pipelines is often not counted against fossil fuels when making these comparisons.¹⁵⁹

It is estimated that a utility-scale solar power plant will require between 5 and 10 acres per megawatt (MW) of generating capacity. Like fossil fuel power plants, solar plant development requires some grading of land and clearing of vegetation. Research from the National Renewable Energy Laboratory shows that powering the entire country with utility-scale solar would use 0.6% of the nation’s land mass – a significant amount.¹⁶⁰

The Solar Star project in California is one of the largest solar energy farms in the world, with 1.7 million panels over 3,000 acres north of Los Angeles. A natural gas power plant 100 miles to the south produces the same amount of energy on just 122 acres. There is a growing movement, at least partially driven by false information and social media, to prevent solar developers from permitting new sites in rural America, out of concern for both land use and visual impact. The land for solar farms needs to be flat, dry, sunny, and near transmission infrastructure to hook into the grid. Opponents argue that solar

¹⁵⁸ <https://cnr.ncsu.edu/news/2019/11/renewable-energy-poses-challenge-for-wildlife-conservation>

¹⁵⁹ <https://www.aimspress.com/article/doi/10.3934/energy.2021054>; see especially the Supplement/Appendix

¹⁶⁰ <https://www.seia.org/initiatives/land-use-solar-development>

developers are using the climate change issue to justify profit-making businesses that hurt the environment in other ways.¹⁶¹

Many rural residents balk at such development in their communities when the electricity will be largely used for residents in large urban areas. And many agree that the first priority for siting should be on former brownfields (old factory and business sites) and on existing buildings and parking lots.

Many farmers, hard pressed to make a living, support solar farms to supplement their income. Solar farms can still be used to farm crops and graze livestock. Studies have shown that it is beneficial to co-locate croplands and solar farms in what are known as “agrovoltaics.” A farmer can easily revert their land to solely agricultural use if they decide to. Land not used for crops while a solar farm may even “maintain soil quality and contribute to the biodiversity of the land.”¹⁶²

Solar energy can cut a farm’s electricity and heating bills, meeting the farm’s own energy needs. Solar heat collectors can dry harvested crops and warm homes, livestock buildings, and greenhouses. Solar water heaters can also provide hot water for dairy operations, pen cleaning, and homes.¹⁶³

One of the reasons to favor public ownership of energy is to give the public more control over siting issues. At a minimum, local governments should be proactive in engaging local residents to determine the best places to site solar and wind farms in their communities, rather than waiting for a private developer to select sites.

¹⁶¹ <https://www.reuters.com/world/us/us-solar-expansion-stalled-by-rural-land-use-protests-2022-04-07/>

¹⁶² <https://innovativesolarsystemsllc.com/2019/08/why-solar-benefits-of-solar-farms/>

¹⁶³ <https://www.ucsus.org/resources/renewable-energy-and-agriculture>

Wind Impacts

It is estimated that a million birds are killed annually by wind turbines in the U.S. That pales in comparison to the number killed by collisions with communications towers (6.5 million); power lines (25 million); windows (up to 1 billion); and by cats (1.3 to 4.0 billion). Birds are also lost due to habitat loss, pollution, and climate change.¹⁶⁴

Still, wind turbines do kill birds and bats, and steps should be taken to reduce the number of such kills. We should avoid siting wind turbines in migratory flyways. Ultrasound generators can help bats avoid wind turbines, and painting turbine blades black can cut bird deaths.¹⁶⁵ Wind turbines can also be turned off at the low speeds that seem the most dangerous for bats.

As with solar, onshore wind farms usually need to be spread over more land than other power installations, meaning they need to be built in wild and rural areas, which raises concerns over the “industrialization of the countryside.” Conflicts have arisen in scenic and culturally important landscapes. Wind turbines also generate noise, and at a residential distance of 1,000 feet this may be around 45 dB; however, at a distance of one mile, most wind turbines become inaudible. Some individuals may also be impacted by a strobe effect from spinning blades.¹⁶⁶

Some ocean activists are also concerned that offshore wind farms will lead to the industrialization of the ocean and impact marine animals and their habitat, including from the laying of transmission lines on and in the ocean floor and noise from construction.¹⁶⁷

The impact on whales has been a major concern. The construction of offshore wind needs to take into account the migration paths of whales; in fact, one of the earliest offshore wind farms suspended construction for half a year due to concern over negative impacts on

¹⁶⁴ <https://www.sierraclub.org/michigan/wind-turbines-and-birds-and-bats>

¹⁶⁵ https://www.bbc.com/news/science-environment-53909825;https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4175170

¹⁶⁶ https://en.wikipedia.org/wiki/Environmental_impact_of_wind_power

¹⁶⁷ <https://cleanoceanaction.org/issues-campaigns/energy/wind>

whale migration. In 2023, there were concerns that noise from offshore wind construction, including the use of sonar for mapping, was contributing to the increase in the number of dead whales found in the northeast. While independent studies discounted the development of offshore wind as the factor,¹⁶⁸ concerns still persist.

Commercial fishers have been among the most vocal opponents of offshore wind in the northeast, even though turbine platforms act as habitat for some fish species. Off the northeastern and mid-Atlantic U.S., lease areas overlap with fisheries that add billions of dollars to regional economies.¹⁶⁹ Fishermen feel their concerns – which include safety issues operating around wind farms, fishing gear getting tangled with platforms or transmission cables, and how offshore wind development will alter the ocean environment and affect fish stocks – are not being considered by regulators. American fishers are bracing for the sorts of conflict seen in Europe, where fishermen are often legally forbidden to operate in the vicinity of wind farms and subsea cables or have stopped due to safety and liability concerns.

Our oceans are already under significant stress from climate change, overfishing, and pollution including extensive plastic waste. Many pesticides and nutrients used in agriculture end up in coastal waters, resulting in oxygen depletion that kills marine plants and shellfish. Factories and industrial plants discharge sewage and other runoff into the oceans. Global warming is altering ocean chemistry and oceanic processes, and threatening many species of marine animals that cannot adapt to higher temperatures.¹⁷⁰

Challenges in a Transition to 100% Renewable Energy

There are certainly skeptics who believe that ongoing political and NIMBY opposition, regulatory roadblocks, and consumer skepticism

¹⁶⁸ <https://www.saltwatersportsman.com/news/offshore-wind-and-dead-whales/>

¹⁶⁹ <https://www.theguardian.com/environment/2021/jul/24/offshore-wind-development-new-jersey-us-fishermen-ocean-life>

¹⁷⁰ <https://www.nationalgeographic.com/environment/article/ocean-threat>

may make it impossible to upgrade the power grid fast enough to meet steadily increasing demand. Opposition could increase if a supply shortage leads to regular blackouts or calls to decrease energy usage. Others argue that there are too many periods when the sun is not shining, or the wind is not blowing for batteries to fill in the gaps. Building a new grid will require one of the biggest engineering efforts the U.S. has ever undertaken, beyond that even of the interstate highway system or electrifying the country.¹⁷¹

Access to Minerals for Renewable Energy

The world's transition to zero emissions by building renewable energy, including electric vehicles, will spur a major increase in demand for crucial metals such as lithium, cobalt, copper, nickel, and rare-earth elements, with steeply rising prices and limited supplies.¹⁷² Mining and processing these minerals is highly polluting and environmentally damaging.

One way to free up access to such minerals is by “terminating the military industrial fuel complex” as well as increasing the recycling of used solar panels and the substitution of common elements for rarer ones in energy production and storage technologies (e.g., NaS batteries and liquefied air energy storage).¹⁷³

China by far is the largest country for rare-earth metal production, with the U.S. second. Native populations in the U.S. and elsewhere are concerned about expanded extraction on their lands.¹⁷⁴ Protests

¹⁷¹ <https://news.yahoo.com/going-green-will-require-a-lot-more-energy-can-the-us-make-enough-214350086.html>

¹⁷² <https://www.weforum.org/agenda/2021/11/soaring-metal-prices-delay-energy-transition-net-zero>

¹⁷³ <https://climateandcapitalism.com/2022/01/05/a-critique-of-degrowth/>;
<https://www.aimspress.com/article/doi/10.3934/energy.2021054>

¹⁷⁴ <https://www.nytimes.com/2021/12/27/us/mining-clean-energy-antimony-tribes.html>

have occurred in Latin America, such as in Chile, over the mining of lithium.¹⁷⁵

A typical electric car requires six times the mineral inputs of a conventional combustion-powered car. An onshore wind plant requires nine times more mineral resources than a similarly sized gas-fired power plant. The International Energy Agency (IEA) predicts that the energy sector's needs for critical minerals could increase by as much as six times by 2040. As the costs of technologies fall, minerals will be an increasing factor in renewable energy costs. While such minerals are widely scattered across the planet, the production and processing of many of these minerals are highly concentrated in a handful of countries, with the top three producers accounting for more than 75% of supplies. The increasing demand is already generating controversy over environmental and labor issues and Indigenous rights as companies seek to extract the minerals in more remote and ecologically sensitive locations.¹⁷⁶

The IEA has six key recommendations for policymakers, including the need for governments to commit to emission reductions, which would provide the confidence needed for suppliers to invest in mineral production. "Governments should also promote technological advances, scale up recycling to relieve pressure on primary supplies, maintain high environmental and social standards, and strengthen international collaboration between producers and consumers."¹⁷⁷

The federal tax credit for electric vehicles included in the recently passed Inflation Reduction Act has requirements to promote EVs being manufactured in North America, as well as provisions as to where the materials are sourced from. To be eligible for the credit the EVs' batteries must be made with materials sourced domestically, or from a country that has a free-trade agreement with the U.S. By 2026,

¹⁷⁵ <https://www.reuters.com/article/us-chile-protests-lithium/chile-protesters-block-access-to-lithium-operations-local-leader-idUSKBN1X42B9>

¹⁷⁶ <https://www.iea.org/news/clean-energy-demand-for-critical-minerals-set-to-soar-as-the-world-pursues-net-zero-goals>

¹⁷⁷ <https://www.iea.org/news/clean-energy-demand-for-critical-minerals-set-to-soar-as-the-world-pursues-net-zero-goals>

vehicles will need to have 80% of critical materials sourced based on the rules. The U.S. does not have the battery material mining operations in place to meet the growing demand. It will take some time for the country to catch up on lithium extraction and processing.¹⁷⁸

The Capacity of Solar and Wind is Less than Fossil Fuels

Capacity measures how often a plant is running at maximum power. Nuclear has the highest capacity factor, 92% in 2021, of any energy source. (Peter Bradford, former head of the NY Public Service Commission, contends the number is lower due to periodic shutdowns). That is nearly twice as much as a coal (49.3%) or natural gas (54.4%) plant and nearly 3 times more than hydro (37.1%), wind (34.6%) and solar (24.6%) plants.¹⁷⁹

The lower numbers for renewables reflect that the wind does not always blow (though better offshore), the sun does not shine at night, and water flow is dependent on factors such as rain.

While capacity is different from electricity generation, it does tell you how big you have to build an energy facility to produce the amount of electricity you need.

Intermittency of Renewable Energy

The intermittency of renewable energy (e.g., no solar at night) has raised concerns over potential supply shortages, with fossil fuel companies arguing that they are needed to provide reliability to the electric supply, preventing blackouts and brownouts.

Scientists such as Mark Jacobson of Stanford point out that technological solutions exist to keep the electricity grid stable. One good mix is to link solar and wind, particularly offshore wind, as

¹⁷⁸ <https://www.msn.com/en-us/news/other/not-enough-lithium-to-satisfy-us-ev-adoption-goals-says-mining-ceo/ar-AA11B8um>

¹⁷⁹ <https://www.energy.gov/ne/articles/what-generation-capacity>

winds are often stronger at night. Jacobson has studied this issue in 143 countries and documents that renewables alone could provide stable energy everywhere in the world, without “back up” from fossil fuels. One advantage is that using 100% renewable energy would significantly reduce energy needs, such as in buildings and by transitioning from gas-fueled vehicles to more efficient electric vehicles.

Offshore wind is usually steadier than onshore wind and often peaks when electricity demand peaks.¹⁸⁰ Wind turbines in cold climates also increase reliability because, on average, winds become stronger when temperatures drop and heating demand goes up. Electricity storage is another grid-stabilizing strategy, saving excess production from renewable energy for later use. Present storage technologies include batteries, pumped hydropower storage, flywheels, compressed air storage, and gravity storage. In many places, solar plus batteries is already cheaper than coal or nuclear, with battery costs having declined 97% since 1991.

Another approach to the intermittency issue is to focus on demand. Efficiency improvements—such as switching to LEDs and insulating buildings—can reduce electricity consumption. Utilities can give financial incentives to encourage consumers to shift their energy use to periods when sunlight or wind is available.

In their book, *The Earth is Not For Sale*, Professors David and Peter Schwartzman point out that “already available reliable and relatively cheap storage technologies, along with tapping into hydropower and geothermal energy, will facilitate the expansion of renewables and provide baseload power capacity. New advances in battery storage point to the use of common rather than rare elements (e.g., Science News, 2015). A potentially promising approach is to use the obsolete infrastructure from the fossil fuel era, e.g., compressed air storage in shutdown coal-fired plants (Spector, 2017). However, a big enough array of turbines, especially offshore, can likely generate

¹⁸⁰ <https://physics.aps.org/articles/v15/54>

a baseload supply without the need to supplement it with separate storage systems. Further, the progressive expansion of a combined system of wind, photovoltaics, and concentrated solar power in deserts will generate a baseload, simply because the wind is blowing and the sun is shining somewhere in the system if linked to a common grid (Archer and Jacobson, 2007; Kempton et al., 2010).¹⁸¹

Siting Challenges

According to the Federal Permitting Improvement Steering Council, permitting large solar projects takes nearly two and one-half years, while permitting electric transmission lines takes nearly three and one-half years.¹⁸² The length of the permitting process, however, varies greatly from state to state. The “varied patchwork” of state, federal and local siting laws and regulations is a major obstacle facing the deployment of renewable energy.

“Not in my backyard” or “NIMBY” sentiments are another major obstacle to renewable energy infrastructure.

Siting of renewable energy has been a major problem in New York, with wind and solar projects often requiring ten years or more for approval. To try to reduce the time frame closer to two years, New York passed a law in 2020 strengthening the state’s ability to override municipal laws and regulations when those laws are found to be “unreasonably burdensome.” The state Office of Renewable Energy Siting will be responsible for overseeing the permitting process for renewable energy projects larger than 20 MW.

Under the new law, the local government review process is supposed to take only a year. Once a state determines the project is complete, the Siting Office will have 60 days to publish draft permit conditions. The public and municipality will then have 60 days to

¹⁸¹ *The Earth is Not for Sale*, David and Peter Schwartzman, p. 97.

<https://www.worldscientific.com/worldscibooks/10.1142/10827#t=aboutBook>

¹⁸² <https://www.reuters.com/legal/legalindustry/regulatory-practical-keys-achieving-solar-future-2021-10-11/>

provide comments. Adjudicatory hearings, similar to evidentiary hearings, will be held if the public comments raise a “substantive and significant issue.” To respond to the concern that the state was overriding the historical commitment to local rule, the law requires the identification of “host community benefits,” such as discounts on utility bills.¹⁸³

In June 2022, California passed a law to streamline the approval process for large renewable energy systems.¹⁸⁴

At the federal level, the Bureau of Land Management’s solar and energy rule adopted during the Obama Administration promotes renewable projects through faster approval processes and development incentives.¹⁸⁵

Smaller renewable energy projects, including solar and wind farms, can also run into problems with local governments. Many local governments lack zoning rules for such projects and have often responded to community opposition to proposed projects by imposing a moratorium to give them time to “figure it out.” Local governments in states such as California, Indiana, Maine, New York, and Virginia have imposed moratoriums on solar farms.¹⁸⁶

Financial Challenges

Financing renewable energy has also been a challenge. Big fossil fuel companies have both deep pockets to self-finance and long-standing relationships with institutional lenders. Utilities are also already heavily invested in dealing with fossil fuel and nuclear power

¹⁸³ <https://www.theregreview.org/2022/03/16/miller-how-current-siting-regime-stifles-renewable-energy/>; see also <https://www.harrisbeach.com/insights/new-york-takes-action-to-expedite-renewable-energy-siting-and-development/>

¹⁸⁴ <https://www.swca.com/news/2022/07/regulatory-alert-california-steps-in-to-streamline-approvals-for-renewable-energy>

¹⁸⁵ <https://www.federalregister.gov/documents/2016/12/19/2016-27551/competitive-processes-terms-and-conditions-for-leasing-public-lands-for-solar-and-wind-energy>

¹⁸⁶ <https://www.nbcnews.com/tech/tech-news/county-county-solar-panels-face-pushback-rcna16233>

infrastructures. Renewable energy often depends on federal and state government subsidies to make a project financially feasible, but such subsidies can fluctuate from year to year, making both developers and lenders nervous about the long-term financial viability of a project.

Oil Change International estimates that the U.S. annually spends \$37.5 billion subsidizing fossil fuels. Through direct subsidies, tax breaks, and other incentives, U.S. taxpayers help fund the industry's research and development, mining, drilling, and electricity generation. Internationally, governments provide at least \$775 billion to \$1 trillion annually in direct subsidies, not including other costs of fossil fuels related to climate change, environmental impacts, military conflicts and spending, and health impacts.¹⁸⁷

Renewable energy's biggest cost is the upfront capital investment. Its operating costs are lower than fossil fuels since their energy sources – wind, water, and the sun – are free. Construction costs for solar and wind continue to decline, though they are still somewhat above natural gas.

Switching from fossil fuels to renewable energy could save the world as much as \$12 trillion by 2050, an Oxford University study says. Researchers say that going green now makes economic sense because of the falling cost of renewables. While wind and solar are already the cheapest option for new power projects, questions remain over how to best store power and balance the grid.¹⁸⁸

The way tax credits for renewables are designed also present challenges for developers. Tax breaks are supposed to go to companies that develop renewable energy projects, but these developers rarely owe any taxes as a new company, with no pre-existing tax bills to which the credits can be applied. To utilize the tax breaks, they often need to bring on third-party financial partners –

¹⁸⁷ <https://priceofoil.org/fossil-fuel-subsidies/>; and

<https://www.ucsusa.org/resources/barriers-renewable-energy-technologies>

¹⁸⁸ <https://www.bbc.com/news/science-environment-62892013>

typically large banks – selling their tax breaks in return for the upfront funding from the banks.¹⁸⁹

The International Renewable Energy Agency reported that “renewable energy projects, especially in developing countries, face multiple challenges from the institutional, policy and regulatory level to the market and project level which can hinder the development and uptake of renewable energy. The latter include lack of market transparency, lack of financing and experience in project development, and lack of relevant information on regulations, markets, and resource availability.”¹⁹⁰

Globally, investment in clean energy grew by only 2% a year in the five years after the 2015 Paris climate accords. But since 2020, the pace of growth has sped up significantly to 12%, with critical fiscal support from governments. It has also been aided by the rise of sustainable finance, especially in advanced economies. However, clean energy spending in developing economies (excluding China) remains stuck at 2015 levels. A troubling sign is the 10% rise in investment in coal in 2021, led by emerging economies in Asia, with a similar increase expected in 2022. Clean energy investment accounts for only around 5% of oil and gas company capital expenditure worldwide, up from 1% in 2019.¹⁹¹

Renewables dominate investment in new power generation and accounted for 70% of 2021’s global total of \$530 billion spent on all new generation capacity.¹⁹² The U.S. added 462% more electricity from renewables than from fossil fuels in the first half of 2022 compared to 2021, according to the U.S. Energy Information Administration (EIA).¹⁹³

¹⁸⁹ <https://theconversation.com/renewable-energy-us-tax-credits-for-wind-and-solar-mostly-benefit-big-banks-173965>

¹⁹⁰ <https://www.irena.org/financeinvestment/Financing-Renewable-Energy-Projects>

¹⁹¹ <https://www.iea.org/news/record-clean-energy-spending-is-set-to-help-global-energy-investment-grow-by-8-in-2022>

¹⁹² <https://www.iea.org/reports/world-energy-investment-2021/executive-summary>

¹⁹³ <https://www.msn.com/en-us/money/technologyinvesting/renewable-energy-is-absolutely-crushing-fossil-fuels-in-2022/ar-AA118iJq>

Renewable energy stocks outperformed fossil fuels by more than threefold in the last decade. Investing in green power was also less volatile in advanced markets.¹⁹⁴

U.S. Government Subsidies for Renewable Energy

The 2022 Inflation Reduction Act included the largest investments to date by the U.S. government for renewable energy. Some of the subsidies for consumers include:

- \$9 billion in home energy rebate programs to help people electrify their home appliances and for energy-efficient retrofits, with a focus on low-income consumers;
- 10 years of consumer tax credits to make heat pumps, rooftop solar, electric HVAC, and water heaters more affordable, which make homes more energy efficient;
- \$4,000 in consumer tax credits for lower- and middle-income individuals who buy used electric vehicles, and up to \$7,500 tax credits for new EVs; and
- A \$1 billion grant program to make affordable housing more energy efficient.

The package includes more than \$60 billion to support “onshore clean energy manufacturing” in the U.S. This includes:

- Production tax credits to help U.S. manufacturers accelerate production of solar panels, wind turbines, batteries, and process key minerals;
- \$10 billion for investment tax credits for new manufacturing facilities that make clean tech like EVs, wind turbines and solar panels;

¹⁹⁴ <https://www.bloomberg.com/news/articles/2021-03-18/renewable-returns-tripled-versus-fossil-fuels-in-last-decade>

- \$500 million to use the Defense Production Act to speed up manufacturing of things like heat pumps, as well as processing critical minerals;
- \$2 billion in grants to help automaker facilities transition to clean vehicle production; and
- Up to \$20 billion in loans to construct new manufacturing facilities for clean vehicles.

Various government incentives existed before the IRA. Federal tax incentives included the Renewable Electricity Production Tax Credit (PTC), the Investment Tax Credit (ITC), the Residential Energy Credit, and the Modified Accelerated Cost-Recovery System (MACRS). Grant and loan programs are available from federal government agencies such as the Departments of Agriculture, Energy, and Interior. Most states also have some financial incentives available for renewable energy equipment.¹⁹⁵

Renewable Portfolio Standards and State Mandates or Goals

Renewable portfolio standards (RPS)¹⁹⁶ require that a percentage of electric power sales in a state comes from renewable energy sources. Some states have specific mandates for power generation from renewable energy, and some states have voluntary goals.

Most states have updated RPS targets of at least 40%. However, recent RPS legislation has pushed toward 100% clean or renewable energy goals. 10 states, D.C., Puerto Rico, and Guam have set 100% clean or renewable portfolio requirements with deadlines ranging between 2030 and 2050. Three states, plus the U.S. Virgin Islands, have goals of 50% or greater.¹⁹⁷

¹⁹⁵ <https://www.eia.gov/energyexplained/renewable-sources/incentives.php>

¹⁹⁶ <https://www.eia.gov/energyexplained/renewable-sources/portfolio-standards.php>

¹⁹⁷ <https://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx>

Renewable Energy Certificates or Credits (RECs)

RECs allow a purchaser to pay for the generation of renewable electricity without directly obtaining the actual electricity from renewable energy sources. A renewable energy credit is created when a renewable energy source generates one MWh of electricity into the grid. RECs can be bought and sold, say to help a utility meet its RPS goals.

The climate impact of RECs is debatable. The sale of unbundled RECs (not tied directly to the electricity itself) is the most common form of green-power procurement in the voluntary market. U.S. sales of unbundled RECs jumped from 19.8 million MWh in 2010 to 68.7 MWh in 2019. Buying RECs does not always encourage the development of new wind or solar farms. It does not necessarily help to displace fossil-based electricity, and it does little to decarbonize the grid.¹⁹⁸ One study of major U.S. corporations utilizing RECs to support “net zero” policies found that while the companies claimed a 30% reduction in emissions, actual reductions were closer to 10%.¹⁹⁹

Net Metering

Net metering allows residential and commercial customers who generate their own electricity from renewables to sell the electricity they are not using back into the grid. In effect, customers are allowed to run their meters backwards, putting any extra electricity (say, from a solar system on their house) back into the grid. This enables them to avoid putting in their own battery storage system, which has limitations. During the day, most solar customers produce more electricity than they consume; net metering allows them to export that power to the grid and reduce their future electric bills.

¹⁹⁸ <https://www.spglobal.com/esg/insights/problematic-corporate-purchases-of-clean-energy-credits-threaten-net-zero-goals>

¹⁹⁹ <https://www.theverge.com/2022/6/9/23160508/corporate-renewable-energy-misleading-rec-power-purchase-climate>

As of 2021, 37 states and the District of Columbia have net metering for certain utilities; eight states have statewide distributed generation compensation rules other than net metering; and two states are in transition to statewide distributed generation compensation rules other than net metering. Two states do not have statewide rules, but some utilities in those states allow net metering.²⁰⁰ Most net metered systems are solar PV systems. In New York at least, net metering customers do not have to pay the “distribution” part of the utility bill, which is a significant savings.

Utility companies usually oppose net metering. One argument is that net metering makes other utility customers subsidize users of renewable energy; such users tend to be more affluent, raising charges for less-affluent customers. There are ongoing efforts to repeal or reduce net metering rules. New York for instance has argued that as renewable energy develops, it makes more sense to modify such subsidies to provide greater support to renewable energy sources that are developed where they are most needed.

Proponents of net metering argue that it can “create a smoother demand curve for electricity and allow utilities to better manage their peak electricity loads. By encouraging generation near the point of consumption, net metering also reduces the strain on distribution systems and prevents losses in long-distance electricity transmission and distribution. There are a wide variety of cost-benefit studies round the country that demonstrate the value solar provides to local economies and the electricity system as a whole.”²⁰¹

Feed-in Tariffs (FITs)

FITs are long-term contracts that provide renewable energy producers an above-market price. Providing price certainty and long-term contracts helps developers obtain needed financing. Usually

²⁰⁰ <https://www.eia.gov/energyexplained/renewable-sources/incentives.php>

²⁰¹ <https://www.seia.org/initiatives/net-metering>; and <https://www.seia.org/initiatives/solar-cost-benefit-studies>

FITs award different prices to different sources of renewable energy in order to encourage development of one technology over another.²⁰²

Several states and individual electric utilities in the U.S. have established FITs for certain types of renewable energy systems. FITs were more widely used in Europe to drive the development of renewable energy.²⁰³

Ethanol and Other Renewable Motor Fuels

There are several federal and state requirements and subsidies for ethanol, biodiesel, and other fuels made from biomass. The federal Energy Independence and Security Act of 2007 requires that 36 billion gallons of biofuels be used in the U.S. per year by 2022. Several states have their own renewable fuel standards or requirements. Many states have their own programs for biofuels.²⁰⁴

Upgrading the Grid

Once you have built a renewable energy power system, you must get the electricity into the grid (transmission system) to deliver it to customers. Since renewable-energy sources often are based in more rural locations distant from cities where power is most needed, a high-voltage transmission infrastructure is needed to move the electricity across great distances. America's transmission grid needs a major overhaul to make this possible, as well as making sure the transmission system is secure from extreme weather. A Princeton study determined that the U.S. must triple its transmission infrastructure to decarbonize by 2050.²⁰⁵

²⁰² https://en.wikipedia.org/wiki/Feed-in_tariff#cite_note-5

²⁰³ <https://www.pv-magazine.com/features/archive/solar-incentives-and-fits/feed-in-tariffs-in-europe/>

²⁰⁴ <https://afdc.energy.gov/laws>

²⁰⁵ <https://www.theatlantic.com/science/archive/2021/07/america-is-bad-at-building-power-lines-lets-fix-that-transmission-climate/619591/>

New renewable energy systems often face exorbitant fees to connect to the existing grid. Nationwide, problems connecting to the grid are strangling new rooftop and community solar projects. The Solar Energy Industries Association reported community solar installations fell 21% and small commercial installations fell 10% in the third quarter of 2021 due in part to interconnection issues. 41% of community solar projects withdrew their applications to connect to the grid through the local utility Public Service Company of Colorado in 2019 and 2020. “Homeowners, business owners or nonprofits who are interested in solar are sometimes waiting several months — or years — to connect to the grid, which is typically operated by whichever electric utility serves the area. Long interconnection ‘queues’ as well as a lack of transparency over wait times sometimes lead applicants to drop out of the interconnection process.”²⁰⁶

Many local grids are at capacity and projects are often forced to spend much more than they planned for new transmission lines and other upgrades. One recent study found that “fewer than one-fifth of solar and wind proposals actually make it through the so-called interconnection queue.”²⁰⁷

A report from the Lawrence Berkeley National Laboratory found that queue wait times are continuing to increase as more renewable energy projects are launched. Projects completed in 2022 waited five years for interconnection approval compared to three years in 2015 and fewer than two years in 2008. Queue lengths will be a major barrier to realizing the growth in renewables promoted by the Inflation Reduction Act.²⁰⁸

Heat waves increase the demand for electricity to run air conditioners, straining electricity generators and power infrastructure. The drought in the American West has meant less water to run

²⁰⁶ <https://www.eenews.net/articles/want-more-solar-panels-good-luck-connecting-to-the-grid/>

²⁰⁷ <https://www.nytimes.com/2023/02/23/climate/renewable-energy-us-electrical-grid.html>

²⁰⁸ <https://www.utilitydive.com/news/grid-interconnection-queue-berkeley-lab-lbnl-watt-coalition-wind-solar-renewables/647287/>

hydropower and to provide the cooling needed for nuclear, coal, and natural gas. Wildfires can destroy transmission lines, and utilities sometimes proactively shut down transmission lines during wildfire conditions. Major storms like hurricanes can topple transmission lines.

The government needs to provide stronger leadership in building out the transmission grid. For instance, many power grid operators use historical weather patterns to make investment decisions, rather than the more dire climate projections, seeking to avoid the possibility of financial losses for investing in what might not happen.²⁰⁹ Utilities often resent transmission operations for weakening their ability to control local power markets; one Harvard researcher describes the transmission grid as a syndicate.²¹⁰

One solution would be for the government to take ownership and control of the grid to make sure it is built out properly and to eliminate issues of coordination among multiple grid owners. Public ownership would also lower costs since the profit margin would be eliminated. Others say that creating more microgrids and other distributed renewable energy systems is part of the grid solution.

Here is how the National Conference of State Legislators describes the grid challenge:²¹¹

“Significant infrastructure upgrades will be required to address the needs of an evolving energy network. This includes upgrading existing transmission lines to incorporate distributed energy resources and building new lines to

²⁰⁹ <https://www.cnn.com/2022/05/31/us/power-outages-electric-grid-climate-change/index.html>

²¹⁰ <https://www.theatlantic.com/science/archive/2021/07/america-is-bad-at-building-power-lines-lets-fix-that-transmission-climate/619591/>

²¹¹ <https://www.ncsl.org/research/energy/modernizing-the-electric-grid-state-role-and-policy-options.aspx>

improve wholesale market operations, increase resilience and bring energy from remote renewable resources to population centers. The distribution grid—which carries energy to individual homes and businesses at the local level—will need even more investment than the transmission system. Sixty percent of U.S. distribution lines have surpassed their 50-year life expectancy, according to Black and Veatch, while the Brattle Group estimates that \$1.5 trillion to \$2 trillion will be spent by 2030 to modernize the grid just to maintain reliability.

“As more customers deploy distributed energy resources, some communities are seeing a fundamental shift in energy management, with large, distant generation sources being replaced by smaller, modular, and local sources. Creating a more flexible system—where customers can also be energy producers, energy managers and market participants—will require a much more adaptable and technologically advanced distribution grid. Developing a dynamic grid that can absorb and use the rapid expansion of distributed energy resources and other energy solutions will require advanced grid management technologies, digital controls and communications, new analytics, and supportive regulatory approaches, such as time-of-use pricing.

“Energy transmission, distribution and generation infrastructure are built to meet peak system needs, a costly approach since this may only occur for a few hours per year. New grid management approaches provide an opportunity to significantly decrease these peaks, reducing the infrastructure needed. Energy efficiency, energy storage, distributed generation, demand response, microgrids and new grid controls are already helping to reduce or eliminate the need for new transmission and distribution lines, substations, transformers, and other equipment.”

Energy Efficiency

Amory Lovins of the Rocky Mountain Institute has long argued that investments in energy efficiency (not conservation) are by far the most cost-effective investment in a clean energy future. He argues for a mass investment in the insulation (and redesign) of buildings along with cheap renewables. He notes that since 1975, the cumulative energy saved by reduced intensity is 30 times the cumulative extra supply from doubling renewable output.²¹²

Lovins calls for “integrative, or whole-system, design,” a way to employ orthodox engineering to achieve radically more energy-efficient results by changing the design logic. For instance, by designing his own house to collect energy and to need no heating, he saves 99% of the space- and water-heating energy, and 90% of the electricity. And it was cheaper to build.

“If you make a car out of carbon fiber, you also save two-thirds of the investment in water and half the energy space and time needed to put the car together. And it needs a lot fewer batteries because it is holding less weight because the carbon fiber is light So if you do this across the whole economy, really designing whole systems in factories, equipment, buildings, vehicles, you will end up with severalfold larger energy savings than practically anyone now thinks is available. And the cost goes down.”²¹³

Cutting carbon emissions from challenging sectors like heavy transport and industrial heat will create new opportunities for business, argues Lovins. More than one-third of emissions comes from heavy transport such as trucks and planes and the heat-intensive manufacture of materials such as steel and cement. Cheap renewables provide opportunities for new innovations. It is estimated that adopting circular economy principles could reduce emissions 37% for

²¹² <https://www.greenbiz.com/article/biggest-resource-we-dont-use-qa-amory-lovins-energy-innovator>

²¹³ <https://www.theguardian.com/environment/2022/mar/26/amory-lovins-energy-efficiency-interview-cheapest-safest-cleanest-crisis>

steel, 34% for cement and 56% for plastics manufacturing. Rethinking the manufacturing process can minimize the need for materials. According to the International Energy Agency, we could save about 82% of steel and 90% of cement by comprehensive gains in efficiency by 2060.²¹⁴

“The circular economy is based on three principles: Eliminate waste and pollution; Circulate products and materials (at their highest value); and Regenerate nature. It is underpinned by a transition to renewable energy and materials. A circular economy decouples economic activity from the consumption of finite resources. It is a resilient system that is good for business, people, and the environment.”²¹⁵

Investments in Energy Efficiency

Founded in 1977, the Alliance to Save Energy²¹⁶ is “a nonprofit, bipartisan alliance of business, government, environmental and consumer leaders working to expand the economy while using less energy. Our mission is to promote energy productivity worldwide.” Its recommendations include:

- Deploying energy-efficient technologies in end-use facilities and in power generation distribution can counteract the increased demand for and decreased output of power plants due to higher temperatures;
- Demand response and efficiency programs targeting peak loads can help counteract the increase in peak demand, thus reducing the need for additional power plants;
- Builders can “future proof” buildings against predicted changes in weather patterns by incorporating long-lived

²¹⁴ <https://www.greenbiz.com/article/amory-lovins-decarbonizing-industry-isnt-just-about-costs-its-about-profits>

²¹⁵ <https://ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview>

²¹⁶ <https://www.ase.org/news/alliance-urges-passage-key-energy-efficiency-investments>

characteristics such as orientation, insulation and windows that are appropriate for expected climate conditions;

- Cities can reduce ambient temperatures, and make buildings more efficient, with cool or green roofs; and
- Water efficiency programs can address climate impacts on water resources and reduce energy use for pumping and treating water.

The American Council for an Energy-Efficient Economy (ACEEE) develops transformative policies to reduce energy waste and combat climate change. They publish annual ratings of each state's energy efficient steps along with recommendations for improvements.²¹⁷

ACEEE notes that most state climate policies, such as clean electricity standards and emissions reductions goals, have not addressed the important role of energy efficiency in plans to decarbonize state electric grids and economies. Policymakers should adopt rules that enable utilities to provide customers incentives for buying electric heat pumps, set building energy performance standards that spur energy-efficient retrofits, and invest in electric vehicle charging infrastructure coupled with comprehensive transportation efforts. They also recommend that energy-efficient investments be targeted to low-income populations to make the energy transition more equitable.²¹⁸

There is also a need to strengthen energy standards for home appliances to reduce energy demand while saving money. Unfortunately, consumer adoption of such standards has not been ideal, and the Trump administration sought to kill the energy STAR rating program.²¹⁹

²¹⁷ <https://www.aceee.org/>

²¹⁸ <https://www.smart-energy.com/industry-sectors/energy-efficiency/energy-efficiency-can-help-the-us-deliver-an-affordable-and-just-energy-transition/>

²¹⁹ <https://e360.yale.edu/features/killing-energy-star-a-popular-program-lands-on-the-trump-hit-list>

States and the federal government could adopt stronger energy standards for appliances. In June 2022, the New York legislature passed a bill to require appliances to be more energy efficient. The law will apply to many common household products, including computers and televisions. It requires the state to update energy and water efficiency standards for 7 products already regulated by the state and to set new standards for another 30, including air purifiers, electric vehicle chargers, and restaurant equipment. The new standards are estimated to save New Yorkers \$800 million annually on utility bills by 2025, rising to \$1.3 billion per year by 2030.²²⁰

The Inflation Reduction Act passed in August 2022 made sizeable investments in energy efficiency. Below is an overview from ACEEE.²²¹

- **Buildings:** The IRA bill provides \$9 billion for states to issue rebates to homeowners for whole-home retrofits and for efficient heat pumps, heat pump water heaters, and other electrical equipment. Most of those funds would be for low- and moderate-income households. The IRA also restored and greatly increased tax credits for heat pumps and smaller home improvements such as insulation and increased the tax deduction for commercial building retrofits. Tax incentives were increased for building highly efficient new homes and commercial buildings, including incentives for “zero-energy-ready” homes and buildings. The bill also gives \$1 billion in additional aid to help states and cities adopt and implement strong building energy codes.
- **Transportation:** The bill provides a new tax credit and additional funding for purchasers of electric trucks and buses,

²²⁰ <https://www.governor.ny.gov/news/governor-hochul-signs-legislative-package-spur-energy-efficiency-consumer-savings-and>; and, <https://www.aceee.org/blog-post/2022/06/new-ny-appliance-efficiency-bill-will-save-consumers-money-and-cut-climate>

²²¹ <https://www.aceee.org/blog-post/2022/08/congress-set-vote-largest-efficiency-investments-history>

which lag behind electric cars and SUVs in deployment. The bill also includes a new \$4,000 credit for purchasing used electric cars and SUVs, and it revives the \$7,500 credit for new electric vehicles, which had been slowly expiring. However, there are concerns that new requirements for U.S. sourcing of materials and battery components, along with income caps on who can take the credit, will limit usage, particularly in the early years.

- The bill does much less for other ways of moving passengers and freight or for broader transportation system efficiency. But it does include \$3 billion for a new Neighborhood Access and Equity grant program supporting projects that improve walkability, reduce vehicle pollution, and help residents use affordable transportation to access essential services and green spaces, especially in disadvantaged and underserved communities. This would be the first program focused on transportation equity funded at this level.
- Industry: Decarbonizing industry—a third of U.S. GHG emissions—will require effective energy management, transformative process technologies, use of electricity and low-carbon fuels, and shifts to use of materials responsible for lower life-cycle emissions. IRA would provide significant support for the initial deployment of key technologies.

The IRA includes almost \$6 billion for grants and loans to companies that use innovative decarbonization technologies, like direct reduction of iron from ore using hydrogen instead of fossil fuels or inert anode aluminum production. The IRA also allocates \$10 billion for tax credits for transformative investments in manufacturing facilities and expands the credit to cover equipping an industrial plant to reduce GHG emissions by at least 20% (among other uses).

Tidal and Wave Power²²²

Tidal power uses the force of the tides to turn electric generators. This can be done by vertical or horizontal turbines under the sea in shallow waters. Tidal power can also use barriers to funnel water through a narrow passage, though there is a concern that such barriers could negatively impact marine life. While tidal power provides predictable power around the clock, it is still an expensive, developing technology. Presently, tidal power only makes sense in places where there are exceptional tides, and it still requires large subsidies.

Wave power makes sense in many more places but is still also in the experimental stage. It usually involves small turbines that bob near the surface that are linked in lines while anchored to the seabed.

Battery and Energy Storage

The development of ways to store electricity from intermittent renewable energy such as wind and solar is critical in the move to 100% clean energy. The sun does not always shine, the wind does not always blow, which is why large-scale storage must play a fundamental role.

The challenges for battery storage include reducing the upfront cost and increasing the length of time the electricity can be stored.

According to a May 2022 report from MIT, almost all of world's present large-scale energy storage capacity is pumped hydro. In such a system, water is collected in a reservoir and sent flowing downhill to turn turbines when electricity is needed and prices for power are high. When electric demand is low, energy is used to pump water back into the reservoir. The report also listed iron-air batteries, molten metal and thermal storage and flow-cell batteries. The use of excess

²²² From Fight the Fire, pp. 66 – 67,
https://theecologist.org/sites/default/files/2021-02/Fight_the_Fire_0.pdf

renewables at low demand times to create hydrogen is another option.²²³

The increasing research and investment in new battery storage technologies has led to rapid cost reductions, notably for lithium-ion batteries. In Germany, small-scale household Li-ion battery costs have fallen by over 60% since late 2014. The declining costs have opened up new applications for battery storage. A study by the International Renewable Energy Agency (IRENA) found that by 2030, total installed costs could fall between 50% and 60% (and battery cell costs by even more). Battery lifetimes and performance will also keep improving, helping to reduce the cost of services delivered. Lithium-ion battery costs for stationary applications could fall to below \$200 per kilowatt-hour by 2030. IRENA expects battery storage in stationary applications to grow from 2 gigawatts (GW) worldwide in 2017 (11 GW in 2020) to between 80 to 420 GWh in 2030, rivalling pumped-hydro storage.²²⁴

California has the largest number of utility-scale batteries connected to the grid in the U.S., reaching 3,163 MW by June 2022. Many additional large battery storage systems are in development, with more than 700 MW projected to be added in the summer of 2022. Such storage facilities make money on the price differences between times of charging when prices are low and discharging when prices are high because energy is scarce.²²⁵

A solar-plus-storage system is a battery system that is charged by a connected solar system (typically photovoltaic). From 2008 to 2017, the U.S. was the world leader in lithium-ion storage use, with about 1,000 MWh of storage, almost all by utilities. The average duration of

²²³ <https://www.wbur.org/news/2022/05/16/mit-energy-initiative-clean-power-storage-funding-research>

²²⁴ <https://www.irena.org/publications/2017/oct/electricity-storage-and-renewables-costs-and-markets>;
<https://www.irena.org/news/articles/2020/Mar/Battery-storage-paves-way-for-a-renewable-powered-future>

²²⁵ <https://www.utilitydive.com/news/california-grid-operator-enhances-reliability-prospects-utility-battery-storage/627083/>

such systems is 1.7 hours, but it can reach 4 hours. Batteries account for the biggest share of a storage system's cost right now. A storage system contains an inverter and wiring in addition to the battery—and utilities will need big battery packs if they are going to provide backup power for all customers. The system costs in 2019 ranged from \$380 per kWh for those providing electricity for 4 hours to \$895 per kWh for 30-minute systems.²²⁶

Globally, factors pushing the development of storage include:

- “Grid modernization. The growth of battery storage goes hand-in-hand with grid modernization efforts, including the transition to smart grids. Batteries help to unlock the potential of smart technologies, and vice versa.
- Participation in wholesale electricity markets. Battery storage can help balance the grid and improve power quality regardless of the generation source. Nearly every nation examined is revamping its wholesale market structure to allow batteries to provide capacity and ancillary services.
- Financial incentives. Nations are increasing the availability of financial incentives for storage investment.
- Phase-outs of FITs or net metering. Reduction of feed-in-tariffs (FITs) or net metering payments is driving behind-the-meter battery deployments in some countries, as customers strive to derive maximum value from their rooftop solar installations in the absence of these incentives.
- Desire for self-sufficiency. In Germany, for example, ecological motives, independence from utilities, resiliency, and technical curiosity are all thought to be motivations. Self-sufficiency is also a strong driver in Italy, the United Kingdom, and Australia.
- National policy. Many countries are turning to renewable energy storage to reduce dependence on energy imports,

²²⁶ <https://www.energy.gov/eere/solar/articles/solar-plus-storage-101>

enhance the reliability of their systems, and move toward decarbonization targets.²²⁷

Nature Based Climate Solutions

Nature-based climate solutions, such as reforestation, regenerative agriculture, and wetland restoration employ natural processes to reduce greenhouse gas concentrations in the atmosphere and slow global warming. Such natural climate solutions help address climate change in three ways: reducing greenhouse gas emissions related to land use; capturing and storing additional carbon dioxide from the atmosphere; and improving resilience of ecosystems.²²⁸

Some nature-based solutions, such as conserving existing wetlands, mainly prevent greenhouse gas emissions. Others, such as restorative agriculture and regrowing clear-cut forests, actively remove CO₂ from the atmosphere. Some do both.²²⁹

The IPCC estimates that by 2030, up to a third of its annual land-based emissions reductions targets could be achieved at a cost of \$20 or less per carbon ton through the use of nature-based solutions.

The Nature-Based Solutions (NBS) Coalition, co-led by China and New Zealand, launched the NBS for Climate Manifesto at the 2019 UN climate summit, with recommendations on 200 best practices and initiatives.²³⁰

Much of the millions of acres of land that have been deforested is not used for food production, allowing reforestation to sequester billions

²²⁷ <https://www2.deloitte.com/nl/nl/pages/energy-resources-industrials/articles/challenges-and-opportunities-of-battery-storage.html>

²²⁸ <http://naturalclimatesolutions.org/>

²²⁹ <https://www.american.edu/sis/centers/carbon-removal/fact-sheet-nature-based-solutions-to-climate-change.cfm>. See the chapter on agriculture for a number of nature-based solutions to our agriculture and food systems, as well as the issue of deforestation.

²³⁰

<https://wedocs.unep.org/bitstream/handle/20.500.11822/29705/190825NBSManifesto.pdf>

of tons of carbon dioxide without diminishing food production. In some cases, reforestation can be inexpensive and as simple as refraining from burning marginal grazing land, allowing forests to regenerate naturally. Reducing deforestation will require establishing large-scale incentives and regulatory mechanisms to address the major sources of deforestation, such as cattle ranching in the Amazon or palm oil production in Indonesia.²³¹

Globally, coastal wetlands constitute 80 to 300 million acres. Much of those wetlands are degraded and in need of restoration. Coastal wetlands such as mangroves, tidal marshes, or seagrass beds can be restored by reducing pollution, replanting lost vegetation and/or by repairing the natural flow of water. Avoiding coastal wetland conversion is a low-cost climate mitigation pathway.²³²

Some have touted algae as a climate solution, though recently the major fossil fuel companies have pulled their investments due to the cost, the length of time to develop, and other challenges.²³³

Ocean ecosystems serve as the largest carbon sink in the world. Ocean-based natural climate practices include restoring seagrass meadows or growing kelp or shellfish to restore or expand marine ecosystems.²³⁴

²³¹ <http://naturalclimatesolutions.org/>

²³² <http://naturalclimatesolutions.org/>

²³³ <https://www.theguardian.com/environment/2023/mar/17/big-oil-algae-biofuel-funding-cut-exxonmobil>; <https://www.news-medical.net/life-sciences/Could-Algae-Solve-the-Global-Climate-Crisis.aspx>

²³⁴ https://wwf.panda.org/discover/our_focus/oceans_practice/ocean_and_climate/

CHAPTER 3

BUILDINGS AND TRANSPORTATION

While most of the public discussion on transitioning to renewable energy has focused on electricity, buildings and transportation account for a larger share of greenhouse gas emissions. And while emissions from electrical production have decreased over time in the U.S., the carbon footprint from buildings and transportation has continued to increase. (We do want to first reduce energy use in these sectors and then convert whatever is left to use electricity, a process known as beneficial electrification.)

Americans love their cars, and politicians are scared of anything that increases the cost of filling up at the gas pump. The U.S. has a pretty poor railroad and mass transit system, even compared to many developing countries, which further discourages people from getting out of their cars. For decades, many have decried sprawl, which has racial undertones, little has been done to halt it. Aircraft are really bad for the climate²³⁵ and eliminating their carbon footprint is technologically challenging, especially without the high-speed trains used in other industrial countries as an alternative to intercity travel.

While it is relatively straightforward to build new carbon-free buildings, the vast majority of buildings already exist and have decades of usable life. Homes of low-income residents can have major carbon footprints when they are cheaply and poorly built, without sufficient insulation or energy efficient appliances. The cost of an

²³⁵ Aircrafts contribute 3.5% of global emissions.

<https://research.noaa.gov/article/ArtMID/587/ArticleID/2667/Aviation-is-responsible-for-35-percent-of-climate-change-study-finds>

energy retrofit for such homes is typically beyond the means of the occupants, requiring significant taxpayer subsidies. And the fossil fuel industry works hard to ensure that burning fossil fuels are the de facto heating source. Many worry about climate gentrification, as those in poverty are often unable to participate in the transition to a clean energy future.

I built my own passive solar house in 1985 in a rural intentional community based on sustainability principles, with each house required to be energy efficient and incorporate solar technology. Even though I was elected to the local Town Board, ideas like orienting homes to maximize solar gain and not requiring lot lines to be drawn at right angles to the road were not well received. When we told the town we supported clustering homes together to preserve open space, they responded by rezoning our area to double the size of each building lot to two acres to reflect their concept of open space.

Buildings

Buildings and their construction account for 36% of global energy use and 39% of energy-related greenhouse gas emissions annually, according to the United Nations Environment Programme. In the U.S., residential and commercial buildings account for 40% of energy consumption.²³⁶

Decarbonizing buildings means eliminating the emissions from existing buildings and new construction. In other chapters we discuss building decarbonization steps such as electrification combined with 100% renewable energy; energy efficiency; and managing energy loads.

From 1990 to 2015, carbon emissions from commercial and residential buildings in the U.S. increased 7.8% and 20.4%. Emissions have been relatively flat since 2010. The majority were *indirect* emissions from the electricity used to power buildings. The

²³⁶ <https://archive.curbed.com/2019/9/19/20874234/buildings-carbon-emissions-climate-change>

rest were from on-site combustion of fossil fuels for heating, hot water, and cooking, and from leaks of compounds used in refrigeration and air conditioning.²³⁷

In addition to their carbon footprint, buildings must become prepared to deal with physical changes from global warming, such as rising sea levels, flooding, more extreme weather conditions on construction sites, and water shortages. They will have to deal with rising temperatures and heat waves.

Buildings have three main ways the use energy: in construction; heating and cooling; and running appliances, machinery, etc. (the latter being most impactful for businesses and industry).

Reducing the carbon footprint of buildings involves electrifying their heating and cooling with renewable energy and improving energy efficiency starting with stronger insulation requirements.

Adopting stricter building codes for new buildings is critical to eliminating their carbon footprint, as states like California have done. Starting in January 2023, most new commercial construction in California will be required to install some solar energy generation and battery storage, along with heat pump technology. The new 2022 building standards mandate heat pumps for water or space heating for single-family homes.²³⁸ In 2020, California required that rooftop solar panels be installed on new single-family homes and low-rise multi-family buildings to achieve “zero-net electricity” status. The standards do allow builders to participate in shared community solar projects.²³⁹

However, there are far more existing buildings than new ones built each year. In 2012–2013, the median age of a U.S. home and commercial building were 37 years and 32 years, respectively. Slow turnover means that by mid-century much of the existing U.S.

²³⁷ <https://www.c2es.org/document/decarbonizing-u-s-buildings/>

²³⁸ <https://www.bizjournals.com/sacramento/news/2022/07/17/new-building-codes-climate-change-mandates.html>

²³⁹ <https://www.nrdc.org/experts/pierre-delforge/ca-2020-building-code-draft-zero-net-electricity-new-homes>

building stock will be 70 years old.²⁴⁰ Advocates in New York City proposed legislation to require energy retrofits whenever buildings are sold or refinanced.

Governments are increasingly offering financial incentives to entice building owners to make needed energy retrofits, but there are significant limits to such approaches. Low-income individuals often live in the most poorly constructed homes and lack the resources to take advantage of subsidies, even when those investments pay for themselves in a short period of time.

Low-income households need the government to upfront the costs of such energy investments. But even when New York State took such an approach in 2010 with the Good Jobs Good New York program which requiring utilities to upfront the costs of any investments certified through an energy audit and then recovering the costs through energy savings on future utility bills, a new Governor, the utilities, banks, and energy regulators worked together to undercut the program.²⁴¹

Many building owners' inertia or other management needs take preference over energy upgrades. Figuring out how to mandate such energy upgrades is both politically and legally challenging.

Large buildings in New York City are a good example. Buildings above 50,000 square feet account for a significant percentage of the carbon footprint of all buildings. On Earth Day 2009, the city's billionaire Mayor Michael Bloomberg announced an effort to require owners of such buildings to complete energy audits to identify both their energy use and to show how they could save money through energy retrofits. Due to opposition from the owners however, he dropped the requirement that the energy upgrades be done every five years, banking instead that wealthy New Yorkers would voluntarily

²⁴⁰ <https://www.c2es.org/document/decarbonizing-u-s-buildings/>

²⁴¹ <https://citylimits.org/2016/01/26/why-a-green-jobs-program-produced-so-few-jobs/>; <https://medium.com/@emmaiagelman/lessons-from-ny-for-a-green-new-deal-c7e1028580c1>

decide to take action to save money.²⁴² Unfortunately, few did, as the value of the savings were relatively small and they argued it was not worth the disruption to their tenants.

A decade later the City Council passed a law to require energy upgrades to buildings larger than 25,000 square feet after a prolonged advocacy campaign by community, climate, and labor groups. The requirements would start in 2024 and be phased in fully by 2050²⁴³ – more than 40 years after Mayor Bloomberg started the effort. The building owners continue to lobby city and state lawmakers to weaken the requirement however, such as to allow more carbon offsets (e.g., the purchase of renewable energy credits).²⁴⁴

An additional challenge is that the builder, owner and occupier of buildings tend to change over time. The builder may not install the most energy efficient appliances or equipment in order to lower the initial selling price, whereas the buyer or renter will be responsible for paying the energy bill. This tends to favor lower upfront costs despite the net lifetime savings that could be achieved through greater energy efficiency.

Green Buildings

According to the EPA, Green building “encompasses” a structure’s planning, design, construction, operations and end-of-life recycling or renewal, while considering energy, water, indoor environmental quality, materials selection, and location.” Green buildings and communities reduce landfill waste, enable alternative transportation

²⁴² <https://news.climate.columbia.edu/2009/12/07/there-must-be-a-way-to-weatherize-new-york-city/>;

<https://www.nyc.gov/assets/sustainablebuildings/html/LL97-n-LL33-map.html>

²⁴³ <https://www.imt.org/new-york-city-passes-bold-bill-to-slash-buildings-climate-impact%E2%BB%BF/>

²⁴⁴ <https://www.nysfocus.com/2022/06/27/local-law-97-renewable-energy-credits-recs/>

use, and encourage retention and creation of vegetated land areas and roofs.²⁴⁵

In 1998, the U.S. Green Building Council (USGBC) piloted LEED, a rating system for environmentally sound buildings and as of 2018, there were 94,000 commercial buildings with LEED certification in 167 countries. (LEED has four levels of certification: Certified, Silver, Gold, and Platinum.) LEED standards have been written into building codes across the country. A 2008 study funded by USGBC claims that LEED-certified buildings use 25 to 30 percent less energy than non-LEED buildings,²⁴⁶ though others dispute the findings, especially at the lowest level (Certified).²⁴⁷ A 2014 University of California at Berkeley study found that by constructing buildings to LEED standards, they contributed 50% fewer greenhouse gases than conventionally constructed buildings due to water consumption, 48% fewer GHGs due to solid waste and 5% fewer GHGs due to transportation.²⁴⁸

The United Nations' *A Practical Guide to Climate-resilient Buildings and Communities*²⁴⁹ shows how buildings and community spaces can be constructed to increase resilience, especially in developing countries, where housing is often self-built. To deal with heat waves, structural designs can reduce heat inside buildings. For example, traditional housing designs in Vietnam, such as the optimum orientation of buildings, high-rise rooms, and large openings improve ventilation. Communities can create urban forests and green spaces with trees and other plants that help cool the surrounding environment by offering shade and releasing water through their leaves.

²⁴⁵ <https://greenbuildinginsider.com/67/environmental-benefits-green-building>;
<https://www.epa.gov/land-revitalization/green-buildings>

²⁴⁶ <https://www.bloomberg.com/news/articles/2018-06-05/reconsidering-leed-buildings-in-the-era-of-climate-change>

²⁴⁷ <https://www.iepec.org/wp-content/uploads/2018/02/086-5.pdf>

²⁴⁸ <https://www.usgbc.org/articles/how-green-buildings-can-help-fight-climate-change>

²⁴⁹ <https://www.unep.org/news-and-stories/story/5-ways-make-buildings-climate-change-resilient>

To deal with the cold, insulation in roofs, walls, ceilings, and double-glazed windows minimize heat loss. Trombe walls - heavyweight structures of concrete, stone, or other heavy material - can absorb heat by day and radiate it out by night when it is colder. Water has a high capacity to store heat and can be used in “water walls,” which use drums of water to store heat. Buildings should be oriented to maximize sun exposure, and external surfaces of walls should be painted dark. Green roofs that support plant growth on rooftops provide insulation and reduce the energy demand for cooling during summer and heating during winter. The Municipal Roadmap to Sustainability²⁵⁰ outlines steps local governments across the U.S. have taken to reduce their carbon footprint.

For instance, the orientation of a building directly affects the amount of solar energy that can be captured, either for photovoltaic electricity generation or for passive solar heating and cooling. South facing solar panels produce about 20% more electricity than east or west facing panels. Communities should consider setback requirements so as not to impede the ability of housing developments to maximize the use of solar power across all buildings.

Plug and process loads refer to electric equipment that is plugged into an outlet, for example plug-in appliances and electronics, computers, printers, etc. These loads are the fastest growing source of electricity usage in both residential and commercial buildings and consume approximately one-third of primary energy in commercial buildings. Plug and process loads are projected to increase from 30% to 35% of total commercial building energy consumption by 2025. Municipalities can create programs that encourage residents and businesses to replace old energy-inefficient electronics with Energy Star models and easy-to-use intelligent power strips and management systems. These completely shut off unused electronics to eliminate wasted energy from phantom loads.

²⁵⁰ <https://www.municipalsustainability.org/>

Banning Gas in New Buildings

In 2022, New York State looked to become the first state in the country to enact a statewide ban on natural gas connections in new buildings, following the lead of dozens of local governments that have passed similar policies in the past two years. A version of the ban was included in the Governor's proposed budget; there was also separate legislation with a shorter time frame. The proposal followed the enactment of such a ban the previous year by New York City. The proposed law would require newly permitted buildings shorter than seven stories to go all-electric by 2024, with taller buildings following in 2027. The ban applies to heating and clothes dryers; water heaters would eventually be included.

However, the proposal was removed from the budget and the subsequent All-Electric Buildings Act failed to gain approval of the legislature.²⁵¹ Opposition from the natural gas industry and their unions contributed to its defeat even though it was the one specific proposal promoted by the state's newly enacted Climate Action Council.

Twenty mostly Republican states have passed laws barring cities and counties from blocking gas hookups.²⁵²

Opponents argue that such bans undercut gas companies' efforts to produce more renewable natural gas with methane captured from landfills, farms, and other sources. They also point out that unless the electricity supply is produced from clean sources, gas bans will simply shift emissions rather than reduce them.

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https://assembly.state.ny.us/leg/?default_fld=&leg_video=&bn=A08431&term=&Summary=Y&Text=Y

²⁵² <https://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2022/01/06/natural-gas-bans-are-new-front-in-effort-to-curb-emissions>

Decarbonizing Existing Buildings

In November 2021, the city of Ithaca, NY became the first U.S. community to adopt a goal to decarbonize and electrify all buildings in the city by the end of the decade — a goal that was part of the city’s own Green New Deal. It’s part of an overall plan to make the city carbon neutral by 2030. Ithaca – which has a total annual budget of less than \$80 million – raised \$100 million from private investors attracted by the relatively risk-free investment with the potential for lots of cashflow. The lending program would provide low- or no-interest loans to residents. For most homeowners, the program would enable them swap out a gas furnace for an electric heat pump, or a gas stove for an electric one – changes that would otherwise require high upfront costs. The program will also train a new green workforce in Ithaca, with a goal of 1,000 new jobs by 2030.²⁵³

Ithaca’ has a ratio at 1 to 20 for taxpayer versus private investment funding. Ithaca wants to raise another \$250 million for further climate projects. Their next initiative is to enable residents to buy used electric vehicles at a low cost with private investors being responsible for owning the battery technology — the biggest part of an EV’s cost — and leasing the battery to drivers.²⁵⁴

The recent federal Inflation Reduction Act significantly lowers the cost to homeowners and building owners to electrify their buildings. The law will provide up to \$14,000 in rebates for electrical appliances. It can provide up to 50% of the costs of a full-home energy retrofit, or up to 80% of the costs for low- and moderate-income families. It provides a tax credit for new rooftop solar or battery storage of 30% and provides up to \$400,000 for owners of apartment buildings to upgrade their systems to help tenants.”²⁵⁵

²⁵³ <https://www.theguardian.com/environment/2021/aug/19/ithaca-new-york-raised-100m-climate-proof-buildings>

²⁵⁴ <https://www.cnbc.com/2021/11/04/ithaca-is-first-us-city-to-begin-100percent-decarbonization-of-buildings.html>

²⁵⁵ <https://thehill.com/opinion/energy-environment/3650035-the-federal-building-electrification-cavalry-is-here-its-time-for-american-cities-and-states-to-act/>

Other Ways for Cities and Towns to Decarbonize

Cities and regions should adopt stricter energy efficiency standards for public buildings; and utilize public building projects to promote broader energy efficiency investments. They can launch pilot projects and leverage green finance to boost energy efficiency investment in buildings and promote innovative business models that can make energy efficiency measures more convenient and impactful. Communities can raise awareness about the benefits of decarbonization among citizens and local businesses, including one-stop-shop advisory services, and promoting clear messages on the benefits of decarbonizing buildings. They can incentivize energy efficiency measures in low-income households, and support capacity building and skills development in the local workforce.²⁵⁶

Reducing Home Energy Use on the Micro Level

Heating is the largest energy expense in most homes, accounting for 35 to 50% of annual energy bills in colder parts of the country. Homeowners can save 10% on energy costs by insulating, sealing, and weatherstripping the cracks around windows and doors.²⁵⁷

One step individuals can take to reduce their carbon footprint is to use all-electric appliances rather than those that use fossil fuels, such as gas-powered stoves and ovens, natural gas heaters and water heaters, and gas-powered clothes dryers.

The typical household can reduce its energy use and greenhouse gas emissions by 25 to 30% by implementing simple energy efficiency techniques such as switching to light-emitting diode bulbs, installing programmable thermostats and weatherizing windows and doors.²⁵⁸

²⁵⁶ <https://www.oecd-ilibrary.org/sites/c4c248e2-en/index.html?itemId=/content/component/c4c248e2-en>

²⁵⁷ <https://www.c2es.org/content/home-energy-use/>

²⁵⁸ <https://www.energysage.com/energy-efficiency/why-conserve-energy/>

The federal Office of Energy Efficiency and Renewable Energy suggests some additional home energy improvements;²⁵⁹

A. Add insulation to the attic, crawl space or basement, and exterior walls in conjunction with air sealing;

B. Install more energy-efficient windows, doors, and skylights. About 20% of air infiltrates through openings in your windows, doors, and skylights. Storm windows alone can reduce heat loss through windows by 25 to 50%;

C. Install programmable thermostats that save energy by automatically regulating the building's temperature. As much as 10% a year can be saved on heating and cooling bills by simply turning thermostats back 10 to 15% for 8 hours;

D. Seal ducts. Many duct systems are not insulated properly, losing up to 60% of the heated air;

E. Tune-up or upgrade heating and cooling systems. Typically, 43% of a home utility bill goes to heating and cooling. Combining proper equipment maintenance and upgrades with insulation, air sealing, and thermostat settings can cut energy use for heating and cooling from 20 to 50%.

F. Install an energy-efficient hot water heater, such as an energy-efficient tank water heater or an on-demand tankless water heater. Water heating is the third largest energy expense, usually about 12% of a utility bill. Also consider using less hot water, turning down the thermostat and insulating water heaters.

G. Install thermostatic control valves in showers, which shut off the shower once the water turns warm.

H. Upgrade household appliances and electronics to ENERGY STAR or ENERGY STAR Most Efficient qualified products. Appliances account for about 15% of a household's energy consumption, with refrigerators, clothes washers, and clothes dryers the biggest users.

²⁵⁹ <https://www.energy.gov/eere/why-energy-efficiency-upgrades>

I. Install energy efficient lighting. An average household dedicates 11% of its energy budget to lighting. Using new lighting technologies can reduce lighting energy use in your home by 50 to 75%.

Transportation

Transportation in the U.S. accounts for about a third of emissions. Aircraft are the third-largest source of greenhouse emissions in the U.S. transportation sector and account for 9% of U.S. transportation. Diesel-engine trains contribute two percent of U.S. transport emissions. Ships release 3% of the world's CO₂ and are a main source of nitrous oxide and black carbon (soot).²⁶⁰

Globally, 95% of the world's use of energy for transportation comes from burning fossil fuels, with transportation responsible for a quarter of all energy-related emissions—and without major changes, transportation's carbon footprint is expected to increase. Extreme weather events are highly disruptive to transportation and transportation infrastructure and will require major investments to become more climate resilient. However, over a billion people still lack access to an all-weather road, and only half of the world's urban population have convenient access to public transportation. Transport is especially costly for many of the world's least developed countries, particularly those that are landlocked, and for small island developing countries.²⁶¹

Expanding, electrifying, and improving public transportation must be a top priority to reduce emissions, while also increasing access — especially for disadvantaged communities — and improving public safety.

Transportation emissions continue to rise, while tending to rise and fall with the level of economic activity. The U.S. needs to

²⁶⁰

https://www.biologicaldiversity.org/programs/climate_law_institute/transportation_and_global_warming/

²⁶¹ <https://www.un.org/en/desa/transport-transformation-critical-address-climate-change-and-universal-access-safe-affordable>

construct an electrified rail and road transportation system nationwide that includes recharging stations for electric vehicles, convenient and affordable intra-urban mass transit, inter-urban rail for intermediate distances, and high-speed rail for long distances.

Rather than improving mass transit or developing alternatives to cars and trucks for transport, most U.S. initiatives are for individually owned electric cars and other vehicles. The Inflation Reduction Act (IRA) devotes the vast majority of its \$50 billion in transportation spending to make cars greener, providing only a few billion in funding for mass transit, biking, walking and trains. There is only \$1 billion in grants for clean heavy-duty vehicles like buses and \$3 billion in grants to invest in projects that address neighborhood equity, safety and affordable transportation. Transit and bikes did better in the prior bipartisan infrastructure bill, which included \$89.9 billion in transit funding over five years along with the largest investment in Amtrak since its creation in 1971.²⁶²

Prof. Mark Z. Jacobson in *No Miracles Needed* points out that hydrogen fuel cells that produce electricity makes sense for “larger vehicles such as long-distance, heavy commercial trucks, trains, ships, and airplanes.... The heavier a vehicle and the further it must travel, the more likely a hydrogen fuel-cell vehicle is to overtake a battery-electric vehicle in terms of efficiency.”²⁶³

Ongoing massive subsidies to the auto and fossil fuel industries maintain the dominance of automobile culture. Upgrading streets to accommodate increased traffic generates new traffic, and people take jobs further from their homes or purchase homes further from their jobs. Some people do shift from public transit to private cars due to the trip time in cars being shorter. As the use of public transit decreases, public transit loses funding, becomes less viable, and service deteriorates, encouraging even more people to use their cars.

²⁶² <https://www.politico.com/news/2022/07/28/transit-democrats-car-climate-deal-00048599>

²⁶³ *No. Miracles Needed*, Mark Jacobson, pp. 69-72

Focusing on electric vehicles as the primary solution tend to make racial and income disparities worse.

Studies show that addressing emissions from transportation solely with electric vehicles would require more than 350 million on-road EVs, half of national electricity demand and excessive amounts of critical materials to be deployed in 2050. Improving average fuel consumption of conventional vehicles, with stringent standards and weight control, would reduce the requirement for alternative technologies, but is unlikely to fully eliminate emissions.²⁶⁴

The U.S. should target census tracts with a high level of diesel-pollution with policies to electrify facilities with large volumes of truck traffic. States can adopt Indirect Source Rules, as permitted under the federal Clean Air Act, to boost electrification and improve air quality near ports, warehouses, railyards, and other facilities. Indirect Source Rules provide the cleanest policy mechanism to drive down emissions in these types of facilities.²⁶⁵

Sprawl Increases Transportation Emissions

We Conserve PA notes that “urban sprawl is typically described as having some or all of these characteristics: It is low density, automobile dependent, has a leapfrog design, has a seemingly endless outward expansion and consumes significant amounts of natural and man-made resources. Sprawl development is the dominant form of development in America.”

“Sprawl has multiple economic costs, including increased travel costs; decreased economic vitality of urban centers; loss of productive farm and timberland; loss of natural lands that support tourism and wildlife related industries; increased tax burdens due to more expensive road, utility and school construction and maintenance costs; loss of the rural characteristics that make many communities attractive

²⁶⁴ <https://www.nature.com/articles/s41558-020-00921-7>

²⁶⁵ <http://gelfny.org/faq/testimony-and-comments-in-proceedings/gelf-testimony-nys-climate-action-plan/>

to homebuyers; and increased car use leading to higher air pollution and increased health care costs for diseases like asthma.”²⁶⁶

Sprawl — people living further and further from where they work —increases our miles of travel and leads to less dense populations, even less mass transit alternatives, and additional vehicle traffic.

While the desire for better schools and a perceived “better places” to raise children is a factor, racial issues tied to white flight from urban areas have also had a major impact. Single-family zoning was passed in some cities to ensure racial segregation and many suburban communities still enforce single family residences, although there is increasing pressure to allow homeowners to add apartments to address climate impact and the growing affordable housing crisis.²⁶⁷

Sprawl is a problem that many governments in recent decades have said needs to be curtailed. There have been countless committees and published studies so clear proposals exist, ²⁶⁸ but progress has been minimal.

Sprawl is also driven by preferences for low-density residential areas. Other factors include the benefits of newer homes, nearby shopping, better schools, and what is perceived as greater security. Pro-sprawl policies include favoring road infrastructure and discouraging vertical construction.

“Cities, counties, and communities can focus on changing land-use planning strategies and guide growth and development toward compact, vertical, walkable neighborhoods and districts. Communities can rethink annexation policies to control how growth is defined, spurring enclaves or cluster developments that preserve and encourage open spaces and agricultural lands that help eliminate food deserts,” said Keith Walzakis of Cushing Terrell.²⁶⁹

²⁶⁶ <https://conservationtools.org/guides/96-economic-benefits-of-smart-growth-and-costs-of-sprawl/>

²⁶⁷ <https://grist.org/cities/how-suburban-sprawl-causes-segregation-and-isolates-the-poor/>

²⁶⁸ <https://environmental-conscience.com/causes-effects-solutions-for-urban-sprawl/>

²⁶⁹ <https://gbdmagazine.com/slowing-urban-sprawl/>

Other anti-sprawl policies include creating dense neighborhoods with mixed uses, creating a more integrated web of public transit, shared bike and scooter programs, and redesigning neighborhoods to encourage walking.

While most of this discussion has focused on the U.S., sprawl is a worldwide problem, including in developing countries.

City and suburban streets around the world have become less connected over the past four decades, encouraging modes of transportation that are less climate friendly. Woodlands, farms and deserts are being paved over with roads, a change that is difficult to reverse and which has profound consequences for global warming.²⁷⁰

A United Nations report on sprawl says “How cities develop in the years to come will determine progress on addressing key environmental, economic and social challenges, including climate change and access to affordable housing.”²⁷¹

Globally, urban sprawl, agriculture practices, deforestation, and climate change are all linked, and could trigger a worldwide food crisis if not checked. Even though cities take up a relatively small amount of land, they can accelerate deforestation or replace land that could be used for agriculture. That limits the ability of natural landscape to capture carbon dioxide. Urban sprawl also requires more transportation, increasing emissions.²⁷²

The number of landslides worldwide is increasing due to sprawl and climate change. The first half of 2022 was one of the deadliest on record globally for landslides and the number of fatalities from landslides is close to 4,500 annually. Over the past 50 years, disasters caused by landslides have become ten times more frequent. More than 80% of fatal landslides occur in the tropics, mainly triggered by heavy rain. The rapid pace of urbanization, especially in low- and lower-

²⁷⁰ <https://www.scientificamerican.com/article/reducing-street-sprawl-could-help-combat-climate-change/>

²⁷¹ <https://www.oecd.org/environment/tools-evaluation/Policy-Highlights-Rethinking-Urban-Sprawl.pdf>

²⁷² <https://www.smartcitiesdive.com/news/100-experts-issue-dire-warning-about-urban-spraws-impact-on-climate-chang/560767/>

middle-income nations in tropical regions, is putting more people in the path of danger. Many people arriving in cities end up living in poor or informal settlements on hills and in floodplains. Informal housing practices along with unregulated deforestation, slope cutting and household water drainage, can increase the chance of landslides.²⁷³

A 2018 report concluded that compact growth, as opposed to urban sprawl, could generate \$17 trillion in economic savings globally by 2050. As part of bold climate action overall — including low-carbon growth in cities — compact growth could generate at least \$26 trillion in economic benefits by 2030. Unfortunately, once housing and infrastructure have been built, it's extremely difficult and expensive to change a city's design. For example, it's cheaper to extend highways than build rail transportation.²⁷⁴

Mass Transit

Moving people from cars into mass transit is an obvious way to reduce emissions from transportation. The U.S. needs to fund expanded mass transit, including light rail and buses. This includes express bus systems (aka bus rapid transit), especially in areas with insufficient density to support local trains or light rail. Improving interstate and intrastate rail systems would also help decarbonize long-distance travel, including reducing the use of aircraft.

The Report Card for America's Infrastructure by the American Society of Civil Engineers found that "45% of Americans have no access to transit. Much of the existing system is aging, and transit systems often lack sufficient funds to keep their existing systems in good working order. Over a 10-year period across the country, 19% of transit vehicles, and 6% of fixed guideway elements like tracks and tunnels were rated in 'poor' condition. Currently, there is a \$176 billion transit backlog, a deficit expected to grow to more than \$270

²⁷³ <https://www.nature.com/articles/d41586-022-02141-9>

²⁷⁴ <https://www.wri.org/insights/cities-can-save-17-trillion-preventing-urban-sprawl>

billion through 2029. Meanwhile, transit ridership is declining, a trend compounded by the COVID-19 pandemic.”²⁷⁵

The rise of cars in the U.S. made them the cornerstone of the American transportation system, contributing to the disinvestment in mass transit such as rail and buses. Mass transit in the U.S. lags behind not only other industrial countries, but even many third world countries. Many parts of the country lack access to reliable bus systems, especially for daily commutes.

In the 1920s, most American city-dwellers took public transportation to work every day, with 17,000 miles of streetcar lines across the country, running through virtually every major American city and many of their suburbs. Today, just 5% or so of workers commute via public transit, mostly clustered in a few dense cities like New York, Boston, and Chicago. Only a few cities still have extensive streetcar systems – partially as a result of the decision to allow cars to use streetcar tracks, which created gridlock and contributed to their demise.²⁷⁶

Light rail transit (LRT) is a form of urban passenger rail transit. While its vehicles are similar to a traditional tram, it operates at a higher capacity and speed, and often on an exclusive right-of-way. In many cities, light rail systems more closely resemble subways and heavy-rail metros. Bus rapid transit (BRT) is an alternative to LRT and many planning studies undertake a comparison of each mode when considering appropriate investments in transit corridor development. BRT has more flexibility as to where they can travel but also need rights of ways to be most efficient.²⁷⁷

High-speed rail lines, which travel at speeds of at least 200 miles per hour, exist in over 20 countries. The U.S. unfortunately is not one of them. Our fastest train, Amtrak’s *Acela* in the Northeast corridor, can reach 150 mph but only averages 66. Starting in 2006, China has built more than 23,500 miles of high-speed rail. Most Chinese cities

²⁷⁵ <https://infrastructurereportcard.org/cat-item/transit-infrastructure/>

²⁷⁶ <https://www.vox.com/2015/5/7/8562007/streetcar-history-demise>

²⁷⁷ https://en.wikipedia.org/wiki/Light_rail

with as little as 500,000 people have a high-speed rail link. In 2018 alone, China spent \$117 billion on railway projects. High-speed shorten travel times, increase productivity and labor mobility, and reduce operating costs, accidents, highway congestion and greenhouse gas emissions as some air and auto travelers switch to rail.²⁷⁸

Other steps governments can take to expand mass transit include:

Free or Reduced Fares;

Encourage employer subsidies of transit commuter tickets for employees (perhaps with government grants). Make transit passes tax-deductible to encourage workers and businesses to use public transport and make employee parking a taxable benefit.

Use existing auto infrastructure for transit expansion where possible. Light rail could be established in expressway medians in metropolitan high-density corridors;

Integrate transportation into land use decisions, with consideration for the need for mass transit, and attention to the commuting needs of residents and workers; and,

Nationalize ownership of railroad tracks, as we have done with highways, to improve use, safety and speed.

Electric Vehicles

The number of electric cars on the road in the U.S. has increased much slower than other countries such China and those in Europe (e.g., Norway, Iceland, Sweden).²⁷⁹ There was a record number of electric vehicles sold in the U.S. in 2021 (about 607,600 light electric vehicles), 83% more than in 2018. Six million seven hundred thousand were sold worldwide. One challenge is that most consumers

²⁷⁸ <https://www.greenbiz.com/article/why-us-needs-get-track-high-speed-rail>

²⁷⁹ <https://www.pewresearch.org/fact-tank/2021/06/07/todays-electric-vehicle-market-slow-growth-in-u-s-faster-in-china-europe/>

still view electric cars as more expensive than those using fossil fuels.²⁸⁰

In a recent Pew Research Center survey, 7% of U.S. adults said they currently have an electric or hybrid vehicle, and 39% said they were very or somewhat likely to seriously consider buying an electric vehicle. As of 2020, nearly 1.8 million EVs were registered in the U.S., more than three times as many as in 2016. But the U.S. represents only 17% of the world's 10.2 million EV owners. China has 44% (4.5 million), and Europe has 3.2 million for 31%. California has by far the highest share of EVs of any U.S. state. California is also a U.S. leader in building out charging stations, with about a third of the 42,000 publicly accessible charging stations in the U.S.²⁸¹

After California decided in 2022 to require all new cars be zero emissions by 2035, many of the 17 states with vehicle emission standards tied to California's rules may follow suit.²⁸²

More than 40 countries have pledged to phase out internal combustion engine vehicles before 2050. Globally, electric vehicle sales grew 80% in 2021, though this was only 7.2% of global car sales in 2021.²⁸³

The International Energy Agency (IEA) in September 2022 recommended all new internal combustion engine vehicles be banned by 2035. IEA said electric vehicles need to increase globally from the current one per cent to between 20 and 25 per cent by 2030, with 60 per cent of new cars sold needing to be net-zero.²⁸⁴

²⁸⁰ <https://www.statista.com/topics/4421/the-us-electric-vehicle-industry/#dossierKeyfigures>

²⁸¹ <https://www.pewresearch.org/fact-tank/2021/06/07/todays-electric-vehicle-market-slow-growth-in-u-s-faster-in-china-europe/>

²⁸² <https://www.cbsnews.com/sanfrancisco/news/17-states-weigh-adopting-californias-electric-car-mandate-climate-change/>

²⁸³ <https://www.weforum.org/agenda/2022/01/the-ev-revolution-obstacles-solutions/>

²⁸⁴ <https://www.msn.com/en-us/autos/news/iea-calls-for-global-ban-on-petrol-and-diesel-cars-by-2035/ar-AA1211VE?ocid=msedgntp&cvid=7384de4ee97041f0831b99357428dcc2>

Electric vehicles in the U.S. are not a new phenomenon. They had a sizeable market share (1/3) in 1900 during the industry's infancy, with the rest being steam and gasoline. Gas won out, driven by the public's desire for longer-range vehicles; electric starters replacing hand-cranked; lower gasoline prices; and assembly line mass production. By 1935, electric vehicles largely disappeared in the U.S.²⁸⁵

However, while no greenhouse gas emissions come directly from EVs, they run on electricity that is presently still largely produced from fossil fuels in many parts of the world. Energy is also used to manufacture the vehicle – and, in particular, the battery.

Carbon Brief notes that across Europe, EVs contribute considerably lower emissions over their lifetime than conventional internal combustion engine vehicles. But in countries with coal-intensive electricity generation, the benefits of EVs are smaller, with lifetime emissions similar to the most efficient conventional vehicles – such as hybrid-electric models. This will improve as we move towards 100% renewable electricity. There are also large uncertainties around the emissions associated with electric vehicle battery production, with different studies producing widely differing results. As battery prices fall and vehicle manufacturers start including larger batteries with longer driving ranges, battery production emissions are expected to have a larger impact on the climate benefits of electric vehicles.²⁸⁶

Around half of the emissions from battery production come from the electricity used in manufacturing and assembling the batteries. Producing batteries in regions with relatively low-carbon electricity or in factories powered by renewable energy, as will be the case for the batteries used in the Tesla Model 3, can substantially reduce battery emissions.

²⁸⁵ <https://www.pewresearch.org/fact-tank/2021/06/07/todays-electric-vehicle-market-slow-growth-in-u-s-faster-in-china-europe/>

²⁸⁶ <https://www.carbonbrief.org/factcheck-how-electric-vehicles-help-to-tackle-climate-change/>

One possible positive trend is that younger people have been less interested in buying cars. Many are attracted to an urban lifestyle where walking, mass transit and bicycling are the preferred transportation, as well as the growing concept of ride sharing. High student debt also discourages the large capital investment required to buy an automobile.²⁸⁷

EV Challenges

Challenges facing the expanded use of electric cars include the length of trips on a single charge, the initial price, customer acceptance, charging infrastructure, chip shortages, battery shortages (and cost), and their reliance on rare earth materials (discussed in the renewable energy chapter). The average price for a new EV in the U.S. in February 2022 was \$60,054 compared to \$45,596 for traditional vehicle.²⁸⁸

There are presently far fewer charging stations compared to gas stations and they can be hard to find (although apps can drivers locate them). The cost of installation – from \$2,500 for a slower charger to \$35,800 for a fast charger – plus miscellaneous fees such as permits and regulations, make charging stations an expensive investment. It can be a challenge to provide charging stations where they people usually park, especially in urban areas with primarily on-street parking.²⁸⁹ People can charge their cars at home using a regular outlet, but it is much slower (though not a problem if one does it overnight).

Many drivers remain worried about how far they can travel in electric vehicles before their batteries run out. Most presently go about 100 miles on a single charge (although some can more than double

²⁸⁷ <https://www.forbes.com/sites/lanceeliot/2019/08/04/the-reasons-why-millennials-arent-as-car-crazed-as-baby-boomers-and-how-self-driving-cars-fit-in/?sh=751e54f663fc>

²⁸⁸ <https://cccis.com/news-and-insights/insights/challenges-facing-electric-vehicles-in-america/>

²⁸⁹ <https://www.weforum.org/agenda/2022/01/the-ev-revolution-obstacles-solutions/>

that distance and the average continues to increase). Unless you have access to a specialized charging station (which are expensive and in short supply), getting a full charge takes around eight hours.²⁹⁰ States and the federal government, including the Inflation Reduction Act of 2022, are investing in charging station infrastructure, though expansion remains slower than desired.

It costs less to use an electric vehicle compared to a car that runs on gas. On an annual basis, it costs between \$300 to \$400 to charge an electric vehicle, compared to \$4,000 to \$2000 for gas for a traditional internal combustion engine vehicle. Electric cars have fewer moving parts, meaning less repairs.²⁹¹ *Consumer Reports* found drivers pay half as much to repair and maintain their vehicles, saving an average of \$4,600 over the life of the vehicle compared with a gasoline-powered car.²⁹²

The Inflation Reduction Act (IRA) expanded the federal tax credit for electric vehicles (up to \$7,500) while adding one for used EVs (\$4,000) – but the devil is in the details. For example, household income must be less than \$300,000; and car cost less than \$55,000. Many states also offer some form of credit for EVs. The IRA did remove the cap on the number of cars from each manufacturer that qualifies for the credit, while providing a way to take advantage of the full credit regardless of the amount of taxes you owe. The IRA also requires a percentage of the battery’s minerals and manufactured parts to be produced domestically.²⁹³

Car free Cities and Congestion Pricing

There is a growing movement, particularly in Europe, to promote car free cities. While it will reduce emissions, it also seeks to end the

²⁹⁰ <https://auto.howstuffworks.com/challenges-facing-the-electric-car-industry.htm>

²⁹¹ <https://www.mach1services.com/costs-of-using-car-charging-stations/>

²⁹² <https://www.consumerreports.org/car-repair-maintenance/pay-less-for-vehicle-maintenance-with-an-ev/>

²⁹³ <https://www.resources.org/common-resources/inflation-reduction-act-electric-vehicle-subsidies-for-passenger-vehicles/>

gridlock that many urban areas experience. The effort gained popular support when many communities made some streets car free during the COVID-19 pandemic.

Paris has announced a ban on most cars driving through the city that will take effect in 2024, especially in major tourist areas. A main objective is to eliminate transit traffic, vehicles that pass through the area without stopping. The goal is to reduce traffic in the heart of Paris by at least half.²⁹⁴

According to Wikipedia, “A car free city is a population center that relies primarily on public transport, walking, or cycling for transport within the urban area. Districts where motorized vehicles are prohibited are referred to as car free zones. Car free city models have gained traction due to current issues with congestion and infrastructure and proposed environmental and quality of life benefits. Currently in Asia, Europe and Africa, many cities continued to have car free areas due to inception before the origin of the automobile. Many developing cities in Asia are currently using the proposed model to modernize its infrastructure.”²⁹⁵

Congestion pricing seeks to reduce the number of vehicles – and emissions - in high density areas of cities by charging a price or toll to enter the area, particularly at high volume periods. It seeks to shift some rush hour travel to other transportation modes or to off-peak periods. Singapore was the first county to introduce congestion pricing in urban areas in 1975. Some cities that have since adopted it include London, Stockholm, Milan, and Gothenburg, Sweden.²⁹⁶ New York State approved it for New York City several years ago, but it is still in the federal approval process.²⁹⁷

²⁹⁴ <https://thepointsguy.co.uk/news/paris-to-implement-a-ban-on-most-cars-in-the-city-by-2024/>

²⁹⁵ https://en.wikipedia.org/wiki/Carfree_city

²⁹⁶ https://en.wikipedia.org/wiki/Congestion_pricing

²⁹⁷ <https://www.nytimes.com/2022/08/18/nyregion/nyc-congestion-pricing-manchattan.html>

Reduce the Use of Cars and other Vehicles

Below are suggestions that climate groups submitted to the New York State Climate Action Council on ways to reduce vehicle use.

Place a moratorium on highway widening, appropriating funds instead for mass transit and facilities for pedestrians and bicyclists.

Mandate HOV (High Occupancy Vehicle) lanes on freeways, and lower tolls for carpools.

Discourage unnecessary auto use by eliminating free parking in non-residential areas well served by mass transit and establish preferential parking rates for HOV.

Increase Corporate Average Fuel Economy (CAFE) standards to levels which truly challenge automakers to improve the state of the art, using the fuel economy performance of vehicles worldwide for reference. Eliminate the distinction between cars and light trucks (e.g., the E85 loophole and the 8,500-pound exemption).

Enact a fuel-economy-based sales tax that creates a significant incentive for people to select more efficient vehicles, and for automakers to make them available in the U.S.

Lead by example, using government procurement to put more high-efficiency and alternative-fuel vehicles into service.

Electrify truck stops, freight terminals and loading docks. Enact and enforce anti-idling regulations. Idling engines consume nearly a billion gallons of gasoline and diesel fuel and emit ten million tons of carbon dioxide annually (2007 data).

Encourage carpooling programs, telecommuting, and other creative solutions to reduce commuter traffic congestion.

Climate groups also pointed out that transportation planning should follow a prioritization of modes of transport to produce a sustainable transport system, namely:

- Walking and disabled access.
- Cycling.
- Public transport (trains, light rail/trams, buses, and ferries) and rail and water-born freight.

- Light goods vehicles, taxis and low powered motorcycles.
- Private motorized transport (cars & high-powered motorcycles).
- Heavy goods vehicles.
- Aircraft.

To reduce the need to travel, transport planning should support mixed-use developments, for example shopping with housing and small businesses. The development and retention of local facilities must be supported through planning and financial measures.

Making Walkable Neighborhoods

Governments need to promote pedestrians and bicycling by making streets, neighborhoods, and commercial districts more pedestrian and bike friendly.

The Intergovernmental Panel on Climate Change (IPCC) advocates for an approach to passenger transport planning called “Avoid, Shift, Improve.” Avoid means reducing the need for transport in the first place. This includes planning new urban areas and redeveloping old ones to be as well-organized as possible, so people will not have to travel far for their working, shopping, schooling, and recreational needs. “Shift” means switching necessary travel to more sustainable and higher-occupancy modes of transport. The “improve” part involves switching bus, rail, and car transport from fossil fuels to electric.²⁹⁸

In addition to creating walkable neighborhoods, communities should:

1. Create and enforce pedestrian-first policies.
- 2; Target vehicular speeds to support safe and comfortable pedestrian travel.
- 3: Make communities walkable by improving the first mile/last mile connection. Improving walkability citywide is

²⁹⁸ <https://theconversation.com/electric-cars-arent-enough-to-hit-climate-targets-we-need-to-develop-better-public-transport-too-171330>

largely determined by how well walkable spaces interact with other forms of active or sustainable transportation.

Investing in walkable cities, whether through allocating funds to pedestrian walkways or building affordable housing close to downtowns, also attracts diverse populations and creates jobs. Walking costs the city very little, unlike cars and even public transit. According to the Chicago Metropolitan Agency for Planning, 63% of millennials and 42% of baby boomers would like to live in a place where they don't need a car. According to the National Association of Realtors, 62% of millennials prefer to live in a walkable community where a car is optional. If cities seem less automobile-dependent, chances are they are more appealing to a range of ages. People also tend to spend more money in walkable cities, stimulating the local economy.²⁹⁹

The IPCC in August 2021 identified cycling as a key climate solution. Bicycle use produces zero emissions. “Life-cycle CO₂ emissions drop by 14% per additional cycling trip and by 62% for each avoided car trip” the IPCC concluded. “Switching from a car to a bicycle saves 150g of CO₂ per kilometer, e-cargo bikes cut carbon emissions by 90% compared with diesel vans and swapping the car in cities for walking and cycling even just one day a week can reduce your carbon footprint by about half a ton of CO₂ over a year.”³⁰⁰

In the U.S., biking is more popular in the west — especially in dense urban areas, gentrified neighborhoods, and university/college locales — than in the east, except for places such as Chicago, Minneapolis, and New York City. One way to promote bicycling is bike sharing programs. Cycling is more popular in Europe. In Denmark, 16% of all trips — and 25% of trips less than 3 miles—are made by bike. Communities that support bicycling have spaces dedicated to parking bikes rather than cars, bike lanes have a clear

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<https://www.cmap.illinois.gov/documents/10180/966686/How+to+make+cities+more+walkable+-+Vox.pdf>

³⁰⁰ <https://ecf.com/news-and-events/news/world-needs-much-more-cycling-combat-climate-change>

presence and are well maintained, and “bicycle superhighways” connect nearby suburbs to city centers.³⁰¹

China has been described as a bike kingdom but as their level of economic development increases, cars have begun to squeeze out bikes.³⁰²

³⁰¹ <https://www.reliance-foundry.com/blog/biking-usa-europe>

³⁰² <https://www.cheng-tsui.com/blog/america-or-china-which-country-is-the-true-bike-kingdom>

CHAPTER 4

CARBON PRICING

I first began testifying in the New York State Legislature about the need for a carbon tax several decades ago. As head of the Hunger Action Network, we were always advocating for progressive tax reforms and increased revenues since anti-poverty programs were always at the end of the line to receive government funding. We needed to expand the tax base as much as possible so that anti-hunger and welfare programs had some chance of getting additional funding. However, I was challenged over my advocacy for a carbon tax by State Senator Owen Johnson, chair of the Senate Finance Committee, who said he could not understand why I opposed carbon emissions since after all trees liked to breathe CO₂.

As a board member of the Environmental Planning Lobby, I had opposed the push in 2005 to get New York's Republican Governor, George Pataki, to enact a regional cap-and-trade program for electricity producers with half a dozen other states. I argued that it was much weaker than a carbon tax, which economists had long argued was the most effective way to reduce greenhouse gas emissions. Many proponents admitted that a Regional Greenhouse Gas Initiative was unlikely to produce significant reductions in emissions in New York or the other participating states in the Northeast, but they hoped it would have more impact if it became a national model for states like Ohio to adopt (it did not). They also noted that cap-and-trade had been successful with acid rain, and it is invariably easier to get politicians to build on an existing successful program.

Fortunately, groups working on tax policy like Hunger Action Network and the labor-backed Fiscal Policy institute, along with New York's then Attorney General Eliot Spitzer, were able to override the

environmental groups and at least got the carbon permits to be auctioned off with the revenues going to the state to fund clean energy projects. Many of the environmental groups felt that if the polluters were to get most of their permits for free, they were likely to sue to challenge the program.

Support among climate groups for carbon pricing has waned in recent years. Environmental justice groups oppose climate pricing, especially cap-and-trade, since it often allows pollution to continue in low-income communities and communities of color in exchange for dubious carbon offsets elsewhere. Some groups argue that carbon pricing is just permission to continue polluting, with the costs passed on to the consumer; a better solution would be mandatory emissions cuts. While I agree with the mandatory cuts, the International Monetary Fund, which is not known for progressive policy positions, notes that the world's government in effect gives more than \$5 trillion annually as a subsidy to fossil fuel companies by not charging them for the damages caused by burning fossil fuels.

Carbon Pricing

The idea behind carbon pricing is to make polluters pay for the damages they cause. It puts a price on greenhouse gas emissions (e.g., carbon, methane) that reflects the cost to society from the negative public health, environmental, and global warming impacts from the burning of fossil fuels.

Putting a price on the use of fossil fuels will also make cleaner renewable energy sources more financially attractive and it will create financial incentives for polluters to reduce emissions.

Economists agree that a carbon tax is the most effective way to reduce carbon dioxide emissions.³⁰³ However, some climate activists, including environmental justice groups, believe that mandated emission cuts are more effective and fairer.

³⁰³ <https://www.scientificamerican.com/article/how-to-set-a-price-on-carbon-pollution>

The social cost of carbon is an estimate of the economic costs, or damages, of emitting one additional ton of carbon dioxide into the atmosphere, and thus the benefits of reducing emissions. The main components of the calculation are what happens to the climate and how these changes affect economic outcomes, including changes in agricultural productivity, damages caused by sea level rise, and the decline in human health and labor productivity.

A study published in September 2022 in *Nature* estimated the social cost of carbon to be \$185 per ton of CO₂ — 3.6 times higher than the U.S. government’s value of \$51 per ton.³⁰⁴ (The Trump administration had lowered it to \$1 to \$7 per ton, which it used to justify its roll back of Obama-era EPA regulations on power plant emissions and vehicle fuel efficiency.)³⁰⁵

The NYS Department of Environmental Conservation recently set \$125 as the social cost of carbon, while methane was set at \$2,782 per ton and nitrous oxide at \$44,727 per ton.³⁰⁶

A study by professors at the University of Chicago estimated that the very long-term social cost of carbon, the cost borne by future generations living in a changed world, will be \$100,000 per ton.³⁰⁷

Estimates on the social cost of carbon vary for a number of reasons, starting with what costs are excluded in the calculations. Some of the omitted damages are the effects of climate change on fisheries; the effects of increased pest, disease, and fire pressures on agriculture and forests; and the effects of rising sea levels and resource scarcity due to migration. Models generally omit the effects of climate change on economic growth. What is the value of the estimated 8 million or so people who die annually from air pollution?³⁰⁸

³⁰⁴ <https://www.nature.com/articles/s41586-022-05224-9>

³⁰⁵ <https://theconversation.com/what-is-the-social-cost-of-carbon-2-energy-experts-explain-176255>

³⁰⁶ <https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/coal/123120-new-york-regulators-set-central-cost-of-carbon-dioxide-emissions-at-125mtt>

³⁰⁷ <https://news.uchicago.edu/story/climate-change-will-ultimately-cost-humanity-100000-ton-carbon-scientists-estimate>

³⁰⁸ https://costofcarbon.org/files/Cost_of_Carbon_Fact_Sheet.pdf

The International Monetary Fund (IMF) is a strong proponent of a carbon tax. It estimates that the world governments provide an annual \$5.9 trillion subsidy to fossil fuel companies, primarily by failing to make them financially responsible for all the damages caused by their pollution. The IMF estimates that raising fuel prices to their “fully efficient levels” would reduce projected global fossil fuel CO₂ emissions 36% below baseline levels in 2025, in line with the 25 to 50% reduction in emissions needed by 2030 to be on track with containing global warming to the Paris goal of 1.5-2 degrees celsius. (The IMF notes, however, that most levels of the carbon tax have been far below what they should be to reflect actual costs.)³⁰⁹

According to the World Bank, in 2020 there were 61 carbon pricing initiatives in place or scheduled for implementation, consisting of 31 cap-and-trade systems and 30 carbon taxes. These programs covered about 22% of global greenhouse gas emissions, up slightly from the prior year. Governments raised more than \$45 billion from carbon pricing in 2019.³¹⁰

However, the global average carbon price is \$2 a ton — a small fraction of the estimated \$75 a ton price in 2030 consistent with a 2 degree celsius warming target.³¹¹ A Congressional study of the impact of the cap-and-trade program in northeastern states (the Regional Greenhouse Gas Initiative) found that the cap on emissions was too high and the prices too low (less than \$6 a ton) to drive down emissions, but that there had been a beneficial impact from the revenues being invested in renewable energy.³¹²

A carbon tax (or pricing) has been a major topic of discussion at the recent international Conferences of Parties. At COP26 in Glasgow, delegates did approve Article 6 – the Paris Agreement’s rules governing carbon markets. Brazil and others want carbon offset payments for protecting forests. Little progress on implementation

³⁰⁹ <https://www.imf.org/en/Topics/climate-change/energy-subsidies>

³¹⁰ State and Trends Carbon Pricing, <https://openknowledge.worldbank.org/handle/10986/33809>, p. 7

³¹¹ <https://www.imf.org/en/Topics/climate-change/energy-subsidies>

³¹² <https://crsreports.congress.gov/product/pdf/R/R41836/14>

however was made at COP27, though the IMF said the price of carbon needs to average at least \$75 a ton globally by the end of the decade for global climate goals to succeed. In December 2022, the European Union agreed to tax imports based on their carbon footprint, “inserting climate-change regulation for the first time into the rules of global trade,” raising concerns both in the U.S. and in developing countries.³¹³

Support for a Carbon Tax – and How to Invest Revenues

A global poll taken in 31 countries prior to the COP26 gathering in late 2021 found 62% of people globally are in favor of a carbon tax while one third are opposed to raising taxes to encourage decreased use.³¹⁴

One of the big debates with the carbon tax is how much to rebate to consumers to offset the regressive nature of the tax and how much if any to invest in climate action such as the development of renewables.

Since low- and moderate-income households spend a higher percentage of their income on energy than the wealthy, a carbon tax is generally viewed as regressive. Most agree that some, if not all, of the revenues should be rebated to individuals to offset the tax. But there are many different opinions as to the best approach.

Polls over the years show a majority of Americans support making polluters pay for carbon emissions. A decade ago, a majority of respondents supported a revenue-neutral carbon tax, and an even larger majority supported a carbon tax with revenues used to fund research and development for renewable energy programs.

³¹³ <https://blogs.edf.org/climate411/2022/12/12/article-6-looking-ahead-to-cop28/>; <https://www.reuters.com/business/cop/exclusive-cop27-imf-chief-says-75ton-carbon-price-needed-by-2030-2022-11-07/>; [https://www.wsj.com/articles/europe-reaches-deal-on-landmark-carbon-import-tax-11670921011?st=41xf64lfdgkpd5z](https://www.wsj.com/articles/europe-reaches-deal-on-landmark-carbon-import-tax-11670921011?st=41xf64lfdgkpd5z;);

³¹⁴ <https://globescan.com/2021/11/05/new-global-poll-shows-growing-public-support-for-carbon-tax/>

Surprisingly, Republican Party support for a carbon tax was significantly higher (about 50%) when the revenues are used to promote renewable energy.³¹⁵

So, while supporters of the “100% fee and dividend” model argue that it is more politically doable to give all the revenues back to consumers, that contention is not supported by polling. Using the revenues to reduce other taxes also polls better than providing a dividend to every American.³¹⁶ And for many politicians, if they are going to take the risk of enacting a tax, they prefer to direct at least some of the funds to objectives such as deficit reduction, education, infrastructure investments, etc.

Many proposals have sought to provide some level of rebate to individuals – some targeting low- and middle-income families – through the tax system. One problem with this approach is that the lowest income individuals often have limited interaction with tax returns, so they may miss out. Plus, if they are living from paycheck to paycheck (or on benefits or social security), getting a once-a-year tax rebate does not help them pay their monthly bills.

In New York, a polluter penalty bill developed by NY Renews proposes distributing some of the revenues in ways that directly help low-income consumers (e.g., free subway tickets in New York City). Others have advocated reductions in other regressive taxes. And the provision of relief checks to Americans during COVID did show it was possible that the government could do the same with a climate dividend payment.

Public support is much stronger when the proposal is framed as “making polluters pay” rather than as a tax.³¹⁷

³¹⁵ <https://closup.umich.edu/issues-in-energy-and-environmental-policy/13/public-views-on-a-carbon-tax-depend-on-the-proposed-use-of-revenue>; and, <https://climatecommunication.yale.edu/publications/americans-willing-pay-carbon-tax/>

³¹⁶ <https://climatecommunication.yale.edu/publications/politics-global-warming-april-2020/toc/2/>

³¹⁷ <https://grist.org/article/voters-like-taxing-carbon-as-long-as-you-dont-say-carbon-tax/>

Probably the biggest pushback comes from those who argue a carbon tax would raise energy bills. Most elected officials focus heavily on their next election and worry that voters will punish them if they see prices go up at the gas pump or in their heating bills. Voters also do not like the word tax.

Polls also show that while a strong majority of voters want action on climate change, for most voters (outside of Greens and liberal Democrats) global warming does not rank among their top priorities.³¹⁸

Division of opinions about how to invest the revenues from a carbon tax has led to significant disagreements among climate campaigners. In the state of Washington, labor and environmental justice groups actively opposed a 2016 ballot initiative in support of a revenue neutral approach that would cut other taxes. But when that coalition came back in 2018 with a ballot proposal to use carbon pricing to raise revenues to invest in green jobs and environmental justice measures, it was still defeated.³¹⁹

A major reason for its defeat was that the oil industry poured \$31.2 million into a TV ad-heavy campaign to defeat the measure, more than had ever been spent to defeat a ballot initiative in the state's history.³²⁰ The industry at times argued that it was not that they opposed reasonable carbon pricing, they just opposed that particular proposal.

EJ Concerns Re Carbon Pricing

In recent years more climate groups have started to oppose carbon pricing as an inadequate substitute for mandated emission cuts.

³¹⁸ <https://climatecommunication.yale.edu/publications/politics-global-warming-april-2020/toc/2/>

³¹⁹ <https://www.vox.com/energy-and-environment/2018/9/28/17899804/washington-1631-results-carbon-fee-green-new-deal>

³²⁰ <https://insideclimatenews.org/news/10092019/big-oil-money-blocked-jay-inslee-climate-change-policy-carbon-fee-bp-washington/>

Opposition is especially strong for cap-and-trade programs, where the amount of carbon emissions a given company may produce is capped but they are allowed to buy rights to produce additional emissions from a company that does not use all of its own pollution allowance. This can lead to continuation of pollution in existing environmental justice communities in exchange for carbon offsets elsewhere (the values of which are debatable).

Mary Nichols, who was widely viewed as effective as the head of the California Air Resources Board, was defeated when President Biden sought to nominate her to head the EPA and lead the fight on climate, largely since environmental justice groups saw this as a way to protest California's cap-and-trade program.³²¹

Others argue that carbon pricing just leads to price increases rather than emission reductions, with the fossil fuel companies merely passing the price on to the consumer. They argue instead for mandated emission reductions.

Tom Goldtooth, founder of the Indigenous Environmental Network, argues that “a carbon tax distracts from the urgent need to keep oil, coal, and gas in the ground. It would be a tax scheme benefiting the polluters, which does not cut emissions at source at the level that is needed to get the world to 1.5° C. It will result in the continuation of environmental injustice displacing families, affecting Indigenous treaty rights, and upending local economies.”

Food & Water Watch argues that the inclusion of a carbon tax would create an inequitable, discriminatory, ineffective, and ultimately regressive proposal that gives a green light to the biggest climate scofflaws to pay to pollute and maintain a harmful status quo.³²²

My position is that one should do both mandated cuts and a carbon tax. There is no justification for continuing \$5 trillion in annual

³²¹ <https://redd-monitor.org/2020/12/04/more-than-70-california-environmental-justice-groups-oppose-mary-nichols-to-head-the-us-environmental-protection-agency/>

³²² <https://www.foodandwaterwatch.org/2021/09/28/groups-urge-congress-to-reject-carbon-tax-in-reconciliation-bill/>

subsidies to fossil fuel companies by allowing them to pollute without paying the related costs.

In 2017, former republican Secretaries of State James Baker and George Shultz along with Ted Halstead of the Climate Leadership Council (some prominent Republicans and business leaders) published *The Conservative Case for Carbon Dividends*.³²³ It supported a carbon tax combined with returning the money to taxpayers as a “climate dividend.” The plan called to scrap Obama-era emission regulation, saying that a market-driven approach would have the same impact as regulation. While the oil companies would just pass the cost of new taxes on to customers, they would get a dividend to help them pay for it. The plan called for border adjustments to ensure an increase in the cost of goods coming from nations that do not have a similar carbon tax. The council also wanted the fossil fuel polluters to be protected from lawsuits over their contribution to climate change.³²⁴

Some of the biggest groups pushing for a carbon tax, like Citizens Climate Lobby, have been willing to accept such proposals.³²⁵ Most climate groups however, reject the idea of trading a carbon tax in exchange for EPA’s power to regulate carbon (though some point out EPA has not done much with this power). Virtually all reject waiving the fossil fuel companies’ liability for climate damages.

Carbon Tax Basics

A carbon tax is an “upstream” tax on the carbon dioxide content (or equivalent from other greenhouse gases) of fossil fuels (coal, oil, and natural gas) and biofuels. The cost of the tax is then passed along to consumers and producers, with fossil fuels and energy intensive goods and services becoming costlier. If the carbon tax is effective, goods and services which are less energy intensive will become more

³²³ <https://clccouncil.org/our-story/>

³²⁴ <https://www.nytimes.com/2017/06/20/science/exxon-carbon-tax.html>

³²⁵ <https://www.nytimes.com/2017/06/20/science/exxon-carbon-tax.html>

affordable than those which release larger quantities of carbon dioxide into the atmosphere.

Under a carbon tax, “the government sets a price that emitters must pay for each ton of greenhouse gas emissions they emit. (The idea is that) businesses and consumers will take steps, such as switching fuels or adopting new technologies, to reduce their emissions to avoid paying the tax. A carbon tax differs from a cap-and-trade program in that it provides a higher level of certainty about cost, but not about the level of emission reduction to be achieved (cap-and-trade does the inverse).”³²⁶

A carbon tax can be levied at any point in the energy supply chain. The simplest approach is to levy the tax “upstream,” where the fewest entities would be subject to it (suppliers of coal, natural gas processing facilities, and oil refineries). A tax could also be levied “midstream” (on electric utilities) or “downstream” (on energy-using industries, households, or vehicles). Without provisions protecting local production, a carbon price could put domestic energy-intensive, trade-exposed industries (such as chemicals, cement/concrete, and steel), at a competitive disadvantage against international competitors that do not face an equivalent price. A shift in demand to those countries could result in what has been called “emissions leakage” from one country to another. All existing carbon pricing programs include mechanisms to address competitiveness concerns.³²⁷

Taxes on greenhouse gases come in two broad forms: an emissions tax, which is based on the quantity an entity produces; and a tax on goods or services that are generally greenhouse gas-intensive, such as a carbon tax on gasoline.

A carbon tax can recapture some of the costs pushed on to taxpayers and consumers from burning fossil fuels, such as the \$30 billion added annual health costs in New York State to deal with air pollution and fossil fuels and the tens of billions of dollars of damage from climate change (e.g., severe weather).

³²⁶ <https://www.c2es.org/content/carbon-tax-basics/>

³²⁷ <https://www.c2es.org/content/carbon-tax-basics/>

Unlike cap-and-trade, carbon taxes do not create complex and easily gamed “carbon markets” with allowances, trading, and offsets.

Cap-and-trade

In a cap-and-trade system, the government sets an emissions cap and issues a quantity of emission allowances consistent with that cap. Emitters must hold allowances for every ton of greenhouse gas they emit. Companies may buy and sell allowances, and this market establishes an emissions price. Companies that can reduce their emissions at a lower cost may sell any excess allowances for companies that need them. Governments can auction allowances, give them away for free, or some combination of the two. Auctioning generates revenue that can be used for climate or other purposes.³²⁸

A big question is whether the cap is set low enough to actually spur major reductions in emissions.

Opponents of cap-and-trade argue that it can lead to an overproduction of pollutants up to the maximum levels set by the government each year, since allowable levels may be set too generously, actually slowing the move to cleaner energy. Emissions credits and penalties are often cheaper than converting to cleaner technologies and resources, meaning that cap-and-trade is not a real incentive for those industries to change their practices.³²⁹

California’s cap-and-trade program is one of the largest in the world and among the first. Although the state’s program helped it meet some initial, more easily attained benchmarks for emission reductions, many worry that it enables California’s biggest polluters to conduct business as usual and even increase their emissions. By 2019, carbon emissions from the state’s oil and gas industry actually rose 3.5% since the program began. Many say cap-and-trade is rarely stringent enough when used alone; direct regulations on refineries and

³²⁸ <https://www.c2es.org/content/cap-and-trade-basics/>

³²⁹ <https://www.investopedia.com/terms/c/cap-and-trade.asp>

cars are crucial to reining in emissions. Such programs usually include offsets, and offset programs largely don't work.³³⁰

Pope Francis in his climate change encyclical stated that “The strategy of buying and selling ‘carbon credits’ can lead to a new form of speculation which would not help reduce the emission of polluting gases worldwide. ... in no way does it allow for the radical change which present circumstances require. Rather, it may simply become a ploy which permits maintaining the excessive consumption of some countries and sectors.”³³¹

A University of Southern California study of that state's program showed that low-income communities and communities of color were less likely to see reductions in pollution and more likely to live near polluting plants that participated in cap-and-trade. Many studies have found that cap-and-trade programs can maintain or even worsen environmental disparities by allowing polluting industries, often in communities of color, to buy their way out of reducing their emissions.³³²

Cap-and-invest has recently emerged as an alternative branding to cap-and-trade, putting more emphasis on the need to invest funds raised through the program into climate mitigation and adaptation efforts including renewable energy and funding targeting environmental justice communities. The State of Washington has adopted this, and New York is considering a similar plan.

In 2023, many groups in New York appear willing to accept cap-and-invest due to the refusal of state lawmakers in recent years to implement more progressive forms of carbon pricing. These groups want to raise new climate revenues to help with the climate transition (e.g., subsidizing decarbonization efforts), especially to meet the new goals to invest at least 35% of such funds in environmental justice

³³⁰ <https://www.propublica.org/article/cap-and-trade-is-supposed-to-solve-climate-change-but-oil-and-gas-company-emissions-are-up>

³³¹ https://www.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si.html, paragraph 171

³³² <https://insideclimatenews.org/news/25022022/why-do-environmental-justice-advocates-oppose-carbon-markets-look-at-california-they-say/>

communities. They are increasingly focusing on calling on state lawmakers to raise \$10 billion a year for climate action, while leaving it to lawmakers to figure out how to pay for it. The groups however, stress the need for the state to avoid the use of carbon offsets, particularly any that would allow pollution in environmental communities to continue.³³³

The existing cap-and-trade program in New York for electricity (the RGGI) only prices carbon at \$12 a ton and Congress found that the cap was set too high to have a significant impact on reducing emissions. The state estimates the social cost of carbon at \$121 a ton.

Some studies have found that cap-and-trade systems “if well designed and appropriately implemented, can achieve their core objective of meeting targeted emissions reductions cost-effectively.” While proponents they argue that allowing that market to set the price will lower costs, they recognize that “a robust market requires a cap that is significantly below business-as-usual emissions.” They also stress the importance of the government being able to document the actual level of emissions, including before the program starts.³³⁴

The Problems with Carbon Offsets

One key issue is whether companies can use verified emissions reductions generated outside the cap to comply. Governments and industry argue that such offsets can lower the overall costs of meeting the cap. For instance, agricultural and forestry projects can often reduce emissions at lower cost than industrial facilities. However, to be effective, offset projects must undergo rigorous verification procedures to ensure that emissions are actually reduced, and that only one entity takes credit for the offset.

³³³ <https://ecology.wa.gov/Air-Climate/Climate-Commitment-Act/Cap-and-invest>;
<https://www.nysfocus.com/2022/12/05/cap-and-trade-fossil-fuels-new-york/>

³³⁴ <https://www.resources.org/archives/learning-thirty-years-cap-trade/>;
<https://www.investopedia.com/terms/c/cap-and-trade.asp#>

Many studies have concluded that the emission reduction benefits of carbon offsets are greatly oversold and are not a substitute for reducing emissions. Many carbon offset efforts have focused on planting trees. Critics argue that continuing to dig up and burn fossil fuels and emitting fossil fuel emissions into the atmosphere, and then removing these by growing forests, does not actually reduce emissions or atmospheric concentrations over a century-long time scale, due to the length of time needed for trees to mature.³³⁵

“Projects meant to regenerate Australia’s outback forests to store carbon dioxide have been awarded millions of carbon credits – worth hundreds of millions of dollars – despite total tree and shrub cover in those areas having declined,” a 2022 analysis has found.³³⁶

Carbon emissions for fossil fuels are effectively permanent, remaining in the atmosphere for hundreds to thousands of years. In contrast, crops, soils, oceans, and forests are “fast-exchange” carbon reservoirs, with limited carbon storage capacity. They can re-release carbon back into the atmosphere over the course of a few decades, or sometimes even over a few days.³³⁷

The Clean Development Mechanism (CDM) came out of the 1997 Kyoto Protocol, when dozens of nations made a pact to cut greenhouse gases. The program subsidized thousands of projects, including hydropower, wind and, even coal plants that claimed credits for being *more efficient* than they would have been. CDM became mired in technical and human rights scandals, prompting the European Union to stop accepting most credits. A 2016 report found that 85% of offsets had a “low likelihood” of creating real impacts. A 2015 study of another global program, Joint Implementation, found that 75% of the credits issued were unlikely to represent real

³³⁵ <https://www.greenbiz.com/article/carbon-offsets-are-only-delaying-emissions;>
<https://www.pfpi.net/carbon-emissions/>

³³⁶ <https://www.theguardian.com/environment/2022/nov/07/forest-regeneration-that-earned-multimillion-dollar-carbon-credits-resulted-in-fewer-trees-analysis-finds>

³³⁷ <https://amazonwatch.org/news/2021/1006-statement-offsets-dont-stop-climate-change>

reductions, and that if countries had cut pollution on-site instead of relying on offsets, global CO₂ emissions would have been 600 million tons lower. ProPublica found that investments in Reducing Emissions from Deforestation and Forest Degradation (REDD) were also plagued with numerous problems and failed to meet their stated goals; often they just attached the logo to an existing project to draw down more funding.³³⁸

A New Spin on Making Polluters Pay

Many groups promoting a carbon tax frame it as a “make polluters pay” plan, which polls high than labeling it as a “tax.” But with limited progress on adding some form of fee or pricing on carbon emissions, some groups have begun to pivot more towards having governments directly raise funds from fossil fuel companies, particularly as their profits soared in recent years.

The Polluters Pay Climate Fund Act, introduced in Congress in 2021, seeks to require the largest U.S.-based fossil fuel extractors and oil refiners and foreign-owned companies doing business in the U.S. to pay into a Polluters Pay Climate Fund based on a percentage of their global emissions. The Fund would then be used to finance a wide range of efforts to tackle climate change.

The sponsors say that by “using peer-reviewed ‘carbon attribution’ research, it is possible to definitively attribute carbon and methane in the atmosphere to specific companies like ExxonMobil, Chevron, and Shell. Using this methodology, Congress can establish a Polluters Pay Climate Fund that assesses companies based on their contribution to global emissions and appropriate the funds to ensure a just climate transition. The payors into the Polluters Pay Climate Fund would be U.S.-based fossil fuel extractors and oil refiners and those foreign-owned companies doing business in the U.S. that were responsible for at least 0.05% of the total carbon dioxide and methane

³³⁸ <https://features.propublica.org/brazil-carbon-offsets/inconvenient-truth-carbon-credits-dont-work-deforestation-redd-acre-cambodia/>

gas emissions between January 1, 2000 and December 31, 2019. This would limit the total number of payors to the 25-30 biggest polluters, with those who polluted the most paying the most.”³³⁹

A similar Climate Change Superfund Act has been introduced in New York, seeking to raise \$30 billion over 10 years to recover some of the oil and gas industry’s recent windfall profits and use them for adaptation costs that would otherwise be charged to state taxpayers. The money raised will be used to fund infrastructure projects to adapt to climate change by, for example, repairing damage from extreme weather events or upgrading coastal infrastructure.³⁴⁰

³³⁹ <https://www.vanhollen.senate.gov/news/press-releases/van-hollen-leads-senate-democrats-in-announcing-new-legislation-to-make-polluters-pay-for-climate-damage>

³⁴⁰ <https://www.nysenate.gov/newsroom/video/liz-krueger/krueger-dinowitz-introduce-nation-leading-climate-change-superfund-act>

CHAPTER 5

GREEN NEW DEAL

The Green New Deal has received a lot of attention in the U.S. over the last five years after newly elected Congresswoman Alexandria Ocasio-Cortez joined the Sunrise Movement in occupying House Speaker Nancy Pelosi's office in Washington, DC.

The Green New Deal (GND) was launched more than a decade earlier however, first in England and Europe in 2008 and then by the Green Party in the U.S. in 2010. I was the campaign manager for Howie Hawkins when he launched the U.S. version in his campaign for New York State Governor.

Not surprisingly, subsequent versions of the GND have become less radical and detailed. Many who continue to support the GND have tended over time to focus more on its values and principles (e.g., a Just Transition, targeted funding goals for environmental justice) rather than a detailed timeline of how to accomplish it. And it often gets broken down into smaller GND proposals targeting public housing, schools, and decarbonization.

Alexandria Ocasio-Cortez represents the most progressive wing of the Democratic Party, and unfortunately her push for the GND has not been embraced by the party's national leadership. It still resonates strongly with individual elected officials, progressives, and voters – especially the young. Congressman Bernie Sanders did propose a strong GND during his 2020 presidential campaign. More mainstream democrats rebranded the Green New Deal into a more limited call for job creation as a key result of the transition to clean energy. The national party leadership has sought to drop the overall frame of a

GND as too polarizing for voters and an easy target for the GOP to attack as socialist.

Many across the planet had hoped that governments' efforts to reboot their economies post-COVID would be based on the GND, especially as the climate crisis was relegated to a secondary status during the pandemic. While many countries articulated a GND approach, as usual the fossil fuel industry and other special interests were able to ensure the economic stimuli provided ended up being largely business as usual.

The push in 2021-2 by President Biden and Senate Majority Leader Charles Schumer for a robust climate package (Build Back Better) was continually whittled down by opposition from Senator Joe Manchin of West Virginia (an investor in coal) and the Republican Party to a much smaller Inflation Reduction Act. It did not help that mainstream climate groups widely applauded every time the national Democrats unveiled an even weaker version of Build Back Better. One of the reasons that the Biden administration finally dropped the U.S. long standing opposition to "loss and damages" for the Global South at COP27 was that they were stunned to discover that the Inflation Reduction Act was not hailed as a major accomplishment by the rest of the world.

Green New Deal (and the IRA and a Just Transition)

The Green New Deal combines the goal of a rapid transition (within 10 years) to renewable energy and zero greenhouse gas emissions with the guarantee of a good quality of life for everyone, including an Economic Bill of Rights addressing living wage jobs, housing, universal health care and education (including college).

Over time, the Green New Deal has become a branding tool for various climate proposals, building on the theme that investing in climate actions is also a job creation strategy.

While support for the Green New Deal has risen and fallen over time, with the Republican Party increasingly attacking it as socialist,

in 2021 it remained highly popular, enjoying a 31-percentage-point margin (60 to 29%), including nearly all Democrats, and over a third of Republicans.³⁴¹

The Green New Deal first garnered widespread attention in the U.S. in late 2018 after newly elected progressive Congressmember Alexandria Ocasio-Cortez, having shockingly defeated the third ranking Democrat in the House in a Democratic Party primary in New York City, joined a sit-in event organized by the Sunrise Movement in House Speaker Nancy Pelosi's office at the Capitol even before she was sworn in.³⁴²

Howie Hawkins in his 2010 Green Party gubernatorial campaign in New York is seen as the first U.S. politician to campaign for a Green New Deal.³⁴³ Hawkins had modified a GND proposal put forth by the Green Party and other environmental groups in 2008 in the UK and Europe in response to the global financial meltdown. That proposal also included significant reforms to the financial system.³⁴⁴

In 2007, columnist Thomas Friedman wrote a column in *The New York Times* calling for a Green New Deal,³⁴⁵ a theme he said that Barack Obama later included in his 2008 presidential campaign. Certainly, the idea that investment in renewable energy and other environmental measures was a job creation strategy was one that many groups (such as the Blue-Green Alliance) had been promoting for years.³⁴⁶

Alexandria Ocasio-Cortez teamed up with Senator Ed Markey to introduce a GND resolution³⁴⁷ in 2019 that called “on the federal

³⁴¹ <https://www.dataforprogress.org/blog/2021/4/19/voters-support-green-new-deal>

³⁴² <https://www.nytimes.com/2018/11/13/us/politics/house-democrats-freshmen.html>

³⁴³ <https://howichawkins.us/about-howie/the-origins-of-the-green-new-deal-slogan/>

³⁴⁴ <https://europeangreens.eu/content/green-new-deal>

³⁴⁵ <https://www.nytimes.com/2007/01/19/opinion/19friedman.html>

³⁴⁶ <https://www.bluegreenalliance.org/>

³⁴⁷ https://www.markey.senate.gov/imo/media/doc/gnd_text.pdf;
<https://www.commondreams.org/views/2019/01/08/why-sustainable-agriculture-should-support-green-new-deal>

government to dramatically reduce greenhouse gas emissions, create high-paying jobs, ensure that clean air, clean water, and healthy food are basic human rights, and end all forms of oppression. To achieve those goals, the plan calls for the launch of a ‘10-year mobilization’ to reduce carbon emissions in the United States.”³⁴⁸ Ocasio-Cortez’s initial proposal had been to have a two-year process to draft a plan to bring back for congressional action. Despite considerable support among activists and scores of Congressmembers, the idea was never brought up for a vote.

The Democratic Party has never fully embraced the Green New Deal, highlighting the divisions between its liberal and moderate wings.³⁴⁹ It has never made it into the party’s national platform. Some shied away from being labeled socialists, a brand that younger more progressive Democrats emerging out of the two Bernie Sanders presidential campaigns were more likely to embrace. Others argued that they were just being pragmatic, saying that a GND could never garner the Republican support needed to be passed by Congress. Many quickly retreated in face of the attacks from Republicans.³⁵⁰

But even the more liberal wing of the party, including Alexandria Ocasio-Cortez’s Green New Deal, shied away from explicitly calling for a halt to any new fossil fuel infrastructure, including fracking for natural gas, and were reluctant to support calls to cut the military budget to fund the GND.³⁵¹ There was also division over issues such as a carbon tax, the role of nuclear power plants, public power, and the timeline (2030 vs. 2050 for zero emissions). Many labor unions were also skeptical of the GND, especially worried that despite the central role living wage job creation had in the GND, that not enough

³⁴⁸ <https://www.nytimes.com/2019/02/21/climate/green-new-deal-questions-answers.html>

³⁴⁹ <https://theintercept.com/2019/02/25/green-new-deal-democrats/>

³⁵⁰ <https://thehill.com/policy/energy-environment/436171-democrats-to-move-on-from-green-new-deal/>

³⁵¹ <https://howiehawins.us/whatever-happened-to-the-green-new-deal/>

jobs would be created and that they would pay less than the good paying jobs in the fossil fuel industry.³⁵²

One approach that Alexandria Ocasio-Cortez has taken is to introduce GND proposals on particular issues. In April 2021, she introduced the GND Public Housing proposal with Senator Sanders, which they said would “invest up to \$172 billion over ten years in sustainable retrofits, dramatically improving living conditions for nearly two million people living in over 950,000 public housing homes. This legislation reduces public housing water bills by up to 30 percent per year, or \$97 million, and energy bills by up to 70 percent per year, or \$613 million. The bill also creates up to 240,000 good-paying, union jobs per year.”³⁵³

Bernie Sanders was one of the few elected Democrats willing to directly challenge the fossil fuel industry. In his 2020 presidential campaign, Sanders issued a detailed call for a robust Green New Deal.³⁵⁴ For a short time Sanders was leading the Democratic Party primary after winning Nevada but party leaders and donors quickly revitalized Joe Biden’s campaign as other contenders dropped out. He called for a ten-year climate emergency mobilization with \$16 trillion in funding “centered around justice and equity” that would help create 16 million new jobs as a basis for a Just Transition and Environmental Justice. He called to “reach 100 percent renewable energy for electricity and transportation by no later than 2030 and complete decarbonization of the economy by 2050 at latest.” Sanders wanted to build 7.4 million affordable housing units.

Sanders was tougher on fossil fuel companies than even most liberal Democratic Party officials. He called to “Massively raise taxes on corporate polluters’ and investors’ fossil fuel income and wealth,”

³⁵² <https://theintercept.com/2019/02/28/green-new-deal-labor-unions/>;
<https://news.bloomberglaw.com/daily-labor-report/green-new-deal-is-likely-to-splinter-labor-unity>

³⁵³ <https://www.sanders.senate.gov/press-releases/news-sanders-and-ocasio-cortez-rollout-green-new-deal-for-public-housing-act/>

³⁵⁴ <https://berniesanders.com/issues/green-new-deal/>;
<https://jacobin.com/2019/08/bernie-sanders-climate-green-new-deal>

including “raising penalties on pollution from fossil fuel energy generation.” He wanted to “prosecute and sue the fossil fuel industry for the damage it has caused.” He called to “end all new federal fossil fuel infrastructure permits.” He wanted to ban fracking, mountaintop removal coal mining, and the import/export of fossil fuels. He would divest the federal pension funds from fossil fuels and pressure financial institutions to stop bankrolling the industry. He recognized the need to transition farms “to ecologically regenerative practices to combat climate change.”

In July 2021 Congressman Jamaal Bowman of New York, along with 35 co-sponsors (including Alexandria Ocasio-Cortez), introduced a Green New Deal for Schools. The proposal, Bowman said, “which aims to invest \$1.43 trillion over 10 years in public schools and infrastructure to combat climate change — would make a transformative investment in public school infrastructure by upgrading every public school building in the country, addressing historical harms and inequities by focusing support on high-need schools, and hiring and training hundreds of thousands of additional educators and support staff. If enacted, the legislation would fund 1.3 million jobs per year and eliminate seventy-eight million metric tons of CO₂ annually, the equivalent of taking seventeen million cars off the road.”³⁵⁵

Local governments have taken to packaging their climate proposals as a Green New Deal, even though they are often narrower in scope than the aforementioned comprehensive package of climate action and economic bill of rights. Michelle Wu, who became Mayor of Boston in 2022, campaigned on a comprehensive GND platform.³⁵⁶ The City of Ithaca, NY has launched a GND, including a \$100 million plan to decarbonize all buildings and residences in the city.³⁵⁷ Climate activists and elected officials in New York City packaged their law to

³⁵⁵ <https://bowman.house.gov/2021/7/rep-jamaal-bowman-unveils-green-new-deal-for-public-schools>; <https://greennewschools.com/>

³⁵⁶ <https://www.michelleforboston.com/plans/gnd>

³⁵⁷ <https://www.cityofithaca.org/642/Green-New-Deal>

require various climate measures including energy retrofits to large buildings (over three decades) as a GND.³⁵⁸

A network of elected officials in dozens of countries launched a Global Alliance for a Green New Deal in July 2021.³⁵⁹

As the COVID crisis caused a major drop in the world's economy, there was a lot of discussion in the United States, Europe³⁶⁰ and South Korea that governments would invest in a Green New Deal-based economy recovery while also addressing the climate crisis. There also seemed to be a recognition that responding to such a crisis required unprecedented governmental action that embraced all its members.³⁶¹

Unfortunately, those proposals proved illusory, a major missed opportunity.³⁶² The G7 countries in particular put billions of dollars more into fossil fuels than they put into clean energy since the Covid-19 pandemic, despite their promises of a green recovery.³⁶³

A Just Transition

While a Just Transition is a central part of the GND, over time many have raised the need for a Just Transition as a separate climate demand.

A Just Transition has two major components: the creation of a new clean energy world where the needs of everyone are met, starting with an economic bill of rights that guarantees a living wage job and

³⁵⁸ <https://grist.org/article/new-york-citys-newly-passed-green-new-deal-explained/>

³⁵⁹ <https://www.globalgreennewdeal.org/>

³⁶⁰ <https://www.iisd.org/sustainable-recovery/news/the-eu-green-deal-at-the-heart-of-europes-recovery-post-covid19/>;
<https://climatechangenews.com/2020/04/09/european-green-deal-must-central-resilient-recovery-covid-19/>

³⁶¹ <https://www.un.org/development/desa/undesavoice/more-from-undesavoice/2020/12/50538.html>

³⁶² <https://wedocs.unep.org/bitstream/handle/20.500.11822/35281/AWBBB.pdf>

³⁶³ <https://www.theguardian.com/world/2021/jun/02/g7-nations-committing-billions-more-to-fossil-fuel-than-green-energy>

a minimum income, universal (single payer) health care, education including college, and housing; and, protection for existing workers and communities dependent on fossil fuels (and nuclear), with priorities giving to displaced workers in obtaining new jobs and training. The original Green Party call for a GND also included guaranteeing wages and tax payments for at least five years for displaced energy workers. Such guarantees have gotten vaguer in newer versions supported by the Democrats, although they do highlight issues such as prevailing wages in jobs funded by the GND.³⁶⁴

While the concept of a Just Transition is widely embraced even by some who otherwise resist the GND and climate action, particularly the call to protect existing fossil fuel workers, there is far less commitment by elected officials or industry to raising the funds needed to make it occur.

One criticism of the earliest versions of the GND is that they were not developed with direct major input from environmental justice and labor communities.

Various calls for a Just Transition existed prior to the emergence of the GND. The Climate Justice Alliance notes that “Just Transition strategies were first forged by labor unions and environmental justice groups, rooted in low-income communities of color, who saw the need to phase out the industries that were harming workers, community health and the planet; and at the same time provide just pathways for workers to transition to other jobs... Members of the Climate Justice Alliance... have adapted the definition of Just Transition to represent a host of strategies to transition whole communities to build thriving economies that provide dignified, productive and ecologically sustainable livelihoods; democratic governance and ecological resilience.”³⁶⁵

³⁶⁴ <https://theintercept.com/2019/02/28/green-new-deal-labor-unions/>

³⁶⁵ <https://climatejusticealliance.org/just-transition/>

The Paris climate Agreement requires national plans on climate change to include Just Transition measures that include decent work and quality jobs.³⁶⁶

The International Trade Union Conference is the global voice of unions. Its demands for a Just Transition include: “respect the contribution that workers in fossil fuel industries have made to today’s prosperity and provide income support, retraining, redeployment and secure pensions for older workers; recognize that investing in community renewal is critical to gain the hope and trust of affected regions; involve workers in planning for clean mega cities; ensure investment in the jobs and decent work vital to both adaptation and mitigation; guarantee essential social protection and human rights; be backed up by a just transition fund in every nation; and, be based on social dialogue with all relevant parties, collective bargaining with workers and their unions and the monitoring of agreements which are public and legally enforceable. Managed well, transitions to environmentally and socially sustainable economies can become a strong driver of job creation, job upgrading, social justice and poverty eradication.”³⁶⁷

A Just Transition requires an inclusive process. The World Economic Forum notes that “creating a clean energy world requires a large-scale transformation of economies and businesses, affecting labor, consumers, and local populations. Ignoring impacts poses serious risks also for governments and companies, as it can result in backlash blocking climate action. Public dialogue and stakeholder engagement can make ambitious climate action possible by mobilizing broad-based support, while designing measures that respond to the needs on the ground.”³⁶⁸

³⁶⁶ <https://www.ituc-csi.org/just-transition-in-the-paris>

³⁶⁷ <https://www.oecd.org/env/cc/g20-climate/collapsecontents/Just-Transition-Centre-report-just-transition.pdf>

³⁶⁸ <https://www.weforum.org/agenda/2022/06/jobs-growth-and-social-justice-for-transformative-climate-action-a-just-transition/>

THRIVE

For many liberal democrats, including in Congress, support for a Green New Deal morphed into a call for a THRIVE (Transform, Heal, and Renew by Investing in a Vibrant Economy) agenda. Rather than advancing specific funding levels or policy directives, it focused more on the goals of environmental justice and a Just Transition. The THRIVE agenda was first introduced as a Congressional resolution of 2019, garnering the co-sponsorship of many members including the soon-to-become Senate Majority Leader Chuck Schumer of New York.³⁶⁹

While THRIVE sought to broaden the base of support among environmental justice and labor groups, one criticism the approach was that it downplayed the need for radical climate action to avoid climate collapse. While it is imperative that any climate action target jobs, investments and benefits to disadvantaged

communities and displaced workers, someone needs to be driving the underlying actions since elected officials do not do it on their own, especially in face of opposition from the fossil fuel industry and their various enablers (including the financial community). Unfortunately, while the calls for investment in environmental justice communities have won strong support among Democrats, actual progress has remained limited.

Many Washington, DC-oriented climate groups hoped that the THRIVE agenda would become the basis for newly elected President Biden's climate proposals. That did not occur.

The Sierra Club and others put out a report in 2021 documenting the need for \$1 trillion a year for a decade in investments in climate action, which would create fifteen million good-paying new jobs.³⁷⁰ Investment would go to “ecosystem restoration, clean manufacturing, regenerative agriculture, upgrading infrastructure and buildings, clean energy and transportation, public services, and care for children and

³⁶⁹ <https://www.congress.gov/bill/116th-congress/senate-resolution/693/text>

³⁷⁰ <https://www.sierraclub.org/sites/default/files/jobs-renewal-report.pdf>

the elderly. At least 50% of these investments must go to frontline communities that have endured decades of underinvestment. All of the investments must include strong wage and benefit guarantees and access to unions, and equitable hiring that favors women and Black, Indigenous, and people of color.”³⁷¹

From Build Back Better to the Inflation Reduction Act

While Most Climate Funding Ever, It is Too Little and Includes False Solutions

The election of Joe Biden as President was widely viewed as an opportunity to shift away from the climate denial of the Trump administration, even though Biden had among the weakest climate proposals of the Democrats during the primary elections.³⁷² Still, climate activists were optimistic after Biden signaled early on to the idea that climate would be a major concern with his administration, and the new Senate Majority Leader Chuck Schumer stressed the need for bold action.³⁷³

President Biden’s Build Back Better proposal early in 2021 sought more than \$4 trillion worth of infrastructure and economic proposals over 10 years. Progressive Democrats sought to bump that up to \$6 trillion.³⁷⁴

But with the Democrats and Republicans evenly split in the Senate, action would only come through a limited process known as budget reconciliation, which required 50 votes (plus the Vice-

³⁷¹ <https://www.sierraclub.org/trade/thrive-agenda>

³⁷² <https://insideclimatenews.org/news/16012020/2020-election-debate-climate-change-iowa-caucuses-sanders-warren-buttigieg-biden/>;
<https://www.nbcnews.com/politics/2020-election/jay-inslee-tops-greenpeace-climate-grades-joe-biden-gets-d-n1011996>

³⁷³ <https://cnsnews.com/article/washington/cnsnewscom-staff/chuck-schumer-we-need-bold-climate-action-now>; <https://www.msnbc.com/rachel-maddow/watch/schumer-calls-on-president-biden-to-declare-climate-emergency-100012613548>

³⁷⁴ <https://rollcall.com/2022/07/21/how-build-back-better-started-and-how-its-going-a-timeline/>

President acting as the tiebreaker) rather than the normal 60, requiring all Democrats to vote in the affirmative. The main problem was Senator Joe Manchin of West Virginia, a conservative Democrat with deep ties (and personal investment) in the coal industry³⁷⁵ who also objected to various other investments (including childcare) and raised concerns about increasing the deficit.³⁷⁶

After a year and half of torturous negotiations, with the package getting ever smaller, a slimmed down infrastructure package of \$550 billion over 10 years passed separately, and the climate deal was given up for dead several times. Then in August 2022, Manchin unexpectedly agreed to the Inflation Reduction Act.³⁷⁷

Manchin's support for the deal was contingent on a separate federal permitting reform agreement that the Democrats unveiled later in the fall and included in a government funding package which included expediting the 303-mile natural gas Mountain Valley pipeline running through West Virginia, Virginia, and North Carolina.³⁷⁸ The opposition from the climate movement caused Manchin and the Democrats to shelve the side deal in late September, and then again in December.³⁷⁹

While the Inflation Reduction Act was the biggest piece of "climate legislation" ever passed in the U.S., by a wide margin, the Climate and Community Project noted that "it is still a far cry from the scale of public investment needed to contend with the magnitude

³⁷⁵ <https://www.nytimes.com/2022/03/27/climate/manchin-coal-climate-conflicts.html>

³⁷⁶ <https://www.msn.com/en-us/news/politics/manchin-open-to-build-back-better-if-child-tax-credits-are-cut-report/ar-AA5o38o>

³⁷⁷ <https://rollcall.com/2022/07/21/how-build-back-better-started-and-how-its-going-a-timeline/>

³⁷⁸ <https://www.theguardian.com/us-news/2022/sep/22/schumer-manchin-side-deal-pipelines-backlash>

³⁷⁹ <https://www.foodandwaterwatch.org/2022/09/27/manchin-side-deal-removed/>; <https://www.theguardian.com/us-news/2022/dec/07/joe-manchin-legislation-energy-fast-track-democrats-defense-act>

of the crisis we face, and from what's needed for a truly just and equitable transition to a world beyond fossil fuels.”³⁸⁰

The Inflation Reduction Act fell far short of Biden's and Schumer's initial proposals, only investing \$36.9 million annually over 10 years in climate and energy provisions. Overall spending is one-tenth of what Senator Schumer had submitted in August 2021, which was itself far less than what Biden had initially discussed.³⁸¹

Besides the low level of funding and slow timelines, the bill mainly tweaks the market, relying on tax incentives to the private sector and hedge fund investors rather than public ownership or democratic control and planning for the energy sector.

The bill also provides continued support to fossil fuels and other false climate solutions. As Food & Water Watch noted the side deal is the “ultimate devil's bargain,” that creates “new wind and solar tax credits while giving fossil fuel polluters a green light is the ultimate devil's bargain.”³⁸² The Center for Biological Diversity said, “the legislation all but ensures that the fossil fuel industry will maintain current oil and gas production levels without any change for the next decade,” and “This is a climate suicide pact.”³⁸³

The Inflation Reduction Act provides a production credit for nuclear energy and blue hydrogen and extends income and excise tax credits for biodiesel, renewable diesel, and alternative fuels. The legislation would also require oil and gas leasing in the Gulf of Mexico and Alaska, reinstate an illegal 2021 Gulf lease sale, and lock in oil and gas lease sales as a precondition for the approval of federal renewable energy projects.

380

https://www.climateandcommunity.org/files/ugd/d6378b_f05b177ba6b142aaa50ca7111a91f08b.pdf

381 <https://www.npr.org/2021/08/09/1026055615/senate-democrats-release-3-5t-budget-framework>

382 <https://www.foodandwaterwatch.org/2022/08/04/manchin-side-deal-is-a-climate-disaster/>

383 https://biologicaldiversity.org/w/news/press-releases/manchin-poison-pills-buried-in-inflation-reduction-act-will-destroy-a-livable-climate-2022-07-28/email_view/

The side deal that Manchin sought would require a constantly updated list of 25 projects that will be placed on the fast track, limiting public input and necessary environmental review. At least five of the priority items “shall be projects to produce, process, transport, or store fossil fuel products, or biofuels, including projects to export or import those products.” Two of the priority projects should be devoted to the “capture, transport, or store carbon dioxide.” It allows funding for projects that increase the extraction of oil. The fossil fuel prioritization continues well past 2030, requiring at least three projects to be fossil fuel oriented while allowing greater discretion to add more to the priority list.³⁸⁴

Environmental justice groups such as the Climate Justice Alliance³⁸⁵ and the Indigenous Environmental Network³⁸⁶ opposed the Inflation Reduction Act. The groups pointed out the bill analysis from the Joint Committee on Taxation shows that the proposed funding for environmental justice measures is lower than the sponsors claim and that the more lucrative environmental justice provisions sunset by 2028. Groups also question whether a number of proposed projects actually qualify as environmental justice. It also fails to include funding for the U.S.’s climate reparations to the developing world that are bearing the brunt of climate change driven by the U.S. and the other industrial polluting nations.

The Original U.S. Green New Deal

Since the Green Party initiated the call for a Green New Deal (GND) in the U.S. in 2010 (which I helped write) and since the party still embraces it while the Democrats remain divided over it, this book uses the current Green Party version as the starting point to explain the

³⁸⁴ <https://www.foodandwaterwatch.org/2022/08/04/manchin-side-deal-is-a-climate-disaster/>

³⁸⁵ <https://climatejusticealliance.org/the-inflation-reduction-act-is-not-a-climate-justice-bill/>

³⁸⁶ <https://www.ienearth.org/the-inflation-reduction-act-of-2022-is-not-a-climate-bill/>

Green New Deal. It then examines the Green New Deal proposals from Congressman Ocasio-Cortez.

In his 2020 Presidential campaign for the Green Party, Hawkins – who first called for a GND in his 2010 N.Y. gubernatorial campaign - outlined a more detailed analysis of the Green New Deal including an annual \$2.7 trillion investment in climate action and \$1.4 trillion for the economic bill of rights implementation.³⁸⁷

The Sunrise Movement has published a book on the Green New Deal.³⁸⁸ Many of the best funded climate groups with staff in the U.S. are part of the Green New Deal Network, though they have campaigned more recently for the THRIVE Agenda and implementation of Biden's Justice40 environmental justice initiative.³⁸⁹

There are also numerous books on the Green New Deal, starting with Naomi Klein's *On Fire*.³⁹⁰

Ecosocialism

The ecosocialist / anti-capitalist perspective of the Green Party is not yet widely embraced by the mainstream climate movement in the U.S. However, Pope Francis, the Intergovernmental Panel on Climate Change and Greta Thunberg have all pointed out that since the capitalist system and its focus on profit maximization is a root cause of the climate crisis, a solution requires replacing capitalism as the dominant economic approach.

Ecosocialism proposes an economy based on maximizing the public good under democratic control and community ownership. "It combines aspects of socialism with that of green politics, ecology, and anti-globalization. Ecosocialism believes that the capitalist economic system is fundamentally incompatible with the ecological and social

³⁸⁷ <https://howiehawkins.us/the-ecosocialist-green-new-deal-budget/>

³⁸⁸ <https://www.sunrisemovement.org/green-new-deal/>

³⁸⁹ <https://www.greennewdealnetwork.org/>

³⁹⁰ <https://naomiklein.org/on-fire/>

requirements of sustainability. Giving economic priority to the fulfillment of human needs while staying within ecological limits, as sustainable development demands, is in conflict with the profit-driven focus of capitalism. Market-based solutions to ecological crises are rejected as technical tweaks that do not confront capitalism's structural failures."³⁹¹

The Green Party's Ecosocialist Green New Deal

The Green New Deal seeks to convert the old, gray economy into a new, sustainable economy that is environmentally sound, economically viable and socially responsible. It seeks to solve the climate crisis by combining quick action to get to zero greenhouse gas emissions and 100% renewable energy by 2030 along with an Economic Bill of Rights – the right to single-payer healthcare, a guaranteed job at a living wage, affordable housing, and free college education.

The Greens call for a World War Two-scale mobilization to carry through this emergency climate program. During the Second World War, the federal government took over a quarter of U.S. manufacturing capacity in order to defeat the fascist powers.

The Greens call for social ownership and democratic planning in order to make a rapid coordinated transition to 100% clean energy and zero to negative greenhouse gas emissions. The Green Economy Reconstruction Program will socialize key productive sectors, notably energy production, power distribution, broadband, railroads, and automobiles, a greatly expanded public housing sector, and a domestic manufacturing sector to be rebuilt on an ecological basis of clean power and zero waste. If enacted, it would provide tens of millions of high-quality jobs, virtually eliminating unemployment, underemployment, and poverty incomes.

³⁹¹ <https://en.wikipedia.org/wiki/Eco-socialism>

The Greens call for a halt to all new fossil fuel infrastructure (fracking, oil and gas pipelines, gas-fired power plants). Existing infrastructure is more than sufficient to deliver fossil fuels during the transition as they are phased out. The Greens also call for a halt to so-called “low carbon” dirty energy industries and for their rapid phase out, including nuclear power; fossil fuel carbon capture and sequestration; waste incinerators; large-scale biofuels such as factory farm biogas, landfill gas, and wood pellets; hydrogen from fossil fuels; large-scale ecosystem-altering hydropower; and market-based accounting systems like carbon offsets.

Clean energy includes solar, wind, geothermal, tidal, wave, and small-scale hydro. Clean energy does not include natural gas, biomass, nuclear power, or the oxymoron “clean coal.”

The national Green Party platform calls for the following:

Just Transition. Guarantees that workers and communities affected by the transition to clean energy are kept whole during the transition. The Just Transition program will guarantee workers up to five years of their current wages and benefits, or a good pension for early retirement for those who choose it or can no longer work. Communities that lose tax revenues due to the closure of power and manufacturing plants will receive equal revenues until new Green New Deal plants make up for the loss.

Public Energy System. Enact energy democracy based on public, community, and worker ownership of our energy system. Treat energy as a human right. Socialize all power generation and distribution utilities and private energy corporations into a public energy system in order to rapidly implement the transition to 100% clean energy generation and distribution.

The public energy system will operate at cost for public benefit rather than cost plus profit for owners. For-profit private utilities will not build the smart grid necessary to incorporate the distributed nature of renewables and to implement energy conservation and efficiency in energy use because the private utilities are more profitable continuing to use the servo-mechanical grid based on centralized

power plants. The public energy system should be governed from the bottom-up by a decentralized federation of elected local/regional public energy districts that in turn elect state and federal boards for state and federal coordination.

Electrified Transportation. Socialize the railroad and automotive industries into a public transportation system to rapidly electrify transportation powered by clean energy sources. The public transportation system should be governed from the bottom up by a decentralized federation of elected local/regional public transportation districts that in turn elect state and federal boards for state and federal coordination. Intra-city mass transit and inter-city freight rails and high-speed passenger rails should move energy- and resource-inefficient personal vehicles and freight trucking on roads onto electrified passenger and freight rails. Urban planning should encourage walkable and bikeable neighborhoods through pedestrian and bike lanes on roads and rezoning single-family residence zones into mixed use zones.

Ecological Manufacturing. Build a public manufacturing system that can rebuild manufacturing in the U.S. on the basis of clean energy and zero waste. The public manufacturing system will prioritize developing publicly owned companies for clean energy and zero waste in key industries that must be transformed to reach 100% clean energy, such as zero-carbon cement manufacturing and replacing coke ovens with electric arc furnaces and green-hydrogen blast furnaces for steel production. The machine tool industry, which builds factory equipment, must be rebuilt in order to build clean-energy, zero-waste manufacturing equipment for all sectors. Policy should require that manufacturing products are returned to their manufacturer when used up to be reused and recycled into the next generation of products.

Regenerative Agriculture. The Green New Deal for agriculture will replace toxic synthetic pesticides, chemical fertilizers, and large-scale industrialized factory farms based on monocropping and Concentrated Animal Feeding Operations with regenerative organic agroecology with working farmers on small and medium sized farms.

It will ban absentee and corporate ownership of farms and ranches. It will subsidize the transition of farmers to organic production. It will provide community-owned farmland to enable farmers to stay on farms where land prices rise too high. It will provide parity pricing and supply management to ensure all working farmers have a decent income above their costs of production.

Public Housing and Walkable Communities. Expand public housing until every person has an affordable housing option. Rehabilitate existing and build new public housing that is powered by clean energy. Public housing will be open to anyone so that low-income, working class, and middle-class people live in the same developments and reduce race and class segregation. Priority placement should be given to low-income people as the expanded public housing sector is built out in order to house the homeless as soon as possible.

Paying for the Green New Deal. The Ecosocialist Green New Deal proposes to pay for its program from a variety of short-term and long-term sources, including:

Progressive Tax Reform—Close tax havens and implement (more) progressive taxes on wealth, estates, personal income, corporate income, and financial transactions.

Ecological Taxes—The major point of ecological taxes is not to raise revenues but reduce pollution and resource destruction. If they are successful, they eliminate the source of their revenue. As such, they should not be considered long term revenues sources but can be useful for shorter term financing of environmental goals.

Ecological taxes are scarcity rents on the use of natural resources, such as the atmosphere, land, fossil fuels, and mineral resources. While ecological taxes are not a substitute for social ownership and economic planning in a green energy transition, they can be part of economic planning to disincentivize fossil fuel use and natural resource extraction, dumping, and depletion.

Peace Conversion—Deep cuts in the US military budget on the order of 50% to 75% and reallocating the savings into the Ecosocialist Green New Deal.

Public Money—The Greens favor Monetary Reform based on the creation of debt-free public money by a Monetary Authority in the Treasury Department and spending that money into the economy through the federal budget, including the budget for the Ecosocialist Green New Deal.

AOC – Markey Congressional GND Resolution³⁹²

In February 2019, Representative Alexandria Ocasio-Cortez and Senator Ed Markey introduced a congressional resolution calling for transitioning the U.S. to 100% renewable, zero-emission energy sources, along with investment in electric cars and high-speed rail systems and implementing the “social cost of carbon” within 10 years. The Green New Deal also aimed to address poverty by aiming much of the improvements in “frontline and vulnerable communities” which include the poor and disadvantaged people. It had strong labor and environmental justice goals.

The resolution included calls for universal health care, increased minimum wages, and preventing monopolies. The resolution did call for the government to receive some equity ownership in exchange for investments in companies.

Ocasio-Cortez’s website explains that “The Green New Deal is a jobs and justice-centered plan to decarbonize the U.S. economy within ten years. It is one of the only plans put forward which is actually in line with scientific consensus and the United Nations’ IPCC Report. The Green New Deal also focuses on creating the maximum amount of prosperity for working people and marginalized communities in the process.”³⁹³

³⁹² https://en.wikipedia.org/wiki/Green_New_Deal#Green_New_Deal_Resolution

³⁹³ <https://www.ocasiocortez.com/green-new-deal>

The congressional resolution called for a “10-year national mobilization” whose primary goals would be:

“Guaranteeing a job with a family-sustaining wage, adequate family and medical leave, paid vacations, and retirement security to all people of the United States.”

“Providing all people of the United States with – (i) high-quality health care; (ii) affordable, safe, and adequate housing; (iii) economic security; and (iv) access to clean water, clean air, healthy and affordable food, and nature.”

“Providing resources, training, and high-quality education, including higher education, to all people.”

“Meeting 100 percent of the power demand through clean, renewable, and zero-emission energy sources.”

“Repairing and upgrading the infrastructure in the United States, including by eliminating pollution and greenhouse gas emissions as much as technologically feasible.”

“Building or upgrading to energy-efficient, distributed, and ‘smart’ power grids, and working to ensure affordable access to electricity.”

“Upgrading all existing buildings in the United States and building new buildings to achieve maximal energy efficiency, water efficiency, safety, affordability, comfort, and durability, including through electrification.”

“Overhauling transportation systems in the United States to eliminate pollution and greenhouse gas emissions from the transportation sector as much as is technologically feasible, including through investment in – (i) zero-emission vehicle infrastructure and manufacturing; (ii) clean, affordable, and accessible public transportation; and (iii) high-speed rail.”

“Spurring massive growth in clean manufacturing in the United States and removing pollution and greenhouse gas emissions from manufacturing and industry as much as is technologically feasible.”

“Working collaboratively with farmers and ranchers in the United States to eliminate pollution and greenhouse gas emissions from the agricultural sector as much as is technologically feasible.”³⁹⁴

³⁹⁴ <https://www.washingtonpost.com/politics/2019/02/11/whats-actually-green-new-deal-democrats/>; <https://docsend.com/view/8gXH826>

CHAPTER 6

AGRICULTURE

Agriculture is often overlooked as a significant source of greenhouse gas emissions. Globally agriculture accounts for almost a third of emissions. That number is considerably less within the U.S., but we also export our emissions by importing a significant amount of our food, particularly livestock.

Our food system is also under threat from climate change and extreme weather, at both the level of production and distribution. The lack of access to healthy, affordable food for many is already a major domestic and global problem.

Only recently has the Intergovernmental Panel on Climate Change (IPCC) begun to highlight the role of agriculture in the climate crisis, including the recommendation to move to a more plant-based diet. This has become a focal point of attacks by opponents of climate action, who warn Americans that climate activists want to prohibit the sale of hamburgers at McDonalds, instead forcing people to eat insects³⁹⁵ (yes, insects are already a food source in much of the rest of the world, especially Asia).³⁹⁶

There are far more fundamental reforms needed in our agriculture and food system than are addressed in this chapter. Americans may love family farms, but they have been replaced by giant corporate agribusiness dominated by factory farms, a heavy use of fossil fuels (pesticides, fertilizers), monocrops, assembly line production of animals, and genetic engineering.

³⁹⁵ <https://nymag.com/intelligencer/article/fight-climate-change-without-eating-bugs.html>

³⁹⁶ <https://www.theguardian.com/environment/2017/may/05/eat-insects-and-fake-meat-to-cut-impact-of-livestock-on-the-planet-study>

One of my contributing editors, Liz Henderson, a policy coordinator for Northeast Organic Farm Association (NOFA-NY), observed that “no farm business comes anywhere near the size and power of the agribusinesses that are calling the shots. US agriculture is colonized by these concentrated megacorporations that supply chemicals, fertilizers, data control and buy, process, ship and sell what farms produce. It is time to regulate the biggest farm businesses (CAFOs) and stop pouring money into liquid manure management, synthetic nitrogen fertilizers and herbicides. Even more urgent is to dismantle corporate control with its cheap food policies and return to price supports, price limits, and supply management with mandatory conservation so that buyers pay farms the cost of production and the tax payers do not get stuck with the bill.”

One key movement is food sovereignty, “the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems.” La Via Campesina³⁹⁷ is central to this effort. This “global peasant movement” unites people to fight injustice in the food system, including organizing for women’s rights and against land grabs and the spread of genetically modified organisms.

Agriculture

One of the greatest threats posed by climate change is its negative impact on our food system. Agriculture is also a major source of greenhouse gas emissions.

Rising temperatures, migrating pests, and changing rainfall patterns threaten our ability to raise and distribute enough food to feed the world’s current population. More than 10% of the world’s population remains undernourished, and food shortages could lead to an increase in cross-border migration, as the U.S. has seen following the prolonged drought in Central America. A particular danger is that

³⁹⁷ <https://www.theguardian.com/environment/2017/may/05/eat-insects-and-fake-meat-to-cut-impact-of-livestock-on-the-planet-study>

food crises could develop on several continents at once. Food shortages are likely to affect poorer parts of the world far more than richer ones.³⁹⁸

It is estimated that global food production must increase by 60 to 100% to meet the expected rise in the world's population by 2050. Global yields of maize and wheat, the world's two most consumed crops, will decline significantly due to global warming in the coming decades.³⁹⁹

Climate change will disrupt food availability, reduce access to food, and affect food quality. Increases in temperatures, changes in precipitation patterns, increased extreme weather events, and reductions in water availability all threaten agricultural productivity. Climate change can also impact food distribution. For instance, in the U.S., the severe water shortages in 2012 impacted the Mississippi River, negatively including the distribution of grain and other food products in the mid-west. This also impacts the global food supply chain, reducing access and raising prices.⁴⁰⁰

Farmers are threatened both by flooding and drought. Flooding washes away fertile topsoil that farmers depend on and contaminates standing crops while droughts dry it out, making it more easily blown or washed away. Higher temperatures increase the water needs of crops. Some weeds, insects, and other pests benefit from higher temperatures and elevated CO₂, increasing their ability to hurt crop production. Shifting climates enable some agricultural pests to migrate to new areas where farmers had not previously dealt with them and where they have no natural predators.⁴⁰¹

The Environmental Protection Agency estimates that agriculture accounted for 11.2 percent of U.S. greenhouse gas emissions in 2020. Agricultural emissions include nitrogen (N₂O) from cropped and

³⁹⁸ <https://www.nytimes.com/2019/08/08/climate/climate-change-food-supply.html>

³⁹⁹ <https://www.un.org/en/academic-impact/worlds-food-supply-made-insecure-climate-change>

⁴⁰⁰ <https://climatechange.chicago.gov/climate-impacts/climate-impacts-agriculture-and-food-supply>

⁴⁰¹ <https://www.foodsystemprimer.org/food-production/food-and-climate-change/>

grazed soils, the production of synthetic fertilizer from natural gas, methane (CH₄) from enteric fermentation and rice cultivation, N₂O and CH₄ from managed livestock manure, and CO₂ from on-farm energy use.⁴⁰² The impact of the U.S. food system overall, including food processing and disposal, as well as the global deforestation driven by American's eating habits, is much greater. Transporting food across and between countries generates almost one-fifth of greenhouse gas emissions from the food sector – and affluent countries starting with the U.S. make a disproportionately large contribution.⁴⁰³

Large-scale and industrial agricultural operations generate high levels of greenhouse gas emissions – 29% of the world's total. A UN report found that humans have degraded 40% of the Earth's land surface, altering 70% of it. Four of the nine “planetary boundaries” – limits on how humans can safely use the planet's resources – have been exceeded. Food systems are the largest culprit, accounting for 80% of deforestation, 29% of greenhouse gas emissions and the leading share of biodiversity loss. 70% of the world's agricultural land is controlled by just 1% of farms, primarily large agribusinesses.⁴⁰⁴

The IPCC Special Report on Climate Change and Land noted that food supply per capita has increased more than 30% since 1961, accompanied by greater use of nitrogen fertilizers (an increase of about 800%) and water resources for irrigation (an increase of more than 100%). The food system is also under pressure from non-climate factors such as population and income growth and the demand for animal-sourced products. Fruit and vegetable production, a key part of healthy diets, will be negatively impacted by climate change. The IPCC has made recommendations to increase the productivity of land,

⁴⁰² <https://www.ers.usda.gov/topics/natural-resources-environment/climate-change/>; <https://farmdocdaily.illinois.edu/2021/02/synthetic-nitrogen-fertilizer-in-the-us.html>

⁴⁰³ <https://www.outlookindia.com/business/transporting-food-across-and-between-countries-contributes-to-ghg-emissions-new-research-news-203607>

⁴⁰⁴ <https://www.ers.usda.gov/topics/natural-resources-environment/climate-change/>

waste less food, and persuade more people to shift their diets away from cattle and other types of meat to plants. Examples of healthy and sustainable diets are high in coarse grains, pulses (edible seeds from leguminous plants), fruits and vegetables, and nuts and seeds; and, low in energy-intensive animal-sourced and discretionary foods (such as sugary beverages). Supply-side options include increased soil organic matter and erosion control, improved cropland, livestock, grazing land management, and genetic improvements for tolerance to heat and drought. Diversification in the food system is a key way to reduce risks.⁴⁰⁵

As the Union of Concerned Scientists and others have pointed out, the dominance of corporate agriculture in the U.S. is part of the problem. Industrial agriculture treats the farm as a crop factory based on monocrops and assembly-line livestock operations rather than a diverse sustainable ecosystem. This lack of diversity creates risks for farmers while increasing climate impacts such as changes in crop viability and encroaching pests. The heavy use of toxic chemicals as pesticides and herbicides increases the pollution in downstream communities as flooding increases. Many farms will seek to increase irrigation in response to rising temperatures and drought, further depleting water supplies. Rising temperatures will expose farm workers to unsafe working conditions. One positive aspect of the recent federal climate budget bill (the Inflation Reduction Act) was that it increased funding for conservation programs to assist farmers in adopting sustainable practices to make farms more climate resilient.⁴⁰⁶

A December 2022 report, *From Lab to Farm*, highlighted the low priority of the federal government in reducing the climate impact of agriculture. It noted climate mitigation and adaptation is not a statutory priority of the U.S. Department of Agriculture (USDA). Federal agencies “spent an estimated \$241 million per year on agricultural climate mitigation from 2017 to 2021. This amount is

⁴⁰⁵ <https://www.ipcc.ch/srccl/chapter/chapter-5/>

⁴⁰⁶ <https://www.ucsusa.org/resources/climate-change-and-agriculture>

roughly 35-fold less than that spent on U.S. clean energy innovation.” The majority of funding went to soil carbon sequestration.⁴⁰⁷

Republicans, climate deniers and the fossil fuel industry have used the call to move to more plant-based diets as an attack point in the campaign to continue the burning of fossil fuels. Donald Trump and Texas Governor Greg Abbot falsely contended that President Biden’s climate plan would prohibit Americans from buying a McDonald’s hamburger. The issue of meat versus vegetarian diet dovetails with the ongoing culture war in America.⁴⁰⁸

Livestock production however, is the largest impact from agriculture, accounting for 14.5 percent of global GHG emissions from human activities. Meat from ruminant animals (have a digestive system utilizing four stomachs), such as cattle and goats, are particularly emissions intensive.⁴⁰⁹ Livestock are also fed with corn and soy grown as monocrops produced with GMO seed, synthetic fertilizers and herbicides.

Regenerative Agriculture

Regenerative Agriculture uses farming and grazing practices to reverse climate change by rebuilding soil organic matter and restoring degraded soil biodiversity – resulting in both carbon drawdown and improving the water cycle. It seeks to rehabilitate the entire ecosystem placing a heavy premium on soil health with attention to water management, fertilizer use, and more. Such practices include compost application, cover crops, crop rotation, green manures, reduced tillage, organic production, diversified crops, and using beneficial plants to attract beneficial insects and pollinators. Rebuilding soil

⁴⁰⁷ <https://thebreakthrough.org/issues/food-agriculture-environment/from-lab-to-farm>

⁴⁰⁸ <https://www.vox.com/policy-and-politics/2021/4/26/22403599/biden-red-meat-ban-burger-kudlow>

⁴⁰⁹ <https://www.foodsystemprimer.org/food-production/food-and-climate-change/>

health is the keystone of enhancing agricultural climate resilience and combating climate change.⁴¹⁰

The Climate Reality Project describes regenerative agriculture practices as follows:

Conservation tillage: Plowing and tillage dramatically erode soil and releases large amounts of carbon dioxide into the atmosphere. By adopting low- or no-till practices, farmers minimize physical disturbance of the soil, and over time increase levels of soil organic matter, creating healthier, more resilient environments for plants to thrive, as well as keeping carbon in the ground.

Diversity: Different plants release different carbohydrates (sugars) through their roots, and various microbes feed on these carbohydrates and return a variety of nutrients back to the plant and soil.

Rotation and cover crops: Left exposed to the elements, soil will erode and the nutrients necessary for successful plant growth will either dry out or wash away. Planting the same plants in the same location can lead to a buildup of some nutrients and a lack of others. By rotating crops and deploying cover crops strategically, farms and gardens can infuse soils with increased (and more diverse) soil organic matter, often while avoiding disease and pest problems naturally.

Mess with it less: In addition to minimizing plowing, regenerative agriculture practitioners are cautious about chemical or biological activities that can damage long-term soil health. Misapplication of fertilizers and other soil additives disrupt the natural relationship between microorganisms and plant roots.⁴¹¹

The federal government provides some support to regenerative agriculture and conservation methods, but the demand for funding exceeds the supply. Federal policy, however, also supports inherently unsustainable practices, such as concentrated feeding operations,

⁴¹⁰ <https://sustainableamerica.org/blog/what-is-regenerative-agriculture/>;
<https://farmland.org/accelerate-regenerative-agriculture/>

⁴¹¹ <https://www.climaterealityproject.org/blog/what-regenerative-agriculture>

which produce large amounts of waste that cause significant greenhouse gas emissions and can runoff into water resources.

Indigenous People in the Americas practiced regenerative agriculture long before Europeans came. For many hundreds of years, they practiced intercropping, based on how the physical aspects of each plant complement one another and improve each other's health and growth. For instance, the Haudenosaunee (Iroquois) in the Northeast used the Three Sisters. The corn stalks provide a natural trellis for the beans to grow on and beans help the corn grow by adding nitrogen to the soil. The squash vines acted as a "living mulch" that maintains soil moisture and prevents weeds from growing. Indigenous Americans practiced agroforestry, the management of trees, crops, and animals together in a way that benefits each.⁴¹²

Project Drawdown on Agriculture⁴¹³

Project Drawdown is a nonprofit organization started in 2014 that promotes creative solutions to help reduce and then draw down the levels of greenhouse gases in the atmosphere. Their ideas, drawn from leading scientists, often think outside of the box in developing solutions, such as the role of educating girls. Below are some of their approaches to agriculture.

Shift Agriculture Practices. Better agriculture practices can lower emissions from cropland and pastures, including methane generated by growing rice and raising ruminants, nitrous oxide emitted from manure and overusing fertilizers, and carbon dioxide released by disturbing soils.

Climate and meat. Shifting to a plant-based diet not only reduces emissions but growing animals for food is also inefficient. It takes about five to seven kilograms of grain to produce one kilogram of beef. Each of those takes energy and water to produce, process, and transport.

⁴¹² <https://nfu.org/2020/10/12/the-indigenous-origins-of-regenerative-agriculture/>

⁴¹³ <https://drawdown.org/sectors/food-agriculture-land-use>

The problems with chemical agriculture. Synthetic pesticides and fertilizers are usually made from fossil fuels. Chemical farming uses more energy per unit of production than organic farms. Synthetic nitrogen fertilizers in soils produce nitrous oxide, a greenhouse gas about 300 times more powerful than carbon dioxide as a greenhouse gas. Organic farms rely on natural manure and compost for fertilizer. They store much more carbon in the soil.⁴¹⁴

Food closer to home. The estimates of how far the average meal travels from the farm to plate range from 750 to 1500 miles. Food grown closer to home produces fewer transportation emissions, is fresher and supports local farmers. As the distance food travels decreases, so does the need for processing and refrigeration to reduce spoilage.⁴¹⁵ (However, some note that in terms of climate impact, what we eat and how it is grown can be more impactful than just being grown locally.)⁴¹⁶

Silvopasture and Livestock. Silvopasture is an ancient practice that integrates trees and pasture into a single system for raising livestock. Silvopasture is significantly better than any grassland technique for reducing the methane emissions of livestock and sequestering carbon. Pastures strewn with trees sequester five to ten times as much carbon as those that are treeless. Project Drawdown notes that “The advantages of silvopasture are considerable, with financial benefits for farmers and ranchers. Livestock, trees, and any additional forestry products, such as nuts, fruit, and mushrooms, generate income on different time horizons. The health and productivity of both animals and the land improve. Because silvopasture systems are diversely productive and more resilient, farmers are better insulated from risk.” Silvopasture however often

⁴¹⁴ <https://davidsuzuki.org/living-green/food-climate-change/>

⁴¹⁵ <https://davidsuzuki.org/living-green/food-climate-change/>;

<https://foodwise.org/learn/how-far-does-your-food-travel-to-get-to-your-plate/>

⁴¹⁶ <https://www.vox.com/future-perfect/23132579/eat-local-csa-farmers-markets-locavore-slow-food>

runs counter to farming norms and can be costly and slow to implement.⁴¹⁷

Biochar

Biochar is an issue where there is not yet consensus as to its overall benefits, though there are many who promote it as a climate solution.

Biochar, a charcoal-like substance made from burning organic materials in a low or zero-oxygen environment, can improve the quality of soil and trap carbon dioxide in the earth for potentially hundreds, or even thousands, of years. A recent study suggests that it could reduce irrigation costs for farmers, thanks to its highly porous and water-absorbent properties. However, it is costly and works better in some regions than others. Biofuels Watch, which has been critical in the past of biochar, states that “we are still very far from having a reliable understanding of biochar’s impacts – both the impacts on soils and plant growth resulting from application of biochar, and impacts from land use change to supply biomass for the production of biochar.”⁴¹⁸

“Biochar benefits include decreasing soil acidity, retaining water and nutrients, removing unwanted contaminants, and providing a home for beneficial soil biology to thrive. Biochar is also known to persist in soil for millennia. Thousands of years ago, Amazons mixed biochar with their poor-quality soil to create terra preta (“black earth” in Portuguese), a soil product that is highly fertile to this day. Biochar has also been found in extremely fertile grassland soils called ‘Mollisols.’”⁴¹⁹

⁴¹⁷ <https://www.drawdown.org/solutions/silvopasture>

⁴¹⁸ <https://insideclimatenews.org/news/11122020/biochar-carbon-soil-agriculture/https://www.biofuelwatch.org.uk/2020/what-have-we-learned-about-biochar-since-2011/>

⁴¹⁹ <https://char-grow.com/simple-guide-biochar-benefits-uses>

Agriculture is Driving Deforestation

Forests take up carbon dioxide from the atmosphere and release oxygen during photosynthesis. When forests are growing, photosynthesis exceeds respiration, and the surplus carbon is stored in tree trunks and roots and in the soil in what is known as sequestration. When forests are cut down, much of that stored carbon is released into the atmosphere again as CO₂ as well as reducing the forest's ability to sequester carbon. It is estimated that CO₂ from tropical deforestation makes up around 10% of global warming pollution.⁴²⁰

A 2022 study found that logged tropical forests are a net source of carbon emissions for at least a decade afterwards. A prior study found that tropical forests are no longer carbon sinks as a result of deforestation and land degradation.⁴²¹

Every year the world loses around 50,000 square kilometers of forest, 95% in the tropics. Agriculture is responsible for at least three-quarters of this – clearing forests to grow crops, raise livestock and produce products such as paper. The expansion of pastureland to raise cattle is responsible for 41% of tropical deforestation, with soy and palm oil accounting for another 20%.⁴²²

The planet's largest areas of tropical forest are the Amazon basin in South America, the Congo Basin in Central Africa, and Southeast Asia. Amazonia has both the largest area of tropical forest and the highest rate of deforestation. Palm and other vegetable oils are the main drivers of deforestation in Southeast Asia; there are also large amounts of peaty soil, which releases CO₂ when cleared. There have been some positive results for efforts to reduce the clearings – such as by recognizing indigenous groups' sovereignty over their lands to civil society pressure on corporate deforesters to paying tropical countries that reduce their deforestation emissions, though

⁴²⁰ <https://www.ucsusa.org/resources/tropical-deforestation-and-global-warming>

⁴²¹ <https://www.carbonbrief.org/logged-tropical-forests-are-a-substantial-carbon-source-for-at-least-10-years/>

⁴²² <https://ourworldindata.org/what-are-drivers-deforestation>

unfortunately the Bolsonaro government in Brazil reversed much of the progress.⁴²³

In Amazonia, deforestation is killing Indigenous people who live in the forests for their survival. Forced from their forest homes, they are reduced from self-sufficiency to living on the sides of roads and/or depending on government handouts. The rates of disease, alcoholism, malnutrition, and suicide skyrocket. Similar problems are occurring in Indonesia due to palm oil. The forests there are home to about 50 to 70 million Indigenous people, about a quarter of the country's population.⁴²⁴

Planting seedlings after clearing forests is not a climate solution for various reasons,⁴²⁵ including that it takes decades before trees to grow enough to be major carbon sequesters.⁴²⁶ Reforestation (the process of replanting an area with trees) and afforestation (the process of creating a forest on land not previously forested) are notorious for displacing communities, aggravating land conflicts, disrupting food systems, and diminishing biodiversity. Land belonging to local communities is appropriated, privatized, and organized by companies in the Global North, often disregarding local community ownership of such lands.⁴²⁷

Deforestation destroys ecosystems that are vital to wildlife, a factor in why the planet is amid the sixth great extinction of species.⁴²⁸ When humans destroy their forest habitats, animals and insects seek shelter in nearby human communities. This unprecedented level of contact between humans and wildlife is dangerous because animals

⁴²³ <https://www.ucsusa.org/resources/tropical-deforestation-and-global-warming>

⁴²⁴ <https://www.hrw.org/news/2019/09/22/interview-deforestation-threatens-indonesias-indigenous-peoples>;

<https://www.survivalinternational.org/about/deforestation>

⁴²⁵ <https://www.vox.com/down-to-earth/22679378/tree-planting-forest-restoration-climate-solutions>

⁴²⁶ <https://grist.org/science/does-planting-trees-actually-help-climate-change/>

⁴²⁷ <https://350.org/fact-checking-false-solutions-3-carbon-offsetting-through-reforestation-and-afforestation/>

⁴²⁸ <https://www.worldwildlife.org/stories/what-is-the-sixth-mass-extinction-and-what-can-we-do-about-it>

can spread pathogens to humans, which can lead to pandemics such as COVID (though that exact link has not been established).⁴²⁹

Food Sovereignty

Food sovereignty is the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems. People need to be able to decide what food they want to grow, not to have that decision dictated by corporate interests. Advancing food sovereignty would require major food system changes to create environmental stewardship, land ownership, and labor practices that build power and rights among farmers, food chain workers, and consumers.⁴³⁰

The Global Campaign for Climate Justice makes food sovereignty a key demand. A food sovereignty approach increases resilience to crises, helps mitigate the impacts of climate change, and ensures that people live in dignity and harmony with the environment. Their demands include: sustainable climate change resilient agriculture and agro-ecology; democratic access to land and land-based resources; the rights of small food producers; the recognition of women's roles and rights in agriculture, aquaculture, fishing, and pastoral systems; farmers' control of seed diversity; and the global re-organization of food production and trade towards prioritizing consumption of locally produced food.⁴³¹

⁴²⁹ <https://thehumaneleague.org/article/effects-of-deforestation>

⁴³⁰ <https://www.urban.org/urban-wire/food-sovereignty-can-advance-racial-equity-and-climate-resilience>

⁴³¹ <https://demandclimatejustice.org/fight-for-climate-justice/>

CHAPTER 7

FALSE CLIMATE SOLUTIONS

A successful transition to a clean renewable energy future will involve trillions of dollars. Whenever there are such large sums of money involved, there are many who will seek to tap into this funding stream for their own personal profit rather than the common good.

Industry spokespeople travel the country peddling the newest technology to government officials to solve some critical problem. They often say they cannot share the details of the new technology because it is proprietary information that they can't let their competitors (or the public) see, but rest assured, it has worked elsewhere, so let us get rid of this headache for you and in the long run we will save you money. Often they will say that the older version of this technology (for example incineration or nuclear power) admittedly had some problems, but the newest generation has solved them.

False solutions tend to reflect the belief by many that technology and engineering can solve all problems – though it usually avoids examining the root cause of the problems. Critics contend that it often reflects the same mindset or economic approach that created the problem in the first place and it invariably ends up costing a lot more than predicted. The weaknesses and drawbacks of such solutions are often ignored until many years after they have been put into place.

The proposals included in this chapter have varying levels of support. There are certainly credible scientists and advocates who are motivated by the common good who support a role for some of these solutions (e.g., Dr. James Hansen on nuclear, the need for direct air capture, green hydrogen). Others argue that the threats posed by global warming are so dire that we have to be willing to explore all

alternatives, and it is probably more politically feasible to advance approaches that have strong corporate backing. Corporate support is not a test of whether a technology is best for society as a whole however, and its main impact is often to increase the revenues of the industry advocating for technological solutions.

Since it is increasingly clear that the world is not reducing emissions nearly fast enough to keep global warming below 1.5 degrees C, many assert that we have to figure out how to pull carbon out of the atmosphere even though the existing technological approaches are far from feasible. While they acknowledge that natural solutions have a role in capturing carbon, they argue that such approaches alone are not sufficient.

False solutions often contradict the precautionary principle, which emphasizes caution in dealing with new technology, taking time to review before leaping into innovations that may prove disastrous. The precautionary principle has four key components: taking preventive action when the impact of something new is uncertain; shifting the burden of proof to the proponents of an activity; exploring a wide range of alternatives to possibly harmful actions; and increasing public participation in decision making.

A study done by Penn State found that 77% of Americans believe that we have an overreliance on technology.⁴³² Environmentalists often argue that scientists and engineers have far too much faith in the ability of technology to solve problems, and that they should focus more on stopping the cause of the problem. Others counter that too many environmentalists irrationally oppose the introduction of new technology.

One criticism of false climate solutions is that proponents often focus on whether it's possible to make the technology work rather than on whether it's the best and most cost-effective way to solve the problem. Can the solution be scaled up fast enough to avoid climate collapse?

⁴³² <https://sites.psu.edu/siowfa15/2015/10/23/is-society-too-dependent-on-computersphones/>

On December 13, 2022, it was announced that there had been a significant technological breakthrough in the development of nuclear fusion, as researchers had achieved a low amount of net energy gain for the first time. Like the sun, fusion occurs when two atoms slam together to form a heavier atom, creating vast amounts of energy. Not only does fusion produce four times as much energy as nuclear fission (and a million times more energy than burning fossil fuels), but it also does not produce highly radioactive waste.⁴³³

Less media attention, however, was paid to the fact that scientists have been working for 80 years to achieve this critical initial step, and that decades more are likely needed before all of the many other challenges with it are solved.⁴³⁴ While it seems to make sense to continue to invest in developing nuclear fusion, it would not make sense to scale back investments in clean energy systems that are already viable or to reduce efforts to halt greenhouse gas emissions.

It's ok to hope for miracles, but it's not ok to rely on them to save life on Earth.

False Climate Solutions

False climate solutions do not address the root causes of climate change but have the potential to worsen the crisis. While they often provide some climate benefits, they are usually promoted by those whose main agenda is making profits from a particular business model – often sold as a new technology - and providing a future role for the fossil fuel industry. Such solutions are often expensive, have debatable impacts on reducing emissions, and can divert resources from more climate friendly solutions. Yet there are invariably some benefits that their proponents highlight.

⁴³³ <https://www.nytimes.com/2022/12/13/science/nuclear-fusion-energy-breakthrough.html>

⁴³⁴ <https://www.livescience.com/fusion-ignition-scientists-skeptical-explained>

The chapter draws heavily from *False SOLUTIONS Gas and trash: how the fossil fuel industry is holding back a just transition*⁴³⁵ by NY Renews. Food & Water Watch, Center for Biological Diversity, and many environmental justice groups have also written extensively about false climate solutions.

False climate solutions are often opposed by environmental justice groups that represent the frontline communities most directly harmed by climate change. This has been especially the case with approaches such as carbon offsets which continue to allow pollution in low-income and communities of color in exchange for “beneficial” climate impacts (such as planting trees) elsewhere.

False climate solutions can initially attract widespread support as the proponents do a good job of highlighting the positive impacts. It may take a few years before their negative impacts or tradeoffs become apparent.

One example is garbage incineration (waste-to-energy projects), which in the early 1980s was initially embraced by many environmental groups as taking trash that was being landfilled and causing problems such as water contamination and making it valuable by burning it for electricity or heat. Only later did groups realize the enormous air pollution problems being created (e.g., dioxin, heavy metals) at an exceedingly high financial cost, while also creating barriers to local governments expanding recycling and waste reduction, plus the remaining toxic ash still had to be landfilled.

The false climate solutions outlined below have varying levels of support among climate activists and scientists. Some have positive benefits in limited applications, when used on site where they are produced or targeting specific industrial processes.

The role of nuclear power, especially continuing the life of existing facilities, is probably the one with the greatest division of opinion. The use of hydrogen has a generally benign environmental impact but creating it raises various environmental concerns; most

⁴³⁵ <http://bit.ly/falsesolutions>

climate activists oppose “blue” hydrogen, but many see a limited role for “green” hydrogen.

There is also general agreement that it’s necessary to figure out ways to remove carbon from the atmosphere, but there is significant disagreement over the merits of various approaches. The Intergovernmental Panel on Climate Change has promoted carbon capture, partially because it recognizes that its timeline to halt greenhouse gas emissions is too slow to keep global warming below the 1.5 degrees Celsius target.

Nuclear

There is a division of opinion among climate activists and scientists about whether nuclear power should be viewed as a solution to our climate problems. A main benefit is that the emissions from nuclear power plants are considered by many to be carbon free (or at least very low carbon). Another major benefit is that nuclear has the highest capacity rating for electric production, meaning that it can run at full capacity almost all the time, which is important for grid reliability and to meet peak demand.⁴³⁶

While the environmental and financial concerns with nuclear power are outlined below, it’s important to remember that nuclear power, dependent on uranium as its fuel, is not renewable energy.⁴³⁷

Dr. James Hansen, the former NASA scientist who sounded the alarm in Congress about climate change three decades ago, is among the most prominent climate advocates advocating nuclear power.⁴³⁸ Hansen co-authored a study that estimated 1.8 million as the number of lives saved by using nuclear power rather than fossil fuels since 1971. The study also estimated the saving of up to 7 million lives in the next four decades, along with substantial reductions in carbon

⁴³⁶ <https://www.energy.gov/ne/articles/advantages-and-challenges-nuclear-energy>

⁴³⁷ <https://www.clean-energy-ideas.com/nuclear-energy/is-nuclear-energy-renewable-or-nonrenewable/>

⁴³⁸ <https://www.scientificamerican.com/article/nuclear-power-must-make-a-comeback-for-climate-s-sake/>

emissions, if nuclear power replaced fossil fuel usage on a large scale.⁴³⁹

My experience over 50 years is that most scientists have been supportive of nuclear technology, with the opposition coming primarily from the environmental community. Scientists sometimes tend to focus more on whether something is technologically feasible, while environmentalists tend to focus more on the impact on the environment and public health. One of the most prominent scientists who spoke against nuclear in its early days, Dr. Barry Commoner,⁴⁴⁰ was frequently criticized for taking positions outside his field of specialty, which was microbiology. Commoner said that while it was possible for nuclear power to boil water to be turned into electricity, he compared it to using a chainsaw to cut butter; there were much simpler and safer ways to do it.

As outlined below, the length of time to build new nuclear power plants is so long that realistically new plants would come online too late to impact whether or not global warming stays below the 1.5-degree threshold. Building a new nuclear power plant has a higher carbon footprint than existing ones, due to carbon emissions that occur during construction (for example the use of cement) and in the mining and processing of nuclear fuel.⁴⁴¹ In addition, the enormous costs associated with building nuclear power plants would be more cost-effectively used to reduce emissions through investments in renewable energy, battery storage, or other means.

Some climate advocates see hope in a new type of nuclear power technology — small modular reactors that are expected to be quicker to build and promise more safe and efficient carbon-neutral energy production. These reactors still face years of development and

⁴³⁹ <https://pubs.acs.org/doi/full/10.1021/es3051197?source=cen>

⁴⁴⁰ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5922217/>;

<https://www.condehouse.com/journal/story13/> ;

https://www.huffpost.com/entry/celebrating-barry-commoner-father-of-the-modern-environmentalist_b_592b8967e4b08861ed0ccac5

⁴⁴¹ <https://impactful.ninja/the-carbon-footprint-of-nuclear-power/>; see also

<https://theecologist.org/2015/feb/05/false-solution-nuclear-power-not-low-carbon>

regulatory approval. However, the Union of Concerned Scientists raises concerns that the companies that design SMRs are “putting too much stock” in what they claim to be “inherent safety features.” Computer simulations do not always detect problems that occur in the real world.⁴⁴²

Former top nuclear regulatory administrators from the United States, France, Germany, and Great Britain issued a joint statement⁴⁴³ in January 2022 strenuously opposing any expansion of nuclear power as a strategy to combat climate change. They pointed out that new nuclear plants are too costly, too slow to build, not carbon free, not renewable, and still have the huge problem of storage of radioactive waste.

Half of independent studies on the carbon footprint of nuclear power, not funded by the fossil fuel industry, found it to be insignificant; half found it significant but still on the low side. Another analysis found that “half of the most rigorous published analyses have a carbon footprint for nuclear power above the limit recommended by the UK government’s official climate change advisor.”⁴⁴⁴

The argument to keep existing nuclear plants open is stronger, at least until sufficient renewable energy is brought online to shut them down. Since the plants are already built, they are usually described as having zero carbon emissions. The carbon footprint of storing the waste for tens of thousands of years is seldom factored in however, and there are some emissions related to fuel production, transportation, and decommissioning.

Like any other technology, nuclear power plants experience wear and tear during their operations; continuing to run them past their

⁴⁴² <https://www.pbs.org/newshour/science/how-the-next-generation-of-nuclear-reactors-could-be-smaller-greener-and-safer>

⁴⁴³ <https://www.powermag.com/blog/former-nuclear-leaders-say-no-to-new-reactors/>

⁴⁴⁴ <https://theecologist.org/2015/feb/05/false-solution-nuclear-power-not-low-carbon>

expected 40-year life increases the risk of accidents.⁴⁴⁵ They also remain awfully expensive to operate.

New York Governor Andrew Cuomo pushed through an estimated \$7.6 billion bailout over 12 years to keep three old Upstate New York nuclear power plants operating after their owner wanted to close them since they were not economical. The initial cost of the bailout skyrocketed after a Supreme Court decision in a Maryland case rejected his original legal justification for the bailout and he abruptly switched to the social cost of carbon emissions avoided, which raised the cost ten-fold.⁴⁴⁶ This bailout led to other states, such as Ohio, taking similar actions (although Ohio's was repealed after a \$61 million political corruption scandal).⁴⁴⁷

The cost of nuclear power is much higher than other energy sources. The cost per megawatt hour to build a new nuclear plant is at a minimum \$112 (it averages \$151, with a high end of \$181), compared to \$46 for utility-scale solar, \$42 for combined cycle gas, and \$30 for wind. Nuclear power needs government subsidies to remain financially viable. Capital costs for nuclear plants run into the tens of billions of dollars, significantly more expensive than wind, solar and gas plants. The U.S. nuclear industry depends on a continued high level of government financial support for building new plants and operating existing ones.⁴⁴⁸

The costs for nuclear power cited above do not include the cost of the major nuclear meltdowns. For example, the estimated cost to clean up the damage from the three Fukushima reactor core meltdowns was \$460 to \$640 billion. This equates to \$1.2 billion, or 10 to 18.5 percent of the capital cost, of every nuclear reactor worldwide. Nor did this include the cost of storing nuclear waste for

⁴⁴⁵ <https://thebulletin.org/2019/08/aging-nuclear-plants-industry-cost-cutting-and-reduced-safety-oversight-a-dangerous-mix/>

⁴⁴⁶ https://www.huffpost.com/entry/76-billion-bailout-of-ny_b_11302708

⁴⁴⁷ <https://www.nirs.org/ohio-ends-nuclear-bailout-scheme-heres-what-it-means/>

⁴⁴⁸ <https://climatenexus.org/climate-news-archive/nuclear-energy-us-expensive-source-competing-cheap-gas-renewables/>

tens of thousands of years. In the U.S. alone, this costs \$500 million annually for the one hundred civilian nuclear plants.⁴⁴⁹

Amory Lovins of the Rocky Mountain Institute has released an analysis debunking the idea that highly unprofitable, economically distressed nuclear plants should be further subsidized to meet financial, security, reliability, and climate goals. Closing costly-to-run nuclear plants and reinvesting their saved operating costs in energy efficiency provides cheaper electricity, increases grid reliability and security, reduces more carbon, and preserves (not distorts) market integrity - all without subsidies.⁴⁵⁰

Long Standing Problems with Nuclear⁴⁵¹

The waste generated by nuclear reactors remains radioactive for tens to hundreds of thousands of years. Currently, there are no long-term storage solutions for radioactive waste. Most are stored in temporary, above-ground facilities. These facilities are running out of storage space, so the nuclear industry is turning to other types of storage that are more costly and potentially less safe

The waste must be safely stored for many millennia - longer than any human civilization has survived. According to the Nuclear Information and Resource Services, “irradiated nuclear fuel rods discharged from commercial nuclear power plants are highly radioactive, a million times more so than when they were first loaded into a reactor core as ‘fresh’ fuel. If unshielded, irradiated nuclear fuel just removed from a reactor core could deliver a lethal dose of radiation to a person standing three feet away in just seconds. Even after decades of radioactive decay, a few minutes unshielded exposure

⁴⁴⁹ <https://eu.boell.org/en/2021/04/26/7-reasons-why-nuclear-energy-not-answer-solve-climate-change>

⁴⁵⁰ <https://www.rmi.org/about/news-and-press/press-release-subsidizing-unprofitable-nuclear-plants-not-solution-grid-reliability-security-carbon-emissions/>

⁴⁵¹ <https://www.greenamerica.org/fight-dirty-energy/amazon-build-cleaner-cloud/10-reasons-oppose-nuclear-energy>

could deliver a lethal dose. Certain radioactive elements (such as plutonium-239) in ‘spent’ fuel will remain hazardous to humans and other living beings for hundreds of thousands of years. Other radioisotopes will remain hazardous for millions of years. Thus, these wastes must be shielded for centuries and isolated from the living environment for hundreds of millennia. Highly radioactive wastes are dangerous and deadly wherever they are, whether stored at reactor sites (indoors in pools or outdoors in dry casks); transported on the roads, rails, or waterways; or dumped on Native American lands out West.”⁴⁵²

Nuclear energy also allows nations to obtain or harvest plutonium or enrich uranium to manufacture nuclear weapons, a problem noted by the Intergovernmental Panel on Climate Change in their 2014 report on energy: “Barriers to and risks associated with an increasing use of nuclear energy include operational risks and the associated safety concerns, uranium mining risks, financial and regulatory risks, unresolved waste management issues, nuclear weapons proliferation concerns, and adverse public opinion.”⁴⁵³

Nuclear power plants are a potential terrorist target. The flight path of several of the planes that hit the World Trade Center on 9/11 meant they could have hit the Indian Point power plant instead.⁴⁵⁴ An attack on a nuclear plant could put population centers at risk, as well as ejecting dangerous radioactive material into the atmosphere. Nuclear power plants have been a major concern during the recent Russian invasion of Ukraine.⁴⁵⁵

Accidents at nuclear plants have happened and a full-melt down of the core of a nuclear reactor would be disastrous. Nuclear

⁴⁵² <https://www.nirs.org/radioactive-waste/hlw/>

⁴⁵³ <https://eu.boell.org/en/2021/04/26/7-reasons-why-nuclear-energy-not-answer-solve-climate-change>

⁴⁵⁴ <https://www.resilience.org/stories/2004-07-25/911-report-reveals-al-qaeda-ringleader-contemplated-ny-area-nuclear-power-plant-p/>

⁴⁵⁵ <https://thebulletin.org/2022/08/experts-weigh-in-on-the-risk-of-disaster-at-a-ukrainian-nuclear-power-plant/>

proponents argue that the small number of major accidents have been so low that it shows it is safe. Opponents used the same data to make the opposite point in light of the number of deaths and damage that would result in a worst-case scenario. One study calculated that based on the number of nuclear meltdowns that have occurred, such events may occur once every 10 to 20 years. In the event of such a major accident, half of the radioactive caesium-137 would be spread over an area of more than 1,000 kilometers away from the nuclear reactor.⁴⁵⁶ To date, 1.5% of all nuclear power plants ever built have experienced some level of meltdown.⁴⁵⁷

The risks and costs of a potential major nuclear accident are so high that the private insurance industry has required a federal law to cap the liability in case of a nuclear accident (the Price Anderson Act).⁴⁵⁸

The 1986 Chernobyl disaster in Ukraine led to the deaths of thirty employees in the initial explosion and has had negative health effects on thousands across Eastern Europe. A tsunami in 2011 caused three nuclear meltdowns in Fukushima, Japan, resulting in the release of radioactive materials. In both disasters, hundreds of thousands were relocated, millions of dollars spent, and the radiation-related deaths are still being evaluated. Cancer rates among those living close to Chernobyl and Fukushima, especially among children, have risen significantly. In March 1979, a mechanical and human errors at the Three Mile Island nuclear plant in Pennsylvania caused the worst commercial nuclear accident in U.S. history, resulting in a partial meltdown.⁴⁵⁹

⁴⁵⁶ <https://www.mpg.de/5809418/reactor-accidents>

⁴⁵⁷ <https://eu.boell.org/en/2021/04/26/7-reasons-why-nuclear-energy-not-answer-solve-climate-change>

⁴⁵⁸

https://en.wikipedia.org/wiki/Price%E2%80%93Anderson_Nuclear_Industries_Indemnity_Act

⁴⁵⁹ <https://eu.boell.org/en/2021/04/26/7-reasons-why-nuclear-energy-not-answer-solve-climate-change>

In addition to the significant risk of cancer from the fallout from nuclear disasters, there are increased health risks for those who reside near a nuclear power plant, especially for childhood cancers such as leukemia. Workers in the nuclear industry are also exposed to higher-than-normal levels of radiation, with a higher risk of death from cancer. A study of 4,000 uranium miners between 1950 and 2000 found that 405 (10%) died of lung cancer, six times higher than expected based on smoking rates alone. Sixty-one others died of mining related lung diseases.⁴⁶⁰

Native Americans in the U.S. have been disproportionately harmed by mining for uranium. The government usually located reservations on land that were presumed to be worthless at the time. The Navajo and Hopi nations are among the most negatively impacted. From 1946 to 1968, 13 million tons of uranium were mined on Navajo land. The largest underground uranium mine on Navajo and Hopi lands operated from 1979 to 1990. More than 1,000 uranium mines on the reservation are abandoned, unreclaimed, and highly radioactive. Six hundred dwellings on Navajo tribal lands are contaminated with radiation. Residents of former uranium mining areas there suffer from cancer and leukemia clusters and birth defects.⁴⁶¹

Many consider the worst American nuclear accident to have been on July 16, 1979, when a dam near Window Rock, Arizona failed, releasing 1,100 tons of uranium waste and 94 million gallons of radioactive water into the Rio Puerco and through Navajo lands, a toxic flood that had devastating consequences on the surrounding area.⁴⁶²

Nuclear supporters – like proponents of other dangerous technologies – argue that the new generation of reactors solve the

⁴⁶⁰ <https://eu.boell.org/en/2021/04/26/7-reasons-why-nuclear-energy-not-answer-solve-climate-change>

⁴⁶¹ <https://www.culturalsurvival.org/publications/cultural-survival-quarterly/nuclear-war-uranium-mining-and-nuclear-tests-indigenous>

⁴⁶² <https://www.vice.com/en/article/ne8w4x/church-rock-americas-forgotten-nuclear-disaster-is-still-poisoning-navajo-lands-40-years-later>

problems of the older versions, although they tend not to admit problems with the older plants.

Some promote thorium as a “greener” nuclear option. While it has been around since the 1950s - an experimental 10-megawatt liquid fluoride thorium reactor did run for five years during the 1960s at Oak Ridge National Laboratory using uranium and plutonium as fuel – it’s still a theoretical, next generation nuclear technology. As *The Guardian* reported in 2011: “Without exception, [thorium reactors] have never been commercially viable, nor do any of the intended new designs even remotely seem to be viable. Like all nuclear power production, they rely on extensive taxpayer subsidies; the only difference is that with thorium and other breeder reactors these are of an order of magnitude greater, which is why no government has ever continued their funding.”⁴⁶³

Hydrogen – Blue vs. Green

Hydrogen is another divisive issue among climate activists, particularly with respect to how it is produced. The main waste product from the use of hydrogen is water. But while its use is carbon free, its production often involves the use of fossil fuels.

Climate activists generally oppose “blue hydrogen” which is produced mainly from natural gas. The controversial carbon capture technology seeks to capture the carbon used in making hydrogen.⁴⁶⁴

Many climate activists, within limits, support green hydrogen, which is produced by splitting water into hydrogen and oxygen using renewable electricity. But there are other environmental concerns with green hydrogen, and most groups support a limit on the use of green hydrogen (e.g., for local use, certain industrial and transportation uses.)

⁴⁶³ <https://www.theguardian.com/environment/2011/jun/23/thorium-nuclear-uranium>

⁴⁶⁴ <https://news.mit.edu/2022/3-questions-emre-gencer-blue-hydrogen-1017>

Color is big thing with hydrogen, with traditional hydrogen often referred to as grey or black. Pink hydrogen is produced by using nuclear power

Food & Water Watch is one of the strongest opponents of hydrogen, with significant concerns about even green hydrogen. It argues that “Hydrogen entrenches fossil fuel use and infrastructure, as well as the resulting pollution in frontline communities.” It notes that hydrogen production would consume the annual equivalent of water used by 34 million Americans. Jasmin Vargas, a Food & Water Watch organizer, called hydrogen “fundamentally racist and inequitable,” due to the potential nitrogen oxide pollution it could cause. Opponents argue that nitrogen oxide, which can damage lungs, poses more of a threat than current natural gas technology.⁴⁶⁵

Hydrogen’s main climate benefit is to reduce the carbon intensity of on-site industrial production processes (such as in cement manufacture), which require the high temperatures of burning fossil fuels. More than one quarter of global emissions come from on-site industrial processes involving fossil fuels. The problem is that hydrogen production in itself is carbon intensive since almost all of it is presently produced from fossil fuels.

The global demand for hydrogen in 2019 was 70 million metric tons (Mt). According to the Center on Global Energy Policy, half was used to make ammonia and fertilizers with the other half used in petrochemical refineries or production.. There are 169 hydrogen projects in 162 countries. Worldwide, 98% of hydrogen is made from fossil fuels with no CO₂ emissions control and is responsible for 830 Mt of CO₂ each year. In the U.S., 95% of hydrogen is produced by a reaction between a methane source, such as natural gas, and high-temperature steam (700°C–1,100°C), referred to as steam methane reforming (SMR). About 4% is produced through coal gasification, a

⁴⁶⁵ <https://www.lamag.com/citythinkblog/l-a-city-council-okays-power-plant-switch-to-racist-green-hydrogen/>;
<https://www.foodandwaterwatch.org/2022/10/24/the-dirty-side-of-green-hydrogen/>

process that involves reacting coal with oxygen and steam under high pressures and temperatures, and 1% is produced from electrolysis. Globally, 76% of hydrogen is produced from natural gas by SMR, with 22% produced through coal gasification and 2% from electrolysis. Hydrogen produced from uncontrolled fossil fuels is often referred to as grey hydrogen.⁴⁶⁶

With gas currently providing the largest share of the world's heating, it should come as no surprise that the gas industry has been overselling the idea of converting gas infrastructure to run on hydrogen. Hydrogen is being promoted through a powerful international, political and media machine, associated with the fossil fuel industry. The use of hydrogen made from natural gas with carbon capture and storage (CCS) could keep gas flowing through infrastructure that would otherwise be stranded and maintain the need for oil and gas development and processing facilities through which hydrogen can be produced. No color of H₂ makes sense to decarbonize heating and pretending otherwise risks delaying urgent action to slash emissions.⁴⁶⁷

Blue Hydrogen

Blue hydrogen is hydrogen produced from natural gas with a process of steam methane reforming, where natural gas is mixed with very hot steam and a catalyst. A chemical reaction occurs creating hydrogen and carbon monoxide. Water is added to that mixture, turning the carbon monoxide into carbon dioxide and more hydrogen. If the carbon dioxide emissions are then captured and stored underground, the process is considered carbon-neutral, and the resulting hydrogen is called blue hydrogen. However, carbon capture and storage (discussed in more detail later) is grossly ineffective for reducing

⁴⁶⁶ <https://www.energypolicy.columbia.edu/research/article/hydrogen-fact-sheet-production-low-carbon-hydrogen>

⁴⁶⁷ <https://www.rechargenews.com/energy-transition/wrong-side-of-history-wake-up-to-the-hype-around-green-hydrogen-for-heating/2-1-1282365>

greenhouse gas emissions and may also make local air pollution worse, while its high costs divert resources away from renewables.⁴⁶⁸

There's controversy over blue hydrogen because natural gas production inevitably results in methane emissions from leaks of methane from the drilling, extraction, and transportation process. Cornell and Stanford University researchers found that the use of blue hydrogen is more harmful than once thought due to the high amounts of natural gas needed to fuel the process, combined with the escape of "fugitive" carbon dioxide and methane emissions produced from extraction. The study found that blue hydrogen utilizes inefficient carbon capture and storage technologies.

The study found that total carbon dioxide equivalent emissions for blue hydrogen are only 9-12% less than for grey hydrogen. While carbon dioxide emissions are lower, fugitive methane emissions for blue hydrogen are higher because of an increased use of natural gas to power the carbon capture. The greenhouse gas footprint of blue hydrogen is more than 20% greater than burning natural gas or coal for heat and some 60% greater than burning diesel oil for heat.⁴⁶⁹

Green Hydrogen

Hydrogen can be produced through electrolysis of water, splitting water into hydrogen and oxygen. Electrolysis generates no direct greenhouse gas emissions. If clean, renewable energy electricity is used for the electrolysis, the zero-carbon hydrogen is referred to as green hydrogen. Presently however, green hydrogen can be three times more expensive than other hydrogen, hitting \$16.80 per kilogram in the U.S. in July 2022, though the U.S. Department of Energy hopes to lower the cost of green hydrogen to \$1 per kilogram.⁴⁷⁰

⁴⁶⁸ <http://bit.ly/falsesolutions>

⁴⁶⁹ <https://onlinelibrary.wiley.com/doi/full/10.1002/ese3.956>

⁴⁷⁰ <https://www.weforum.org/agenda/2021/12/what-is-green-hydrogen-expert-explains-benefits/>; <https://www.utilitydive.com/news/green-hydrogen-prices-global-report/627776/>

Green hydrogen made through electrolysis has a fair amount of support among climate activists. Targeted uses for energy storage and hard-to-electrify niche sectors could be a positive. Larger scale substitution of hydrogen for fossil fuels however, raises some concerns. Blending or substituting hydrogen into the fossil gas network reinforces gas combustion infrastructure as part of our economy, while also raising fuel costs and creating several technical challenges.

A report on false climate solutions⁴⁷¹ by NY Renews laid out a number of concerns with hydrogen, including green hydrogen:

“Producing hydrogen is also water-intensive, and severe water stress, already a significant issue in some parts of the country, is another potential harm. Producing 1kg of hydrogen via electrolysis uses 18.04 kg of water, in addition to the water lost in the distillation process, which nearly doubles that amount. Combustion of hydrogen for electricity, heating, and industrial processes also raises serious environmental justice concerns, threatening significant emissions of ozone-forming nitrogen oxides that contribute to respiratory distress.”⁴⁷²

NY Renews also points out that “green hydrogen uses large amounts of electricity to produce hydrogen from water, and so by definition it is only as ‘green’ as the power grid from which it draws. This can mean either that green hydrogen drives up GHG emissions from a dirtier grid, or it diverts substantial renewable electricity from a cleaner grid.”

Intensive power demand may be the single biggest barrier to green hydrogen. For example, the International Energy Agency finds that hydrogen demand in the European Union will require 3,600 terrawatt hours of renewable electricity, almost equal to total current electricity demand in the region.⁴⁷³ Heavy draw-down of renewable

⁴⁷¹ <http://bit.ly/falsesolutions>, pp. 42 - 45

⁴⁷² <http://bit.ly/falsesolutions>, pp. 42 – 45;

https://www.foodandwaterwatch.org/wp-content/uploads/2023/02/FSW_2302_HydrogenWaterUse.pdf

⁴⁷³ <https://www.iea.org/reports/the-future-of-hydrogen>

electricity for green hydrogen electrolysis is especially concerning given that the renewable power supply will likely need to grow by 100% or more in the first place - to support electrification of other major sectors such as transportation and buildings.

Among the environmental justice concerns NY Renews cited is evidence that combustion of hydrogen is a potent source of local pollution, particularly nitrogen oxides (NOx). Power plants burning a blend of gas and hydrogen may emit higher levels of NOx than with fossil gas alone. Indoor air quality already compromised by gas appliances may be further compromised by gas and hydrogen fuel mixes. At least two studies also point to escalated NOx emissions in industrial settings powered by gas and hydrogen, potentially exposing workers to health risks.

Hydrogen also presents drawbacks in transmission and distribution. At higher concentrations, it can cause embrittlement of metal pipes and containers. Leakage and safety risks in gas distribution may also be elevated with blending of hydrogen.

NY Renews' report did acknowledge potential benefits from green hydrogen, if produced in limited quantities for specific uses. It could power a fuel cell infrastructure to durably store excess renewable power when it is available. It could also be used for select industrial processes, such as for steel and cement, combined with substantial abatement effects to reduce the amount of greenhouse gas emissions. Some transportation uses could be appropriate, particularly heavy trucks, barges, aircraft, and port equipment.

Groups like the Sierra Club that support green hydrogen do so only under these certain conditions:

1. Green hydrogen is a promising solution only for uses that cannot otherwise directly rely on clean electricity, which is much more efficient.

2. Green hydrogen should not be used to justify a buildout of facilities that otherwise increase pollution or fossil fuel use.

3. If green hydrogen is being used, the goal should be to switch to 100 percent green hydrogen once the technology is available. We

should not support projects that label themselves as “sustainable” because their fuel source includes a small fraction of hydrogen when the lion’s share of it is fracked gas.⁴⁷⁴

Some scientists have raised concerns that support for green hydrogen in the recent Inflation Reduction Act contains loopholes that might lead to increased emissions. Dr. Leah Stokes wrote in the NY Times that “one estimate suggests that lax rules could double the greenhouse gas pollution already created by today’s dirty gray hydrogen to more than 220 million tons of carbon emissions per year. That’s like 26 new coal plants belching out pollution every year. And fossil fuel companies like BP and utilities like Constellation are already lobbying the government for the loose rules that could create a dirty hydrogen monster.”⁴⁷⁵

Carbon Capture and Storage (CCS) – and Direct Air Capture

Carbon capture is another issue on which the opinion of climate activists is divided. The idea is to capture carbon and remove it, either before or after it goes into the atmosphere (e.g., direct air capture). With global carbon emissions of around 420 ppm, far above the supposed target of 350, scientists argue that some level of carbon removal will be necessary – especially since the Intergovernmental Panel on Climate Change’s proposed timeline for emission cuts are inadequate to keep warming below the 1.5-degree target.

Natural carbon removal options, which have widespread support, include regenerative agriculture practices that increase soil carbon content, such as composting, cover cropping, and improved grazing management, afforestation, reforestation, and the restoration of coastal and marine habitats.

⁴⁷⁴ <https://www.sierraclub.org/articles/2022/01/hydrogen-future-clean-energy-or-false-solution>

⁴⁷⁵ <https://www.nytimes.com/2023/04/14/opinion/hydrogen-fuel-tax-credit-climate-change.html>

Carbon capture and sequestration/storage (CCS) is the process of capturing carbon dioxide formed during power generation and industrial processes and storing it so that it is not emitted into the atmosphere. The recent Inflation Reduction Act invested \$12 billion in CCS.⁴⁷⁶ The earlier bipartisan infrastructure bill signed by President Biden had another \$5 billion.⁴⁷⁷

The biggest CCS projects in the country have been multibillion-dollar failures. Wenonah Hauter of Food and Water Watch notes that “Even the world’s largest carbon direct air capture facility that is currently under construction is expected to remove only 0.0001 percent of the CO₂ emitted globally per year. Carbon capture would not reduce the other forms of deadly air pollution created by fossil fuel plants, or the water contamination caused by fracking, or the toxic waste created by drilling.” CCS continues to exist only because of massive subsidies from the federal government.⁴⁷⁸

Most climate activists oppose carbon capture proposals that seek to remove carbon before it escapes into the atmosphere as a thinly disguised way to continue to allow for the burning of fossil fuels. In addition, the billions spent on models show that it is too expensive and does not work. Due to the large amount of energy required to power carbon capture and the life cycle of fossil fuels, Food and Water Watch points out that carbon capture in the U.S. has actually put more CO₂ into the atmosphere than it has removed.⁴⁷⁹ There are also other significant risks related to the disposal and storage of carbon. Still, with its promotion by the fossil fuel industry and by some climate scientists, elected officials in the U.S. have been willing to provide billions of subsidies to this false climate solution.

⁴⁷⁶ <https://www.globalccsinstitute.com/news-media/latest-news/us-congress-passes-bill-with-the-single-largest-ccs-infrastructure-investment-ever/>

⁴⁷⁷ <https://www.jdsupra.com/legalnews/bipartisan-infrastructure-bill-invests-9111801/>

⁴⁷⁸ <https://truthout.org/articles/carbon-capture-wont-work-but-it-will-funnel-billions-to-corporations>

⁴⁷⁹ <https://www.foodandwaterwatch.org/2021/07/20/top-5-reasons-carbon-capture-and-storage-ccs-is-bogus/>

“Spending money on carbon capture and storage or use (CCS/U) and synthetic direct air capture and storage and use increases carbon dioxide equivalent (CO₂e) emissions, air pollution, and costs relative to spending the same money on clean, renewable electricity replacing fossil or biofuel combustion,” according to Food and Water Watch.⁴⁸⁰ In October 2021, more than 330 U.S. scientists wrote to President Biden to urge him “to reject fossil fuel industry delay tactics like carbon capture and storage, blue hydrogen, and carbon offsets that impede the rapid transition to renewable energy and perpetuate a racist fossil fuel system.”⁴⁸¹

What is CCS (Carbon Capture and Storage)?

As the EPA points out, “CCS is a three-step process:

Capture of CO₂ from power plants or industrial processes

Transport of the captured and compressed CO₂ (usually in pipelines).

Underground injection and geologic sequestration (storage) of the CO₂ into deep underground rock formations. These formations are often a mile or more beneath the surface and consist of porous rock to hold the CO₂. Overlying these formations there is supposed to be impermeable, non-porous layers of rock that trap the CO₂ and prevent it from migrating upward.”⁴⁸²

Proponents say that CCS can capture up to 90% of CO₂ released by burning fossil fuels in electricity generation and industrial. The main ways to capture carbon are “post-combustion, pre-combustion and oxyfuel. Post-combustion technology removes CO₂ from the gases that result from burning fossil fuels. Pre-combustion methods –

⁴⁸⁰ <https://research.american.edu/carbonremoval/2019/11/13/jacobson-mark-2019-why-carbon-capture-and-direct-air-capture-cause-more-damage-than-good-to-climate-and-health/>

⁴⁸¹ <https://www.foodandwaterwatch.org/2021/10/07/hundreds-of-scientists-tell-biden-halt-fossil-fuel-development-now/>

⁴⁸² https://19january2017snapshot.epa.gov/climatechange/carbon-dioxide-capture-and-sequestration-overview_.html

done before burning the fossil fuel – involve converting the fuel into a mixture of hydrogen and CO₂. Oxyfuel technology produces CO₂ and steam by burning fossil fuels with almost pure oxygen.”

“Post-combustion and oxyfuel equipment can be fitted to new plants or retrofitted. Pre-combustion methods require large modifications to existing plans to be retrofitted, and therefore are more suitable to newly built ones. Once the CO₂ is captured, it is compressed into liquid state and transported by pipeline, ship, or road tanker to be pumped underground at around one mile deep. It can be stored into depleted oil and gas reservoirs, coalbeds, or deep saline aquifers. Proponents says that it can be used for enhanced oil recovery, where CO₂ is injected into oil and gas reservoirs to increase their extraction.”⁴⁸³

Problems with CCS

Swedish climate activist Greta Thunberg in her 2019 address to the United Nations chided the Intergovernmental Panel on Climate Change⁴⁸⁴ for relying so heavily on the development of a miracle technology as a way to save future life on the planet. Many view CCS as potentially the largest corporate boondoggle in history.⁴⁸⁵

A related issue is direct air capture – to try to remove carbon already in the atmosphere. Once again however, this technological effort has failed so far, while not enough attention has been paid to investing in natural carbon sinks such as forests.

The reason that the oil and gas industry love carbon capture is simple: It extends the fossil fuel era instead of ending it.

Critics argue that carbon capture and storage is expensive, energy-intensive, and unproven at scale, and it does not reduce carbon

⁴⁸³ <https://www.lse.ac.uk/granthaminstitute/explainers/what-is-carbon-capture-and-storage-and-what-role-can-it-play-in-tackling-climate-change/>

⁴⁸⁴ <https://www.npr.org/2019/09/23/763452863/transcript-greta-thunbergs-speech-at-the-u-n-climate-action-summit>

⁴⁸⁵ <https://cleantechnica.com/2019/10/29/carbon-capture-bright-promise-or-senseless-boondoggle/>

in the atmosphere. After five decades of effort, it has not worked.⁴⁸⁶ CCS technology promotes continued reliance on fossil fuels rather than accelerating the transition to cheaper and cleaner renewable energy.⁴⁸⁷ Adding carbon capture to coal- or gas-fired power plants makes them more expensive, less efficient, and less competitive than renewable energy projects, which are already the cheapest source of electricity for most of the U.S. and most of the world.

Food & Water Watch has been among the most vocal critics of CCS. They point out that the history of CSS is one of colossal failure. Between 2005 and 2012, the Department of Energy spent \$6.9 billion attempting to demonstrate the feasibility of CCS for coal, but little came of this investment, and between 2014 and 2016, less than 4% of the planned CCS capacity was deployed. CCS is incredibly energy-intensive - essentially requiring building a new power plant to run the system, creating another new source of air and carbon pollution.

Food & Water Watch also points out the storage of carbon from the process also presents significant risks. Well failure during injection or a blowout could release large amounts of CO₂. Storage locations can leak CO₂, as they tend to be located close to fossil fuel reservoirs, where oil and gas wellbores provide a pathway for CO₂ to escape to the surface and could contaminate groundwater and soil.⁴⁸⁸

To transport the captured CO₂ through pipelines to potential storage sites, it must be highly pressurized and kept very cold, requiring the construction of pipelines that can withstand those conditions. Condensed CO₂ can be corrosive to the steel in these pipelines, increasing the risk of leaks, ruptures, and potentially catastrophic running fractures. Explosive decompression of a CO₂ pipeline releases more gas, more quickly, than an equivalent explosion in a gas pipeline, because of the intense pressures involved.

⁴⁸⁶ <https://priceofoil.org/2021/06/17/carbon-capture-five-decades-of-industry-false-hope-hype-and-hot-air/>

⁴⁸⁷ <https://www.ciel.org/carbon-capture-and-storage-an-expensive-and-dangerous-proposition-for-louisiana-communities/>

⁴⁸⁸ <https://www.foodandwaterwatch.org/2021/07/20/top-5-reasons-carbon-capture-and-storage-ccs-is-bogus/>

The Intergovernmental Panel on Climate Change has stated that “carbon dioxide leaking from a pipeline forms a potential physiological hazard for humans and animals.” In the areas closest to pipelines, released CO₂ could quickly drop temperatures to -80°F, coating the surrounding area with super-cold dry ice.⁴⁸⁹

Food & Water Watch found that while renewable energy technologies can virtually eliminate greenhouse gas emissions from electricity, equipping coal- and natural gas-fired plants with CCS would only reduce greenhouse gas emissions by 39%. Such a scenario could support a 35% increase in coal production and a 13% increase in natural gas production.⁴⁹⁰

Iceland has opened the world’s largest carbon capture factory, utilizing the properties of deep underground basaltic rock.⁴⁹¹

Direct Air Capture

Food & Water Watch notes that “Direct air capture extracts CO₂ directly from the atmosphere. CO₂ can be permanently stored in deep geological formations, or it can be used, for example in food processing or combined with hydrogen to produce synthetic fuels. Today, two technological approaches are being used to capture CO₂ from the air: liquid and solid DAC [direct air capture]. Liquid systems pass air through chemical solutions (e.g., hydroxide) which removes the CO₂. The system reintegrates the chemicals back into the process by applying high-temperature heat while returning the rest of the air to the environment. Solid DAC technology makes use of solid sorbent filters that chemically bind with CO₂. When the filters are heated and placed under a vacuum, they release the concentrated CO₂, which is then captured for storage or use. Most large-scale

⁴⁸⁹ <https://www.ciel.org/carbon-capture-and-storage-an-expensive-and-dangerous-proposition-for-louisiana-communities/>; see also *IPCC Special Report on Carbon Dioxide Capture and Storage, Chapter 4: Transport of CO₂* (2005), at 181

⁴⁹⁰ https://foodandwaterwatch.org/wp-content/uploads/2021/04/ib_2003_carboncapture-web.pdf

⁴⁹¹ <https://unric.org/en/iceland-carbon-capture-plant-operational/>

opportunities to use the captured CO₂ would result in its rerelease into the atmosphere, such as when synthetic fuel is burned. This would not create negative emissions but could still generate climate benefits, for example if synthetic fuels replace conventional fossil fuels.... Some benefits of DAC as a carbon removal option include its limited land and water footprint and the viability of locating plants on non-arable land close to suitable storage, eliminating the need for long-distance CO₂ transport.”⁴⁹²

Despite the hundreds of millions of dollars in government and private investment, including from the U.S. Department of Energy and major fossil fuel companies, direct air capture (DAC) has never been successfully demonstrated on a large commercial or utility scale. Mechanical-chemical DAC brings with it hazards and dangers, ranging from pipeline ruptures to contamination of drinking water, which will inordinately affect frontline, low-income communities, and communities of color.

The cost of direct air capture is more than 50 times the cost per metric ton of most natural climate solutions. To cover some of their costs, DAC companies can sell the byproduct, CO₂, for a variety of purposes. This includes enhanced oil recovery, whereby oil companies inject the CO₂ into old oil wells to pump even more oil out of them.⁴⁹³

Mechanical-chemical carbon removal requires hazardous storage. Millions of tons of removed CO₂ must be stored beneath the ocean or in underground formations where it can lead to earthquakes or be accidentally released or leaked. If released, concentrated CO₂ is toxic and can cause catastrophic injury and result in mass casualty events. When carbon is removed directly from the air – or from gas and oil facility smokestacks – it must be transported to where it can be durably stored. In six midwestern states, 3,500 miles of CO₂ pipelines are being planned to transport millions of tons of carbon,

⁴⁹² <https://www.iea.org/reports/direct-air-capture>

⁴⁹³ <https://www.cnbc.com/2021/03/06/why-companies-in-carbon-removal-tech-struggle-to-pay-for-it.html>

and there are plans for seizing private land by eminent domain to build them.⁴⁹⁴

Direct air capture is energy intensive, requiring fossil fuels to power the operation. CO₂ in the atmosphere is much more diluted than in, for example, flue gas from a power station or cement plant. The chemical reaction required to capture CO₂ in large DAC operations only occurs at very high temperatures. And CO₂ needs to be compressed under very high pressure to be transported and then injected into geological formations. This contributes to DAC projects' higher energy needs and cost relative to other CO₂ capture technologies and applications.⁴⁹⁵

However, despite all these faults, there are many who say that direct air capture has to be utilized since it is clear that the world has moved far too slowly to keep global warming below 1.5 degrees Celsius, let alone reduce the carbon level in the atmosphere below 350 ppm.

Here is how Prof. David Schwartzman, a leading ecosocialist scientist, puts it: "Promoting the restoration of natural ecosystems and a shift to agroecologies from industrial agriculture/GMOs will be necessary and very beneficial for several reasons, including mitigation of GHG emissions and optimizing the preservation of biodiversity. But even keeping warming at no more than the 1.5 deg C target will limit the capacity of the soil to store carbon because of the increase in microbial respiration. Therefore, DAC and permanent storage in the crust (chemical reaction with mafic/ultramafic rocks to produce carbonates) powered by renewable energy supplies will very likely be imperative to draw down the carbon dioxide level below 350 ppm for a long time into the future because of continuous reequilibration of carbon dioxide between the ocean and the atmosphere. This is the only geoengineering project that should be

⁴⁹⁴ <https://www.sierraclub.org/sierra/who-s-afraid-carbon-capture-pipeline-co2-ccs>

⁴⁹⁵ <https://www.rechargenews.com/energy-transition/the-amount-of-energy-required-by-direct-air-carbon-capture-proves-it-is-an-exercise-in-futility/2-1-1067588>

considered to advance climate security for humanity and biodiversity.”⁴⁹⁶

Waste Incineration (aka Waste-to-Energy)

Waste incineration is the incineration of municipal waste (food, paper, cloth, wood, plastics) to reduce waste volume and recover energy for electricity and/or heat.

Waste-to-Energy is considered a renewable energy source in nearly two dozen states although most environmentalists strongly disagree.⁴⁹⁷

I wrote *The Financial and Environmental Impact of Garbage Incineration* in 1985 for the Environmental Planning Lobby (now Environmental Advocates). Much of the report summarized into plain English an air emissions report done by the California Air Resources Board, and then added on the negative financial impacts (e.g., the contracts with municipalities often imposed penalties if the amount of the waste stream being recycled was increased). Within a few years, most environmental groups switched from support to opposition garbage incineration.

Trash incinerators are the largest source of dioxins, the most toxic man-made chemical known to science. Incinerators are major sources of particulate matter that cause respiratory illnesses. Other major pollutants from incinerators are mercury, lead, NO_x, and SO₂.⁴⁹⁸ The waste industry’s own data shows that incinerators emit more sulfur dioxide, nitrogen oxides and carbon dioxide per unit of electricity generated than power plants burning natural gas.⁴⁹⁹The

⁴⁹⁶ <https://www.aimspress.com/article/doi/10.3934/energy.2021054> And: <https://www.scientificamerican.com/article/rare-mantle-rocks-in-oman-could-sequester-massive-amounts-of-co2/>; <https://jacobin.com/2022/09/geoengineering-carbon-removal-fossil-fuels>.

⁴⁹⁷ <https://ilsr.org/waste-incineration-renewable-energy>

⁴⁹⁸ <https://www.energyjustice.net/incineration/worsethancoal>

⁴⁹⁹ <https://theconversation.com/is-burning-trash-a-good-way-to-handle-it-waste-incineration-in-5-charts-118665>

Environmental Protection Agency, which is supportive of incinerators, says that per unit of electricity produced, garbage incinerators generate less GHGs than coal or oil, but slightly more GHGs per unit energy than natural gas.⁵⁰⁰

As of 2019, of 72 incinerators were still operating in the U.S. 80% were sited in environmental justice communities.⁵⁰¹

Researchers at the New School point out that the makeup of municipal solid waste has changed over the past 50 years. Synthetic materials such as plastics have increased, while biogenic, compostable materials such as paper and yard trimmings have decreased. Plastics are particularly problematic for waste handling because they are petroleum-based, nonbiogenic materials. They are difficult to decompose and release harmful pollutants such as dioxins and heavy metals when they are incinerated.”⁵⁰²

Garbage incineration is the most expensive way to produce electricity.⁵⁰³ The amount of electricity they produce is modest especially compared to the harms caused by the air pollutants released. The estimated energy generation capacity of operating incinerators was about 2.3 gigawatts in 2015. By comparison, more than 10.5 gigawatts of new solar and nearly 8.5 gigawatts of new wind went online in that year alone. The Institute for Local Self-Reliance points out that “when accounting for the embodied, life-cycle energy — that is, the amount of energy used to source, manufacture, and transport materials for consumption — of solid waste burned at incinerators, there is a net energy loss.” Three to five times more energy can be “saved through alternative strategies such as waste

⁵⁰⁰ <https://www.energyjustice.net/incineration/expensive-energy> ;
<https://archive.epa.gov/epawaste/nonhaz/municipal/web/html/airem.html>

⁵⁰¹ <https://www.wastedive.com/news/majority-of-us-incinerators-located-in-marginalized-communities-report-r/555375/>

⁵⁰² <https://theconversation.com/is-burning-trash-a-good-way-to-handle-it-waste-incineration-in-5-charts-118665>

⁵⁰³ <https://www.energyjustice.net/incineration/expensive-energy>

prevention, reuse, recycling, and composting than can be generated by burning.”⁵⁰⁴

A far better approach is to eliminate as much waste as possible, using zero waste efforts, extended producer responsibility, bottle bills, etc., reuse what is possible and then recycle what one can. This is often the official solid waste hierarchy for states, with incineration and landfilling listed last, but officials often skip over the first few strategies (reduce, reuse, recycle) and focus on the burning.

Biofuels

NY Renews details the problems with biofuels in their false climate solutions report.⁵⁰⁵

“Bioenergy” - energy extracted from organic matter - is at the heart of many false climate solutions. Bioenergy can divert land use from food to energy production, particularly for populations in the Global South. It may also deplete the Earth’s ability to capture carbon, which is urgently needed to slow and reduce atmospheric warming. Producing these fuels also requires intensive water and pesticide use.⁵⁰⁶

Biofuels are primarily liquid fuels – ethanol and biodiesel - used for transportation, derived from a variety of plant matter including grains, grasses, tree fiber, and vegetable oils. Biofuels, especially for transportation, have long been promoted as carbon neutral by industry. Originally promoted as a way to secure energy independence from foreign oil, biofuels are largely marketed as a climate-friendly and clean alternative to fossil fuels.⁵⁰⁷

Conventional biofuels such as corn ethanol are derived from fermented grain sugars. Ethanol is blended with gasoline, at a rate of 10 to 16%. Biofuels derived from vegetable oils, cooking grease, and

⁵⁰⁴ <https://ilsr.org/waste-incineration-renewable-energy/>

⁵⁰⁵ False Solutions, NY Renews, Biofuels, p. 8 to 18, <http://bit.ly/false-solutions>

⁵⁰⁶ <https://auto.howstuffworks.com/fuel-efficiency/biofuels/10-disadvantages-of-biofuels.htm>

⁵⁰⁷ <https://therealnews.com/biofuels-an-eco-friendly-alternative-to-fossil-fuels>

animal fats are used in diesel engines. Such biodiesel is also used as a blending fuel, particularly for public fleets and other trucking, as well as home heating.⁵⁰⁸

Biofuels create other problems that compound climate and energy problems. NY Renews notes that problems arise from the “cultivation of their feedstocks and related land-use changes, displacement of food production, soil and water contamination, carbon-intensive fuel processing methods, and non-greenhouse gas pollutants and local pollution.” Biofuels have some level of carbon emissions upon combustion and in their production process and contain non-GHG pollutants that are released. Biofuel production from vegetable oils is a net contributor to GHG emissions due to direct and indirect land-use changes. Only biodiesel made from waste fats appears to be less carbon intensive than fossil fuels.⁵⁰⁹

While the industry promotes biofuels as an environmental justice measure since they could reduce emissions from trucks in low-income communities, they are not commercially viable and have had insignificant impact on improving air quality in truck-clogged communities and high exposure workplaces.

Ethanol emissions are associated with higher rates of ozone formation—a major source of respiratory illness, particularly in low-income communities of color. It is also no better than gasoline in terms of carcinogenic potential.⁵¹⁰

A February 2022 study published by the National Academy of Sciences found that corn-based ethanol is likely 24% more carbon-intensive than gasoline due to emissions resulting from land use changes to grow corn, along with processing and combustion. The U.S. Renewable Fuel Standard law enacted in 2005 requires the

⁵⁰⁸ <https://www.eia.gov/energyexplained/biofuels/ethanol.php>

⁵⁰⁹ P. 8, <http://bit.ly/falsesolutions>

⁵¹⁰ Mark Z. Jacobson, “Why Not Liquid Biofuels For Transportation as Part of a 100% Wind-Water-Solar (WWS) and Storage Solution to Global Warming, Air Pollution, and Energy Security,” 2020, at <https://web.stanford.edu/group/efmh/jacobson/Articles/I/BiofuelVsWWS.pdf>

nation's oil industry to annually mix 15 billion gallons of corn ethanol into the nation's gasoline.⁵¹¹

The television series *West Wing* highlighted how the folly of promoting ethanol from corn had much to do with Iowa's status as the first election in the presidential primaries.⁵¹²

The Environmental Protection Agency notes that "production of biofuel feedstocks, particularly food crops like corn and soy, could increase water pollution from nutrients, pesticides, and sediment. Increases in irrigation and ethanol refining could deplete aquifers." Biofuels also can be competition for food for both humans and animals, which can lead to more land area devoted to agriculture, increased use of polluting inputs, and higher food prices. Most biorefineries operate using fossil fuels.⁵¹³

Biogas

Biogas is a mixture of gases, primarily consisting of methane, carbon dioxide and hydrogen sulphide, produced from raw materials such as agricultural waste, manure, municipal waste, plant material, sewage, green waste, wastewater, and food waste.

The capture of methane does have some support among environmentalists. Methane can be captured from the decomposition of organic waste at landfills. Many lawmakers support subsidies for anaerobic digesters, especially for farmers whose operations produce a lot of manure. Others use small-scale systems to promote composting and some capture of methane for local use.

NY Renews notes that "Capturing and processing landfill gas and waste-water solids gas for on-site or nearby uses like heating or powering equipment is beneficial and even carbon negative compared to biomethane produced for distribution in the gas system."⁵¹⁴

⁵¹¹ <https://www.reuters.com/business/environment/us-corn-based-ethanol-worse-climate-than-gasoline-study-finds-2022-02-14/>

⁵¹² <https://criticallytouched.wordpress.com/2019/01/04/west-wing-6x13-king-corn/>

⁵¹³ <https://www.epa.gov/environmental-economics/economics-biofuels>

⁵¹⁴ See False Solutions, NY Renews, p. 26-27, <http://bit.ly/false-solutions>

For landfills, the better solution moving forward is to divert the organic waste into composting programs.⁵¹⁵

The Institute of Agriculture and Natural Resources at the University of Nebraska describes a methane digester system, also called an anaerobic digester, as a “device that promotes the decomposition of manure or ‘digestion’ of the organics in manure to simple organics and gaseous biogas products. Manure is regularly put into the digester after which the microbes break down the manure into biogas and a digested solid.”⁵¹⁶

Groups like Food and Water Watch argue that such subsidies support factory farms.⁵¹⁷ Calling it “factory farm biogas”, it notes that the EPA reports methane emissions from agriculture have increased 7% since 1990. Emissions from factory farm manure have risen 71%, largely from mixing animal waste with water. Factory farms are a major driver of climate change, as they generate vast amounts of waste in one location.⁵¹⁸

California has invested more than \$350 million to build digesters on dairy farms to capture methane and stem climate change. Emerging research suggests that after the digesters process the manure, it emits ammonia, which can travel long distances to contaminate water and soil and threaten ecosystems. Communities nearby also worry that the ammonia emissions will contribute to particulate matter that is seriously dangerous to human health.⁵¹⁹

⁵¹⁵ [https://www.ccacoalition.org/en/activity/organic-waste-diversion;](https://www.ccacoalition.org/en/activity/organic-waste-diversion)
<https://www.npr.org/2021/07/13/1012218119/epa-struggles-to-track-methane-from-landfills-heres-why-it-matters-for-the-clima>

⁵¹⁶ <https://water.unl.edu/article/animal-manure-management/methane-anaerobic-digesters>

⁵¹⁷ <https://www.centerforfoodsafety.org/press-releases/6687/factory-farm-gas-is-not-climate-smart>

⁵¹⁸ <https://www.foodandwateraction.org/food/the-truth-about-bogus-factory-farm-biogas/>

⁵¹⁹ <https://insideclimatenews.org/news/19092022/dairy-digesters-methane-california-manure/>

“Renewable” Natural Gas – or Biomethane

Another biofuel is biomethane, which is often promoted as renewable natural gas (RNG). It is a gas captured from the breakdown of waste materials in landfills and livestock operations and processed into nearly pure methane for blending with fossil gas. Biomethane is being promoted as a clean, “decarbonizing” substitute for burning fossil gas for electricity, heating, transportation, and industrial processes. If produced and distributed into the existing gas network, it will add to methane leakage and related serious warming effects, as well as local environmental health harms.⁵²⁰

There are technical differences between biogas and biomethane (renewable natural gas), though they are often used interchangeably. The International Energy Agency says “biogas is a mixture of methane, CO₂ and small quantities of other gases produced by anaerobic digestion of organic matter in an oxygen-free environment. Biomethane (also known as ‘renewable natural gas’) is a near-pure source of methane produced either by ‘upgrading’ biogas (a process that removes any CO₂ and other contaminants present in the biogas) or through the gasification of solid biomass followed by methanation.”⁵²¹

Renewable Natural Gas must meet pipeline standards of chemical purity to be deliverable for consumer energy uses. In most gas uses, RNG and fossil gas are interchangeable and depend on the same pipeline and delivery infrastructure for reaching end-users. Thus, gas and pipeline companies want to continue to invest in pipeline infrastructure to distribute RNG. Industry is actively promoting biomethane for use in heavy-duty trucks, farm equipment, and other harder-to-electrify uses. Industry is pushing states to establish a Low

⁵²⁰ <http://bit.ly/falsesolutions>

⁵²¹ <https://www.iea.org/reports/outlook-for-biogas-and-biomethane-prospects-for-organic-growth/an-introduction-to-biogas-and-biomethane>

Carbon Fuel Standard (LCFS) to incentivize transportation biofuels, as California has done.⁵²²

NY Renews notes that “the promotion of renewable gas is a strategic bid to buffer the fossil gas industry from policy and market changes that threaten its very existence. Further, such an effort raises serious concerns about the expansion of carbon-intensive land-uses to grow feedstocks necessary to ‘green’ the fossil gas system, as existing feedstock capacity is only sufficient to replace between 6 and 13 percent of current gas demand. Biomethane and fossil gas have virtually the same chemical composition and both emit similar levels of nitrogen oxides upon combustion and thus is not considered any cleaner from an environmental justice perspective. Like other biofuels, biomethane must be blended with other fossil fuels and thus depending on the continued existence, and indeed expansion, of the pipelines and other infrastructure of the larger fossil gas supply chain.”⁵²³

RNG is not as low carbon as the industry claims and its local air and water impacts are concentrated in vulnerable communities. While RNG can prevent methane from escaping from the initial source of the biogas, it does not eliminate the significant leakage of methane from biogas capture and processing, pipelines, building hookups, and appliances. There is not enough of it to substitute for more than a small fraction of natural gas. RNG will also cost significantly more than fossil gas, in the range of 3 to 15 times higher compared to current prices by 2040.⁵²⁴

Biomass

Biomass is the raw feedstocks of biofuels, primarily woody matter, which are burned directly for energy instead of being processed into

⁵²² See False Solutions, NY Renews, p. 22 <http://bit.ly/falsesolutions>

⁵²³ See False Solutions, NY Renews, p. 6, 18, <http://bit.ly/falsesolutions>

⁵²⁴ <https://www.vox.com/energy-and-environment/2020/2/14/21131109/california-natural-gas-renewable-socialgas;>

liquid fuels. Biomass energy - particularly involving direct combustion of woody matter - is expanding, causing climate and environmental justice harms.

There are four basic types of biomass energy technologies:

“Burning or gasifying biomass to produce steam to turn turbines to generate electricity

Burning biomass to generate heat in thermal systems (combined with electricity generation, this is “combined heat and power,” CHP)

Processing biomass feedstocks to produce liquid fuels like corn ethanol or other biofuels (see separate section)

Collecting gases from landfills or anaerobic digesters to produce energy.”⁵²⁵

Driven by demand in Europe, the southern U.S. is now the world’s largest producer and exporter of the wood pellets used to produce biomass energy, rapidly depleting local forests. The European Union sources nearly 60% of its renewable energy from biomass.⁵²⁶

Biomass energy is disruptive of carbon neutrality because carbon recycling from the atmosphere by regrowing forests takes decades even as wood-burning for energy is adding significant emissions today. Wood-burning biomass is the biggest carbon polluter, worse than coal, worse than oil, and worse than natural gas, both because of the low energy to carbon ratio inherent in wood, and also because biomass facilities generally operate at considerably lower efficiencies than fossil fueled facilities.⁵²⁷

Wood emits more carbon per Btu than other fuels: Natural gas: 117.8 lb. CO₂/MMBtu; Bituminous coal: 205.3 lb. CO₂/MMBtu; Wood: 213 lb. CO₂/MMBtu (bone dry, although wood is often wet, which decreases the efficiency of the burn.) The Partnership for Policy

⁵²⁵ <https://www.pfpi.net/biomass-basics-2>

⁵²⁶ <https://www.projectcensored.org/19-european-demand-for-biomass-energy-propels-destruction-of-us-forests/>

⁵²⁷ <https://www.pfpi.net/biomass-basics-2>

Integrity points out that “Proponents argue that since this material will end up as CO₂ in the atmosphere anyway, why not use it to generate some power in the meantime? However, it is important to remember that burning emits carbon instantaneously, while decomposition takes years and even decades, and in the case of the waste wood left over from logging operations, actually builds soil carbon in the meantime.” A study done by Massachusetts found that in New England forests, it would take 40 years of re-growth to draw the carbon pollution from biomass electricity generation down to parity with burning coal for those same four decades.⁵²⁸

Most existing biomass plants in the U.S. are industrial boilers that generate heat and power by burning sawmill and papermill waste. Due to subsidies for “renewable” energy, many new biomass plants are being built, relying on trees for fuel. There are more than 115 new biomass burning electricity generating facilities being developed nationally, as well as a number of coal plants that plan to co-fire biomass. There are hundreds of proposals for smaller, thermal only burners.⁵²⁹

One of the largest users of biomass is Vermont, which gets about one-fifth of its electricity from burning wood and one in eight families burn wood as their primary heat source, about eight times the national average. Vermont defines electricity from burning biomass as renewable energy.⁵³⁰

Natural Gas

For many years natural gas was promoted as a bridge fuel to a clean air future, even though it is a fossil fuel. Compared to other fossil fuels, natural gas is cheaper, plentiful, and comparatively cleaner than burning oil or coal.

⁵²⁸ <https://www.pfpi.net/biomass-basics-2>

⁵²⁹ <https://www.pfpi.net/biomass-basics-2>

⁵³⁰ <https://www.eia.gov/state/analysis.php?sid=VT;>
<https://fpr.vermont.gov/biomass-renewable-energy-standard>

Combustion of natural gas emits about half as much carbon dioxide as coal and 30 percent less than oil, as well as far fewer pollutants, per unit of energy. Since 2005, annual consumption of natural gas in the U.S. increased by more than 40%, becoming the largest source of U.S. electric power generation. Its substitution for coal helped reduce power sector emissions to mid-1980 levels. The U.S. is the world's largest producer of natural gas, and it is a major export.⁵³¹

Since the burning of natural gas produces less carbon emissions than coal and the use of diesel of trucks, it was even promoted by some environmental groups such as the national Sierra Club⁵³² as a way to transition to a clean energy future.

A major problem with natural gas is that its main component is methane. Methane is more than 80 times potent as a greenhouse gas than carbon dioxide during a 25-year time period.⁵³³ Many governments however compare methane to carbon over a 100-year period, where methane is only about 25 times more potent; this significantly understates the global warming impact of methane and natural gas. Methane is about 200 times less abundant in the atmosphere and lasts there for only about a decade on average - while CO₂ can last for centuries. Climate activists point out that since we are extremely concerned about global warming over the next 10 or 20 years, trying to keep warming below 1.5 degrees Celsius, we need to place far more emphasis on cutting methane emissions.

The other big reason many tend to understate the impact of natural gas on climate change is the estimate of how much methane is leaked during the production, distribution, and use of natural gas. The Environmental Protection Agency has used an estimated leakage rate of 1.4%, while others use a leakage rate of 3%.⁵³⁴ A 2019 study by the

⁵³¹ <https://www.c2es.org/content/natural-gas/>

⁵³² <https://energycentral.com/c/ec/sierra-club-admits-taking-money-promote-natural-gas-over-coal>

⁵³³ <https://unece.org/challenge>

⁵³⁴ <https://www.bloomberg.com/features/2022-methane-leaks-natural-gas-energy-emissions-data> , <https://unece.org/challenge>

Environmental Defense Fund found that the U.S. oil and gas supply chain emits about 13 million metric tons of methane annually, much higher than the EPA estimate of about 8 million metric tons. This discrepancy is likely due to EPA's emissions surveys missing potential sources of methane leaks, such as faulty equipment at oil and gas facilities.

Prof. Bob Howarth of Cornell University noted that the Environmental Defense Fund may have actually underestimated the actual leak rate of methane as some of the measurements were obtained with an instrument that - according to the device inventor - produces systematically low numbers. He also noted that that the researchers didn't look at the emissions from gas distribution systems into urban areas, which recent studies suggest are considerable.⁵³⁵ A recent study at the University of Michigan concluded that methane emissions from flaring are five times higher than previously thought.⁵³⁶

Howarth and fellow Cornell scientist Tony Ingraffea had done prior research that showed that methane emissions from shale gas - from well development and hydraulic fracturing through delivery of gas to consumers - were likely 50% greater than from conventional natural gas.⁵³⁷ Howarth's findings have been challenged by the fossil fuel industry.

Stop Fracking of Gas

The Cornell University professors along with Prof. Mark Jacobson were instrumental in the successful effort to get New York State to ban the fracking of gas in December 2014, including their study documenting how the state could meet 100% of its energy needs by

⁵³⁵ <https://www.nature.com/articles/d41586-018-05517-y>

⁵³⁶ <https://truthout.org/articles/new-report-us-gas-flaring-releases-5-times-more-methane-than-previously-thought/>

⁵³⁷ <https://onlinelibrary.wiley.com/doi/full/10.1002/ese3.35>

2030 through renewable energy (especially offshore wind) without the need for fossil fuels.⁵³⁸

The effort to ban fracking was also led by grassroots frontline community activists whose communities throughout the Southern Tier and Central New York were ground zero to the threat fracking posed (you can find more details about this in the chapter about campaigns). Like many environmental fights, mainstream environmental groups with staff and foundation funding initially opposed the call for a ban, saying it was too radical, and instead pushed for a moratorium for more time to study the likely negative impacts on water, noise, surrounding communities, etc. A few statewide groups like the Green Party immediately supported the grassroots push, noting that natural gas was just another fossil fuel and should be opposed. But a few years in, the strength of the grassroots movement won the big groups over, starting with Food & Water Watch which helped organize protests of the Governor whenever he showed up in public. The grassroots groups also got local communities to enact bans on fracking. When the courts upheld the bans, the Governor realized that many of the most likely areas to do fracking were already eliminated.⁵³⁹

The reasons to ban fracking were myriad. Hydraulic fracturing, or fracking, involves blasting huge volumes of water mixed with toxic chemicals and sand deep into the earth to fracture rock formations and release oil and natural gas which could not be economically mined by conventional means.

The Center for Biological Diversity points out that a fracking boom can transform an area almost overnight, creating massive new environmental and social problems. Fracking is intensifying in Pennsylvania, Texas and North Dakota and moving into new areas, like California and Nevada. Twenty-five percent of the chemicals

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<https://web.stanford.edu/group/efmh/jacobson/Articles/I/NewYorkWWSEnPolicy.pdf>

⁵³⁹ <https://inthesetimes.com/article/new-york-fracking-ban1>

used in fracking can cause cancer, while others harm the skin or reproductive system. These chemicals - as well as methane released by fracking - can make their way into aquifers and drinking water. Fracking can release dangerous petroleum hydrocarbons, including benzene and xylene, while also increasing ground-level ozone levels, raising people's risk of asthma and other respiratory illnesses. With a methane leakage rates as high as 7.9 percent for fracked shale gas wells, this would make it worse for the climate than coal.⁵⁴⁰

Even the few places like New York State that have banned fracking find themselves fighting off proposals to build new plants to use fracked gas, including the construction of hundreds of miles of pipelines to transport it.⁵⁴¹

In June 2019, the U.S. displaced Saudi Arabia as the top exporter of crude oil, a startling development for a country that only started exporting crude in 2016. That month, the U.S. exported over 3 million barrels of crude oil per day, in addition to consuming 20.5 million barrels per day in 2018. This expansion was due to the production of oil via fracking, which has driven the U.S. oil production boom over the past decade. With fracking producing record levels of natural gas, this has also led to a rapid increase in exports of liquefied natural gas (LNG), with the U.S. became the world's leading producer of both oil and natural gas.⁵⁴²

Carbon Offsets

For more information about problems with carbon offsets, see the chapter on carbon pricing.

The fossil fuel industry, big utilities, big agriculture, big finance - and their political allies - are pushing carbon offset schemes to allow them to continue releasing the greenhouse gases driving the climate

⁵⁴⁰ <https://www.biologicaldiversity.org/campaigns/fracking/index.html>

⁵⁴¹ <https://stateimpact.npr.org/pennsylvania/2017/12/08/new-yorks-heralded-fracking-ban-isnt-all-its-cracked-up-to-be/>

⁵⁴² <https://www.desmog.com/2019/09/23/us-exporting-fracking-oil-gas-climate-catastrophe/>

crisis, harming Indigenous, Black, and other already-marginalized communities, and undermining sustainable farming and forestry practices. By allowing pollution to continue in exchange for land grabs elsewhere, offsets often shift the burden of reducing emissions from the Global North to the Global South.

What's more, offsets have in general not reduced emissions.⁵⁴³

Offsets undermine sustainable farming and increase consolidation in agriculture. Corporations and large landowners are best positioned to develop offset projects, which further entrenches the factory farm and the corn/soybean monocultural model at the expense of small farmers, including Black and Indigenous farmers. Instead of allowing the industrial, extractive model of agriculture to further prosper by selling offsets to industrial polluters, climate activists and policy makers should support traditional and ecologically regenerative agricultural practices.⁵⁴⁴

Net Zero vs. Real Zero

Many politicians and corporations set Net Zero goals rather than Real Zero goals. Often the government has a goal of an actual reduction of 80 to 85%, by a future date such as 2050. They argue that certain industrial processes such as cement and aluminum do not have alternatives that eliminate emissions (e.g., renewable energy does not provide high enough temperatures for the reaction), so they propose other steps to offset the continued emissions.

Net Zero pledges that cancel out emissions in the atmosphere rather than eliminating their causes are not enough.

Net Zero emissions targets disguise climate inaction and distract from the necessary and urgent work of phasing out fossil fuels at source and localizing sustainable food systems and economies.

⁵⁴³ <https://www.brinknews.com/carbon-offsets-do-not-reduce-carbon-emissions-only-delay-them/>

⁵⁴⁴ <https://www.globalwitness.org/en/press-releases/offsets-dont-stop-climate-change/>; <https://redd-monitor.org/2022/06/07/offsets-dont-stop-climate-change>

Polluters' Net Zero schemes are based on multiple myths and are little more than public relations campaigns. The Center for International Environmental Law points out that Net Zero approaches “rely on assumptions that carbon offsets, tree plantations, bioenergy, and dangerous distractions such as hydrogen and carbon capture and storage will somehow keep or take emissions out of the air after polluters have done their damage.”⁵⁴⁵

Unproven technologies that have repeatedly failed, have yet to be realized, and remain non-viable at scale are being imagined as supposed solutions for continued emissions. From carbon capture and storage to direct air capture to burning plastic waste for fuel, these technologies extend and deepen the fossil economy that drives the climate crisis while imposing profound new risks on frontline communities around the world. Governments and industries are using the “net” in Net Zero to avoid responsibility for past, present, and future emissions and create a false sense of climate progress.”⁵⁴⁶

Many businesses are now hyping their zero emission pledges. Out of the world's top 500 corporations, just 67 have made commitments to reduce their emissions in line with the Paris Agreement, while the vast majority refuse to even disclose their level of emissions. GRAIN, a nonprofit promoting small farmers and sustainable agriculture, note that “Corporations are ramping up their greenwashing to head-off any efforts to reign in their GHG emissions. After five years of having done nothing to move towards the already compromised targets established by the 2015 Paris Agreement, dozens of big polluters like Nestlé and Shell are now making “net zero” pledges, mainly to satisfy the public relations needs of the financial players that fund them. The shift in corporate greenwashing will do nothing to reduce emissions but risks generating a massive land grab for forests and farmlands,

⁵⁴⁵ <https://www.ciel.org/news/over-700-groups-demand-real-zero/>

⁵⁴⁶ <https://www.realsolutions-not-netzero.org/cop26>

particularly in the global South. Food and agribusiness corporations are leading actors in this deadly scam.”⁵⁴⁷

To develop stronger and clearer standards for Net Zero emissions pledges by non-state entities – including businesses, investors, cities, and regions – and speed up their implementation, in March 2022 the UN established a working group, Net-Zero Emissions Commitments of Non-State Entities. “We must have zero tolerance for net-zero greenwashing,” said the Secretary-General.⁵⁴⁸

The UN group released a report at COP27 in Egypt in November 2022, warning that “corporate ‘greenwashing’ must end if world hopes to meet climate goals. Companies need to put clear plans in place—short, medium, and long term—that show they actually have a pathway toward it. They should focus on reducing their own emissions as much as possible and limit buying carbon credits to offset their emissions. They need to address their entire value chain, meaning they need to look at their own supply chain as well as how their products are used. Companies need to stop investing in new fossil fuel supply if they want to claim they are committed to net zero emissions.”⁵⁴⁹

Geoengineering

Geoengineering Monitors notes that “Geoengineering, or large-scale man-made interventions to the Earth’s atmosphere, oceans and soils, aims to either reduce carbon dioxide from the environment or regulate sunlight reaching the surface.”

While geoengineering has received a considerable amount of media attention, it has not received as much attention within the climate change movement since many view it in the realm of science fiction and a distraction from the real imperative to cut emissions.

⁵⁴⁷ <https://grain.org/en/article/6634-corporate-greenwashing-net-zero-and-nature-based-solutions-are-a-deadly-fraud>

⁵⁴⁸ <https://www.un.org/en/climatechange/high-level-expert-group/>

⁵⁴⁹ <https://time.com/6230336/un-net-zero-report-catherine-mckenna/>

Some describe carbon capture and sequestration as a form of geoengineering. As government inaction on reducing emissions reaches the point of no return, geoengineering schemes – and the vast revenues that companies will receive from them – will draw more attention.

Some argue that it is an awfully bad idea, but we may need to do anyway.⁵⁵⁰

Many climate activists argue that since human behavior – burning fossil fuels – is what has thrown the planet’s climate out of kilter, the solution should focus on how to realign with natural systems, not further disrupt nature. Geoengineering is a product of the very mindset that caused global warming. There is also the major concern that various geoengineering schemes may very well have unexpected negative impacts upon the environment, including shifting impacts from one country to another. And if the projects are discontinued, any benefits might be rapidly reversed and even make the situation worse.

If research is done, individual states might decide to unilaterally deploy such technologies (as India does after a deadly heat wave kills tens of millions in the climate fiction novel *The Ministry for the Future* by Kim Stanley Robinson).⁵⁵¹ Investing in such proposals diverts limited resources and policies away from measures needed to reduce emissions.

Geoengineering is already beginning to emerge in the COP climate discussions.⁵⁵² In 2021 the National Academy of Sciences recommended investing several hundred million dollars over five years to study the feasibility, benefits, and risks of geoengineering, though they recommend restrictions on outdoor experiments.

⁵⁵⁰ https://www.huffingtonpost.co.uk/entry/geoengineering-is-a-very-very-bad-idea-heres-why-we-may-have-to-do-it-anyway_uk_5a675cbee4b0e5630073e81a?p1m

⁵⁵¹ <https://www.rollingstone.com/culture/culture-features/the-ministry-for-the-future-interview-kim-stanley-robinson-1101738/>

⁵⁵² <https://www.etcgroup.org/content/false-solutions-alert-geoengineering-climate-negotiations>

Proponents argue that since the threats posed by global warming are so dire, all options need to be explored.⁵⁵³

“None of the technologies have a track record. All of them come with major risks and unknowns, and in some cases, the effects would be obviously catastrophic,” said Niki Miranda-Martinez, coordinator of the international Hands Off Mother Earth campaign. Such technologies, she said, “are highly likely to worsen rather than mitigate the impacts of global warming.” The group notes that since geoengineering requires the intensive exploitation of vast amounts of resources on land and oceans, the projects “would inevitably displace millions of people and potentially wipe out entire ecosystems” and “could redirect funding and investments away from real climate solutions.”⁵⁵⁴

Solar radiation management is probably the most common form of geoengineering proposals. Resilience.org notes that “Some propose to fly airplanes continuously around, spraying (sulfate) aerosols into the atmosphere to reflect some incoming sunlight, so the Earth warms less. Another proposal involves ships sailing the seas, perhaps run by robots, each emitting billions of micro-droplets of water sucked from the sea into the sky to form reflective clouds. There have also been proposals to paint roofs or roads or big swathes of desert white, and fantasies of launching a lot of mirrors into orbit to reflect incoming sunlight.”⁵⁵⁵

The National Academy of Sciences proposes focusing research on three areas: “injecting tiny reflective particles into the stratosphere to block sunlight; using the particles to make low-lying clouds over the oceans more reflective; and thinning high-altitude cirrus clouds.”

⁵⁵³ <https://thebulletin.org/2021/03/100-million-geoengineering-project-proposed-to-dim-the-sun/>

⁵⁵⁴ <https://www.geoengineeringmonitor.org/2019/11/geoengineering-false-solution-to-climate-crisis/>

⁵⁵⁵ <https://www.resilience.org/stories/2020-05-11/false-solutions-to-climate-change-geoengineering/>

Major volcanic eruptions for instance cool the climate by pumping particles high into the atmosphere.⁵⁵⁶

Ocean fertilization, which is likely the best studied ocean geoengineering method, involves supporting the growth of phytoplankton, which converts CO₂ into oxygen through photosynthesis. A Harvard University blog pointed out that “Iron is the main ocean fertilizer under consideration, and this process would be much cheaper and faster than planting more trees on land. However, there are potential unintended consequences of this method. Overgrowth of phytoplankton could cause algae blooms that deplete oxygen from water, thereby harming marine animals. Additionally, although phytoplankton are crucial at the bottom of the marine food chain, a sudden increase in their population may shift the balance of different algal species, destabilizing the marine ecosystem.”⁵⁵⁷

Geoengineering presents politicians and businesses with an option to avoid making difficult choices. Geoengineering Monitor notes that “Rather than putting an end to combustion of fossil fuels, destructive industrial agriculture, and the pursuit of endless economic growth, they can take the less politically contentious path of offering support for a technofix. The prominent voices on geoengineering that reappear repeatedly are actually a very small group of people. Most of them appear to be white men from rich countries, especially Europe and North America. Some of them have direct connections to the fossil fuel industry and many appear to have military connections.”⁵⁵⁸

⁵⁵⁶ <https://thebulletin.org/2021/03/100-million-geoengineering-project-proposed-to-dim-the-sun/>

⁵⁵⁷ <https://sitn.hms.harvard.edu/flash/2022/reversing-climate-change-with-geoengineering/>

⁵⁵⁸ <https://www.geoengineeringmonitor.org/reasons-to-oppose>

CHAPTER 8

CLIMATE AND ENVIRONMENTAL JUSTICE, AND REPARATIONS FOR GLOBAL SOUTH

The principal victims of climate change in the U.S. and globally are low-income people and communities of color. This chapter explores the push to center environmental justice in climate action and funding, including the recent agreement of COP27 to provide for “loss and damages” to the Global South.

I have spent most of my adult life working on anti-poverty issues, with a heavy emphasis on hunger and its root causes. The lack of power by many Americans – and global citizens – enables such exploitation and oppression to occur. Climate change must be centered in the various broader movements for justice and true grassroots empowerment. And while corporate greed explains much of the shortcomings of the American political and economic system, racism is an equally critical factor. All discrimination – whether based on gender, sexual orientation, age, national origin – must be ended in order to create the world we need.

One of the key principles of the climate movement is the need to center the principal victims of climate change in the development and implementation of the solutions. The world has a debt that needs to be paid as part of the just transition to a clean energy future. It means listening to those most harmed. It means learning from the wisdom of our Indigenous communities who have a far more sustainable relationship to nature and our fellow beings, developed over millennia.

Pioneered by activists from the Global South in response to the threats facing their homelands, CarbonBrief describes climate justice as “a reshaping of climate action from a technical effort to cut emissions into an approach that also addresses human rights and social inequality. As industrialized nations and corporations have amassed wealth by burning fossil fuels, a ‘just’ outcome would involve them redistributing more of this wealth towards those having to deal with the consequences.”⁵⁵⁹

This book provides a brief introduction to the climate justice movement as well as links to some of the major coalitions and campaigns. Some environmental justice (EJ) issues are included in the chapter on plastics, which includes the major problem of petrochemicals in Cancer Alley in Louisiana and in Texas.⁵⁶⁰ The environmental justice (EJ) and Indigenous communities have also been leaders in opposing gas pipelines (see chapters on campaigns and direct action) and in opposing local sources of pollution.

The call to invest at least 40% of climate funding in disadvantaged communities has been widely embraced by the climate movement and many elected Democrats in the U.S. As always, the details on implementation are critical. So far, elected officials have largely failed to provide the level of funding required. What’s more, the funding from foundations and governments to support climate organizing and advocacy still underserves the frontline communities.

Climate Justice, EJ, and Reparations for the Global South

Globally, those who live in developing countries are the principal victims of climate change from the greenhouse gas emissions from more developed countries. A similar phenomenon of the poor and people of color being the principal victims occurs within nations, including the U.S.

⁵⁵⁹ <https://www.carbonbrief.org/in-depth-qa-what-is-climate-justice/>

⁵⁶⁰ <https://www.ecoenclose.com/blog/plastic-production-cancer-alley-and-environmental-justice>

According to the Center for Climate Justice, climate justice “recognizes the disproportionate impacts of climate change on low-income communities and communities of color around the world, the people and places least responsible for the problem. It seeks solutions that address the root causes of climate change and in doing so, simultaneously address a broad range of social, racial, and environmental injustices.”⁵⁶¹

Wikipedia describes environmental justice (EJ) as “a social movement to address the unfair exposure of poor and marginalized communities to harm associated with resource extraction, hazardous waste, and other land uses. The environmental justice movement began in the United States in the 1980s and was heavily influenced by the American civil rights movement. The original conception of environmental justice in the 1980s focused on harms to marginalized racial groups within rich countries such as the U.S. and was framed as environmental racism. The movement was later expanded to consider gender, international environmental discrimination, and inequalities within disadvantaged groups.”⁵⁶²

Many leaders of the global climate justice movement are Indigenous people, people from developing countries and small island states, and others on the frontline of the climate crisis. A central demand is a just transition, moving to zero emissions and 100% renewable energy while leaving no one behind, providing green jobs for workers, fair and equitable access to affordable, renewable energy and funding to those countries in need of it. The April 2022 Intergovernmental Panel on Climate Change (IPCC) report warned that if emission reductions policies are not designed around the principles of a just and fair transition, it will likely increase inequality and poverty.⁵⁶³

⁵⁶¹ <https://centerclimatejustice.universityofcalifornia.edu/what-is-climate-justice/>

⁵⁶² https://en.wikipedia.org/wiki/Environmental_justice

⁵⁶³ <https://www.cnet.com/news/politics/climate-change-and-the-justice-movement-for-a-greener-future/>

Environmental Injustice in the U.S.

Low-income Americans are far more likely to live in areas where land is less expensive due to the risk of flooding from extreme weather events and from sea level rise. Low-income communities and communities of color also are where polluting facilities tend to be located since those communities lack the political clout of more affluent areas to stop them from being built or located. Individuals and communities also have less resources to respond to climate change (e.g., flooding, droughts, heat waves) and their homes are more likely to suffer damage from extreme weather events.

Hundreds of studies since the 1970s have concluded that industrial pollution and hazardous waste sites across the country are located disproportionately where people of color and low-income families are living.⁵⁶⁴

A study of the placement of hazardous waste facilities over 30 years documented that “Minority and low-income neighborhoods and communities in transition are disproportionately targeted by industries that follow the path of least resistance when deciding where to locate hazardous waste sites and other polluting facilities.” Low-income neighborhoods and communities of color were already established before these facilities chose to locate there.⁵⁶⁵

Disadvantaged communities have higher rates of health conditions such as heart disease, diabetes, asthma, and chronic obstructive pulmonary disease (COPD). Heat stress can exacerbate such conditions, and warming temperatures result in more pollen and smog, which can worsen asthma and COPD. Low-income individuals are more likely to lack adequate health care, access to medicine, and health insurance. African Americans are three times more likely than whites to live in crowded or inferior housing. Individuals living in

⁵⁶⁴ <https://www.copugetsound.org/magazine/IS/pollution-disadvantaged-communities>

⁵⁶⁵ <https://news.umich.edu/targeting-minority-low-income-neighborhoods-for-hazardous-waste-sites/>

homes with poor insulation and no air conditioning are more impacted by higher temperatures. Such housing is more vulnerable to power outages, water issues and damage. Urban low-income areas are 5 to 12 degrees hotter than other areas because they have less green space, fewer trees and parks, and more asphalt that retains heat.⁵⁶⁶

Racism

The legacy of racist housing and industrial policies means black people are 75% more likely than white people to live in fence-line communities close to polluting oil and gas facilities. Black Americans breathe air with 38% more pollution than white people. They are exposed to 56% more pollution than they cause – while white people breathe 17% less pollution than they produce.⁵⁶⁷ Even middle-income black people are exposed to more pollution than lower-income white folks.⁵⁶⁸

Research has documented that race has a stronger influence on exposure to pollutants than poverty.⁵⁶⁹ Patrisse Cullors and Nyeusi Nguvu, members of the Black Lives Matter (BLM) movement, wrote that, “Racism is endemic to global inequality. This means that those most affected – and killed – by climate change are Black and poor people,” which is why we need to center racial equity and justice in seeking solutions for the climate crisis.

This is also true globally. In Latin America, Africa and Asia, issues concerning Indigenous land, the rights of rural landowners, treatment of minority groups and expansion of energy, agribusiness

⁵⁶⁶ <https://news.climate.columbia.edu/2020/09/22/climate-change-environmental-justice/>

⁵⁶⁷ <https://www.climatealityproject.org/climatejustice>

⁵⁶⁸ <https://www.washingtonpost.com/magazine/2022/06/14/climate-justice-green-new-deal/>

⁵⁶⁹ <https://www.greenamerica.org/climate-justice-all/people-color-are-front-lines-climate-crisis>

and other industries are central to racial and environmental justice struggles.⁵⁷⁰

In 2005, Hurricane Katrina caused extensive destruction in New Orleans and its environs. More than half of the 1,200 people who died were Black and 80 percent of the homes destroyed belonged to Black residents. The mostly Black neighborhoods of New Orleans East and the Lower Ninth Ward were hit hardest since government funds had gone primarily to shore up levees in white areas earlier hurricanes. White neighborhoods received priority in the rebuild process.⁵⁷¹

Climate advocates increasingly seek to build links between movements, such as with BLM, as global warming is caused by the same root causes of multiple interlinked crises of hunger, poverty, racism, sexism, classism, ableism, and nature destruction.

Climate Justice Movement

To provide an overview of what environmental justice changes groups are seeking, below are the vision / mission statements of two of the most prominent grassroots coalitions, the Climate Justice Alliance and the Indigenous Environmental Network.

The chapter on carbon pricing also addresses environmental justice concerns with carbon offsets and cap-and-trade programs.

Climate Justice Alliance⁵⁷²

The Climate Justice Alliance (CJA) is “a growing member alliance of eighty-four urban and rural frontline communities, organizations and supporting networks...Frontline, community-based organizations have the solutions to the extractive industrial systems that are eroding human’s primary means of existence on the planet... Effective climate

⁵⁷⁰ <https://climateanalytics.org/blog/2020/black-lives-matter-the-link-between-climate-change-and-racial-justice/>

⁵⁷¹ <https://news.climate.columbia.edu/2020/09/22/climate-change-environmental-justice/>

⁵⁷² <https://climatejusticealliance.org/about/>

crisis solutions honor human rights and the rights of nature. Localized democracies that champion community rights to energy, land, water, and food sovereignty are the best answers to combating exploitation. Shared leadership produces community wellbeing and the most innovative solutions to our climate crisis. Workers should be at the forefront of shaping new economies rooted in fairness, equity, and ecological values.”

CJA outlines six key goals:

End the era of extreme energy (fossil fuels, nuclear power, waste and biomass incineration, landfill gas, mega-hydro, and agrofuels) which pose extreme risks to local ecosystems and communities.

Reduce carbon emissions in line with what science says is necessary to avoid catastrophic climate change.

Build urban and rural economic societies that offer real-world solutions to the climate crisis and strengthen worker and community governance by advocating for collective worker and community control of land, water, and food resources.

Popularize a framework for a just transition to local living economies by organizing economic priorities that provide a path to sustainable, resilient, and regenerative economic systems that transition away from exploitative and extractive economies.

Collaborate on a national climate jobs program creating ten million good, green, and family-supporting jobs through meaningful work.

Develop and implement infrastructure that protects and promotes cultural and biological diversity, creates local seed banks, and protects communities and workers that are most vulnerable to pollution, climate disasters, and economic disruptions.

Indigenous Environmental Network

Established in 1990 within the U.S., the Indigenous Environmental Network (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, health of both our people and all living things, and to build economically sustainable communities.”⁵⁷³

Coal mining, oil drilling, and fishing and hunting directly infringe upon Native land and values. Thirty-five percent of the United States’ fossil fuel is located either directly on or near Indigenous land.⁵⁷⁴ An estimated 20% of the nation’s known oil and gas reserves lie on tribal lands. And 90% of wells that are drilled on federal and Indigenous lands use fracking.⁵⁷⁵

Fossil fuel production causes significant environmental health effects in Indigenous communities, and leadership from frontline Indigenous activists has been critical in fighting these injustices. “Natural resources in the form of oil, coal and gas, uranium, were discovered on our tribal lands, and we were in the way, and so we became the first and worst impacted,” according to Kandi White, native energy and climate coordinator with IEN. When White was diagnosed with a stage four sarcoma tumor as a 20-year-old, her first thought was, “now it’s my turn.” She knew many others with cancer on her Fort Berthold Indian Reservation in North Dakota, a major site of oil and gas production.⁵⁷⁶

Similar problems are seen globally, with the rights of Indigenous peoples often in conflict with the economic interests of extractive companies and governments. According to the Brookings Institute,

⁵⁷³ <https://www.ienearth.org/>

⁵⁷⁴ <https://reimagineerpe.org/node/307>

⁵⁷⁵ <https://rmi.org/native-energy-fossil-fuels-renewables/>

⁵⁷⁶ <https://www.hsph.harvard.edu/news/features/fossil-fuel-extraction-harming-indigenous-communities/>

“Many indigenous communities are located in biodiverse and resource-rich regions with revenue-generating potential for extracting oil, gas, or other resources. The ongoing legacy of colonization plus modern-day exploitation pose significant threats to indigenous communities.” While Indigenous people claim rights to more than half of the planet’s lands and forests, governments only respect their legal right to about 18% of such lands. Land plays an integral role in the cultural, spiritual, and religious lives of Indigenous peoples worldwide, making them resistant to its destruction to extract fossil fuels.⁵⁷⁷

IEN seeks to raise public awareness of environmental issues that impact on indigenous peoples. Its major campaigns include “Just Transition” and “Keep it in the Ground.” It’s a core partner in coalition efforts such as “It Takes Roots” and “Grassroots Global Justice.” Many Indigenous groups have been on the frontlines of major protests against gas pipelines. Fossil fuel companies and politicians often expect political opposition will be minimal when they move pipelines to Native lands to avoid suburban communities. IEN played a leadership role in the fights against the Keystone XL, Dakota Access Pipeline in North Dakota and Line 3 in Minnesota, all major fights that attracted national attention.⁵⁷⁸

Leaders of thirteen climate groups, including IEN, were arrested in September 2022 for protesting the side deal for the Inflation Reduction Act (IRA) with Senator Manchin in exchange for his vote of support on the act. “Manchin’s permitting reform bill... is a direct threat against the inherent sovereignty and jurisdictional authority of our Indigenous nations and its peoples to protect ourselves from this accelerating climate crisis. The content of the bill strips critical NEPA [National Environmental Policy Act] provisions that Indigenous and other environmental justice communities need in order to take action on destructive projects like pipelines. We must uplift and protect our

⁵⁷⁷ <https://www.brookings.edu/blog/up-front/2020/08/07/uncommon-ground-the-impact-of-natural-resource-corruption-on-indigenous-peoples/>

⁵⁷⁸ https://en.wikipedia.org/wiki/Indigenous_Environmental_Network

Mother Earth, not repeal the minimal provisions that do exist. We must continue to fight against climate greenwashing and false solutions. We must take real action to keep fossil fuels in the ground,” said Tom B.K. Goldtooth, Executive Director of IEN.⁵⁷⁹ A week later, Senator Manchin pulled the bill from the budget reconciliation process (although he continued to try to get it passed).⁵⁸⁰

On October 11, 2021, Indigenous People’s Day, 136 people, including many Indigenous leaders, were arrested in front of the White House while calling on President Biden to declare a climate emergency and to stop approving fossil fuel projects. The day was the first in a weeklong People vs. Fossil Fuel protest in Washington, D.C., organized by the Build Back Fossil Free coalition.⁵⁸¹

There has been conflict between some leftists and Indigenous groups in Latin America over the extraction of natural resources to drive development. The turn towards left-wing governments in Latin America around the start of the twenty-first century has been called the Pink Left. Conflicting visions of resource extraction have divided the Ecuadorian Left with struggles between the Ecuadorian government, which focuses on economic development via resource nationalism, and grassroots anti-extractivism activists, who strongly oppose extractive industries due to social and environmental concerns.⁵⁸²

Environmental Justice Requires a Just Transition

Climate justice groups want the needs of the principal victims, those who are most harmed by pollution and climate change, to be a priority

⁵⁷⁹ <https://www.ienearth.org/breaking-the-heads-of-13-climate-ej-orgs-are-on-capitol-hill-in-dc-right-now-risking-arrest-to-denounce-senator-manchins-dirtydeal-to-fast-track-fossil-fuel-projects/#>

⁵⁸⁰ <https://www.commondreams.org/news/2022/09/27/people-power-has-won-day-manchin-dirty-deal-defeated>

⁵⁸¹ <https://www.desmog.com/2021/10/11/indigenous-136-arrested-white-house-fossil-fuel-protest/>

⁵⁸² <https://www.berfrois.com/2021/04/extractivism-in-ecuador/>

in the transition to a clean energy economy. This means giving such communities a real role in making climate decisions, and ensuring that the funding, jobs, and benefits from the transition be targeted to the most vulnerable.

Groups often seek a minimum of 40% of climate funding to go to vulnerable communities and workers, a goal that many elected officials and governments have come to embrace, including President Biden with his Justice40 initiative in his climate Executive Order (EO 14008 of January 27, 2021).⁵⁸³

Justice40 requires that a minimum of 40% of climate-related funding across seven major policy areas — including climate mitigation, clean energy and energy efficiency, transportation, and sustainable and affordable housing — is directed for the benefit of disadvantaged communities. However, since local and state governments have significant discretion in how to spend federal dollars, there are problems with how Justice40 will be enforced in Republican states which often oppose federal guidance when the Democrats are in charge. For instance, the U.S. Department of Housing and Urban Development found that Texas General Land Office, run by a “scion” of the Bush family, had discriminated against minority residents and violated federal civil rights protections in distributing federal funds providing relief after Hurricane Harris slammed Houston, denying aid to Harris County.

Activists are pushing for more of such funds to be distributed directly through the federal government (about 15% currently). The Department of Energy did incorporate environmental justice considerations into the \$8 billion in new infrastructure money that is going toward building regional clean hydrogen hubs (see section on hydrogen in false climate solutions). The Transportation Department has similar guidance for funds for electric charging stations.⁵⁸⁴

⁵⁸³ <https://www.federalregister.gov/documents/2021/02/01/2021-02177/tackling-the-climate-crisis-at-home-and-abroad>

⁵⁸⁴ <https://insideclimatenews.org/news/05062022/red-states-still-pose-a-major-threat-to-bidens-justice40-initiative-activists-warn/>; see also

Unfortunately, officials are usually better at articulating goals than accomplishing them. Implementation is often thwarted by bureaucratic inertia and red tape and push back from interests that benefit from the status quo. As always, the devil is in the details. For instance, the actual agreements often significantly restrict which climate funds are covered by say the 40% goal (e.g., only some new ones) and may also define “vulnerable populations” to be significantly larger than the percentage of the funds that should benefit them.

New York determining that 35% of (a limited amount of new) climate funds should benefit 50% of the state’s population is not really an equitable goal, let alone compensating for past pollution inflicted upon such communities. This was after New York’s provisions on environmental justice funding in the 2019 climate law (CLCPA) were severely weakened by the Governor at the last moment and the labor provisions were discarded.⁵⁸⁵ Plus 35% of zero is zero if lawmakers do not create any qualifying revenue streams, which they shied away from after prices at the gas pump surged and inflation soared.

Environmental justice groups were rightfully upset by many of the provisions included in the Inflation Reduction Act, with even more opposition to the side deal with Senator Manchin on so-called permitting reform. The Inflation Reduction Act (IRA) mandates vast swathes of federal lands and waters be sacrificed for the ongoing development of fossil fuels and expands subsidies for “false climate solutions,” including hydrogen and carbon capture and sequestration.

The Climate Justice Alliance opposed the law, saying: “The IRA has some strengths but does not fully encompass an equitable or just transition that fully protects frontline communities and those who have been gravely impacted by climate change. We fear that the inflation reduction act is a consistent moment of smoke and mirrors and backdoor deals that cut out the front-line communities and deeply

https://rooseveltinstitute.org/wp-content/uploads/2022/04/RI_Justice-40-Federal-Budget_ExecSummary_202204.pdf

⁵⁸⁵ <https://www.thecity.nyc/2022/5/2/23054217/billions-ny-climate-law-disadvantaged-communities-flood>

impacted people.”⁵⁸⁶ Others, including the Indigenous Environmental Network, pointed out that the bill sponsors overstated the benefits of and funding for environmental justice.⁵⁸⁷

Efforts to pass environmental justice measures have had limited success at the state level, although there the situation is better than with Congress. The Bloomberg Government state legislative tracking service found that legislation failed in nine of the sixteen states that have taken up major environmental justice measures in the first half of 2021. The proposals addressed long-standing environmental justice inequities. States have begun to establish higher levels of review of polluting projects that occur in designated environmental justice communities, with ten states having such laws as of October 2021.⁵⁸⁸

New York State lawmakers did pass a bill to require state agencies to consider the “cumulative impact” of all polluting facilities in a community in reviewing permit applications, not just the emissions and impact of the particular facility.⁵⁸⁹

There is a section on a Just transition in the chapter on the Green New Deal.

Raising Up the Voices of the Disadvantaged

One of the key goals of the environmental justice movement is to ensure that those most disadvantaged by climate and pollution have their voices heard in determining solutions. The following “Jemez Principles”⁵⁹⁰ for democratic organizing have been adopted for how

⁵⁸⁶ <https://climatejusticealliance.org/the-inflation-reduction-act-is-not-a-climate-justice-bill/>

⁵⁸⁷ <https://www.ienearth.org/the-inflation-reduction-act-of-2022-is-not-a-climate-bill/>

⁵⁸⁸ <https://news.bloomberglaw.com/bloomberg-law-analysis/analysis-state-laws-are-codifying-environmental-justice>

⁵⁸⁹ <https://www.weact.org/2022/04/we-act-applauds-new-york-state-legislature-for-passing-bills-to-reduce-the-cumulative-impacts-of-pollution-on-disadvantaged-communities/>

⁵⁹⁰ <https://climatejusticealliance.org/jemez-principles/>

groups should conduct meetings, especially when different cultures and communities are being included:

Be Inclusive

Emphasis on Bottom-Up Organizing

Let People Speak for Themselves

Work Together in Solidarity and Mutuality

Build Just Relationships Among Ourselves

Commitment to Self-Transformation

Those most affected by climate change must be present from the beginning of the decision-making process, as frontline communities know the solutions needed to help themselves. They are the ones most likely to see to the root of the problems and produce lasting, comprehensive solutions.⁵⁹¹

Climate Reparations for the Global South

It is the countries in the Global North, which developed their economies through the Industrial Revolution and its heavy use of fossil fuels, which have been the main driver of climate change, accounting for 92% of excess global carbon emissions. Yet it is the Global South, with much lower carbon emissions, which has already experienced the sharpest harm from climate change and will be the principal victims moving forward.⁵⁹²

Climate advocates have called for the industrial polluting nations to compensate the Global South for the damages they have caused; assist them in lifting the standard of living for their citizens without being dependent on burning fossil fuels; and share with them the technology and resources needed to respond to climate change.

⁵⁹¹ <https://uw.pressbooks.pub/climatejusticeandenergysolutions/chapter/listening-to-the-frontlines-the-jemez-principles/>

⁵⁹² <https://www.yesmagazine.org/environment/2021/11/29/climate-reparation>

In a report released just before COP27 in Egypt in November 2022, the United Nations said that “wealthy nations need to give as much as ten times the current levels of funding to help developing countries adapt to climate change or face widespread suffering and displacement as well as increased conflict... It found that developing nations need approximately \$200 billion a year, on average, during this decade.”⁵⁹³

The lifestyles in Europe, North America and other Global North nations have a carbon footprint 100 times greater than the world’s poor nations. In 2019, the top 10% of global emitters (771 million individuals) were responsible for about 48% of global CO₂ emissions, while the bottom 50% (3.8 billion individuals) were responsible for 12%. According to the Global Climate Risk Index 2021, the poorest countries of the world, while having the lowest emission levels, are most susceptible to the damage produced by climate change. Climate change widens already-existing global inequalities, with the World Bank estimating that climate change may drive an additional 135 million people into poverty by 2030.⁵⁹⁴

Africa is home to seventeen of the world’s twenty most climate-vulnerable countries. Climate change is a key factor driving food insecurity in Africa. Climate change means shorter growing seasons for farmers and has contributed to a 40% reduction in agricultural productivity growth in sub-Saharan Africa. Devastating droughts have wiped out livestock. Fish stocks are illegally plundered off the coasts west and east of Africa. Illegal mining and deforestation are polluting rainforests. Endangered species are poached and sold as luxury goods abroad. Funds from these illicit practices often fuel terrorist groups.⁵⁹⁵

⁵⁹³ <https://www.nytimes.com/2022/11/03/climate/united-nations-funding-climate-adaptation.html>

⁵⁹⁴ <https://gceurope.org/global-north-and-global-south-how-climate-change-uncovers-global-inequalities/>

⁵⁹⁵ <https://usun.usmission.gov/remarks-by-ambassador-linda-thomas-greenfield-at-a-un-security-council-debate-on-climate-and-security-in-africa/>

Wangari Muta Maathai was a Kenyan environmental activist who founded the Green Belt Movement, an environmental organization focused on the planting of trees, environmental conservation, and women's rights. An elected member of the Kenyan national parliament and a founder of the Green Party, in 2004 she became the first African woman to win the Nobel Peace Prize.⁵⁹⁶

Developing countries lack the resources to build infrastructure to guard against extreme weather, rising sea levels, and intense heat waves. Climate change threatens economic production in much of the Global South. Many communities in the Global South still depend on agriculture and ways of life based on the rhythms of the climate. More than half of all people in Africa for instance, rely on farming for all or part of their livelihoods, making them especially vulnerable to climate disruptions. Climate change disproportionately slows economic growth in poorer countries. Most of the climate funding from the industrial countries is focused on mitigation efforts, ensuring that developing countries do not burn fossil fuels at accelerating rates by following the development paths the Global North took.⁵⁹⁷

Some recent studies have highlighted that the wealthiest countries – including the United States – need to phase out their domestic fossil fuel production by 2034 while providing significant financing to countries with lower emissions (including those in the Global South), which could phase out slower.⁵⁹⁸

As Olúfemi O. Táíwò and Patrick Bigger wrote in *The Nation*, the climate crisis is also tied to the exploitation from “centuries of colonial plunder and enslavement that enriched Europe, and then the U.S., at the expense of the Global South, to the austerity measures of the 1980s and ‘90s in response to the Third World Debt Crisis, which stifled development and locked many countries into decades of debt dependency. The results of that dependency are, along with the

⁵⁹⁶ https://en.wikipedia.org/wiki/Wangari_Maathai

⁵⁹⁷ https://www.powershiftafrica.org/storage/publications/10_Adow-1_1638878872.pdf

⁵⁹⁸ <https://priceofoil.org/2022/03/22/new-study-charts-a-stark-pathway-towards-an-equitable-end-of-global-oil-and-gas-production/>

pandemic's economic impacts, congealing into a new debt crisis, with fifty-eight of the sixty-five lowest-income countries somewhere between moderate risk of debt distress to full-blown default.”⁵⁹⁹

The international climate finance response so far has focused on two approaches: mitigation (stabilizing and reducing greenhouse gas emissions) and adaptation (altering systems and improving infrastructure to respond to changes from existing climate change). There are also continuing calls for “loss and damage” payments to compensate for the harm from intensifying extreme weather.

Many justice advocates call for “climate reparations.” Fatima Ibrahim, co-founder of the Green New Deal in the United Kingdom, says that “Climate reparations are recognizing the debt that the Global North owes the Global South and paying that off soon so that the Global South has the power to transform their own economies and secure the future.’ It means tackling the oppressive historical systems of colonialism and exploitation that left countries without the resources needed to respond to the climate crisis. These resources include financial and administrative resources to transform the economies of countries and build their resilience to the climate crisis.”⁶⁰⁰

There are two main ways that have been suggested to pay for climate reparations. The first is litigation to force major fossil fuel companies to make restitution for their role in causing climate change. The second is “corrective justice,” where high greenhouse gas emitting countries financially compensate those who have been disproportionately harmed.

Others also call for debt cancellation for poor developing countries that are forced to spend huge portions of their budgets servicing external loans rather than devoting the funds to increasing resilience and meeting the needs of their citizens.⁶⁰¹

⁵⁹⁹ <https://www.thenation.com/article/environment/climate-reparations/>

⁶⁰⁰ <https://www.earthrise.studio/reads/the-case-for-climate-reparations>

⁶⁰¹ <https://www.aljazeera.com/news/2022/9/25/why-are-climate-activists-calling-for-reparations>

The Bible – the sacred text of Christians, Jews, and Muslims – calls for a Jubilee, a society-wide forgiveness of debts, every fifty years. Ancient civilizations understood that without such a regular reboot of the economy, their societies would stagnate and collapse. In 2021, the Jubilee Debt Campaign found that 34 of the poorest countries are spending nearly six times as much on debt as they are on climate adaptation and mitigation. Much of the climate finance comes in the form of loans, with more than two thirds of the public climate funds between 2013 and 2018 being in the form of debt. For instance, between 2016-2018, Latin America and the Caribbean received an average annual of \$12 billion in climate finance, 90% of which was in the form of loans.⁶⁰²

International Agreements on Climate Finance, Loss and Damages

In 2009, the world’s advanced economies agreed to channel \$100 billion to less-developed countries for adaptation and mitigation by the year 2020 – a promise unmet – with the limited funding provided so far largely in the form of loans. The Paris agreement did “strongly urge developed country Parties to scale up their level of financial support, with a concrete roadmap to achieve the goal of jointly providing \$100 billion annually by 2020 for mitigation and adaptation while significantly increasing adaptation finance from current levels and to further provide appropriate technology and capacity-building support.”⁶⁰³

Developed countries expect they will not meet that pledge until 2023 – three years late. In 2021, the developed countries did say they would prioritize grants rather than loans as part of this funding. The United States committed \$11.4 billion a year by 2024 – although that

⁶⁰² https://jubileedebt.org.uk/wp-content/uploads/2021/10/Lower-income-countries-spending-on-adaptation_10.21.pdf

⁶⁰³ <https://unfccc.int/topics/climate-finance/the-big-picture/climate-finance-in-the-negotiations>

requires Congressional approval, which is far from guaranteed.⁶⁰⁴ One report calculated the U.S. should contribute 40 to 47% of the \$100 billion annual payment, depending on whether the calculation is based on wealth, past emissions, or population. The U.S.'s average annual contribution from 2016 to 2018 was only \$7.6 billion.⁶⁰⁵

It is unclear how much impact the existing climate financing, estimated at \$79.6 billion in 2019, is having. There is an overwhelming lack of data, as well as evidence that countries have been supporting projects that could harm the climate with some of the funds (for example, Japan finances upgrades to coal plants).⁶⁰⁶ Such funding is well short of actual needs. Documents submitted to the United Nations by developing countries as of May 2021 outlined the need for \$6 trillion through 2020, with 85% requiring international sources of finance.⁶⁰⁷

Others contend that the estimates of how much climate financing is being provided are greatly overstated. In a 2020 report, the international aid charity Oxfam estimated public climate financing at only \$19 to \$22.5 billion in 2017–18, around one-third of the Organization for Economic Co-operation and Development's estimate. Oxfam argues that, besides grants, only the benefit accrued from lending at below-market rates should be counted, not the full value of loans. They also say that some countries incorrectly count development aid as going towards climate projects. India's ministry of finance disputed the Organization for Economic Co-operation and Development's estimate of \$62 billion of climate finance in 2014, saying the real figure was \$1 billion.⁶⁰⁸

⁶⁰⁴ <https://www.nytimes.com/2021/10/25/climate/100-billion-climate-aid-cop26.html>

⁶⁰⁵ <https://www.nature.com/articles/d41586-021-02846-3>

⁶⁰⁶ <https://www.preventionweb.net/news/wealthy-countries-still-havent-met-their-100-billion-pledge-help-poor-countries-face-climate>

⁶⁰⁷ https://unfccc.int/sites/default/files/resource/54307_2%20-%20UNFCCC%20First%20NDR%20summary%20-%20V6.pdf

⁶⁰⁸ <https://www.nature.com/articles/d41586-021-02846-3>

When the United Nations Framework Convention on Climate Change was being drafted in 1991, the Alliance of Small Island States proposed creating a fund for countries impacted by sea level rise, with each country contributing based on their share of global emissions and their share of the global gross national product. The proposal was rejected. Loss and damage was included in UN climate talks in 2007 as part of the Bali Action Plan. In 2013, that issue did better in the UN climate negotiations with the formation of the Warsaw International Mechanism on Loss and Damage to avert, minimize and address loss and damage, although no actual funding for loss and damage was agreed to.

The Paris Agreement in 2015 did include a section on loss and damage but once again fell short of actual funding, plus the industrial nations put in a statement that loss and damage “does not involve or provide a basis for any liability or compensation.” While the developing countries made a big push at COP26 in Glasgow in 2021, all they were able to secure was a two-year Glasgow Dialogue to discuss possible arrangements for loss and damage funding, along with an agreement to fund the Santiago Network on Loss and Damage, which seeks to give developing countries technical assistance to address loss and damage.⁶⁰⁹

One reason for the lack of progress on loss and damage is that the industrial polluting nations worry that it could be seen as an admission of legal liability, triggering litigation and compensation claims.

A major breakthrough was achieved at the last moment at COP27 in Egypt, when the U.S. dropped its long-standing opposition to loss and damage after the European Union caved to the strong solidarity among the developing countries along with China. Major details such as the level of funding, who should pay, and where the money should go were put off for further discussion. Some countries, particularly China, are still classified as developing countries despite significant economic growth - and large emissions - in recent decades.

⁶⁰⁹ <https://www.wri.org/insights/loss-damage-climate-change>

The recent massive flooding and damages in Pakistan, one of the 134 developing nations pushing hard on the issue, highlighted its importance. The U.S. and the European Union want to ensure that China will contribute to any fund created — and that China would not be eligible to receive money from it. The developing world also pushed for reforms at the World Bank and International Monetary Fund, pointing out that what they called “excessive” debt payments are a major impediment to their investment in climate mitigation and adaptation measures. Efforts to strengthen emission cuts, however, were unsuccessful, and the proposal to phase out fossil fuel use was defeated.⁶¹⁰

⁶¹⁰ <https://www.nytimes.com/2022/11/19/climate/un-climate-damage-cop27.html>;
<https://ittakesroots.org/cop27/>

CHAPTER 9

CLIMATE FINANCE - STOP THE MONEY PIPELINE

Money is the lifeblood of the fossil fuel industry. They make enormous profits but also need enormous amounts of money to pay for the infrastructure and to continue to search for new sources of fossil fuels as the easiest to find and extract become rapidly depleted (remember the worry a few decades ago that we had passed the point of peak oil).

The first major public challenge to the financing of the fossil fuel industry came when Bill McKibben and 350.org launched the campaign to get college and church endowments to divest from fossil fuels. McKibben's Do the Math Tour showed that to keep global warming at manageable levels we need to leave 80% of the existing fossil fuels in the ground. Divestment was a conscious effort both to duplicate the campaign successfully used against Apartheid in South Africa and to give groups local targets that they could mobilize around (think globally, act locally). It was a tremendous success in launching a grassroots movement.

I jumped in to help coordinate the successful efforts to divest both the New York City and New York State public pension funds from fossil fuels since I understood the legislative process from decades of working with the state legislature, first for the New York Public Interest Research Group (NYPIRG) and then Hunger Action Network. I was surprised however, by how difficult it was to convince lawmakers to divest from fossil fuels, especially when they were the worst performing sector on Wall Street for more than a decade. And while both campaigns eventually were largely successful, the

investment advisors within the funds continue to oppose divestment, saying that moral issues (like saving life on the planet) should have no role in financial decisions.

While the call for divestment has been spectacularly successful on many levels, with more than \$40 trillion in assets now committed to some level of divestment, the excitement level waned as the campaign turned into a long slog. Many activists and groups decided to move on to the next level to confront the banks, private equity firms, and insurance companies that continue to provide financial support to the fossil fuel industry even after the Paris Climate Accords.

Throughout my organizing career I have fought against the power of banks, “the money changers,” the financial institutions that use their power and discriminatory practices to extract whatever meager resources low-income and communities of color have been able to cobble together.

At NYPIRG, some former organizers from United Farm Workers launched Bank on Brooklyn to confront the practice of redlining by banks (and others like insurance companies). Banks and their allies in the real estate industry break down low-income and communities of color by refusing to lend there, forcing the few working-class homeowners to flee as the neighborhood suffers from disinvestment and a lack of repairs. Once broken, they often seek to extract even more profits through the process of gentrification.

At the Association of Community Organizations for Reform Now (ACORN), we would often organize protests at banks and utility companies, changing the lyrics of traditional songs to enliven our protests. We would pay our heating bills with wheelbarrows of pennies, saying not one penny more in another rate hike. Some songs didn't need much reworking, such as Sixteen Tons by Tennessee Ernie Ford: “You load 16 tons, what do you get? / Another day older and deeper in debt / St. Peter, don't you call me 'cause I can't go / I owe my soul to the company store.”

At Hunger Action Network, we fought back when Cong. Newt Gingrich and what we called his “contract on America” joined up with

President Bill Clinton to repeal (the admittedly inadequate) Aid to Dependent Children, the main anti-poverty program from the New Deal for children. The new Temporary Assistance for Needy Families (TANF) welfare program claimed to be job oriented, but failed to create any new jobs, especially ones with living wages, instead imposing unpaid work requirements on young mothers. Hunger Action Network called instead for the overhaul of the real ADC program – Aid to Dependent Corporations – which lavished corporate welfare on politically-connected businesses in the name of economic development which invariably failed to produce the promised jobs.

The Battle of Seattle in 1999 was the most visible protest against Clinton's push for corporate globalization (including the North American Free Trade Agreement or NAFTA), which gave corporations the power to sue sovereign nations if they passed environmental and labor laws that conflicted with the drive to maximize profits through "free trade." The initial Green New Deal that emerged in Europe in 2008 was in response to the global financial meltdown caused by the banks and speculation in housing prices. In addition to climate action and an Economic Bill of Rights, the Green New Deal called for fundamental reforms in the financial system. The Occupy Wall Street encampments in 2011 confronted economic inequality - the 1% vs. the 99%. The Green Party and others in the U.S. have campaigned for public banks and for monetary reforms that give the government, not private banks, the central role in creating and controlling the monetary supply.

Stop the Money Pipeline - Financing the Fossil Fuel Industry

"Money is the Oxygen on Which the Fire of Global Warming Burns," Bill McKibben, one of the co-founders of 350.org, wrote in *The New Yorker*.⁶¹¹

⁶¹¹ <https://www.newyorker.com/news/daily-comment/money-is-the-oxygen-on-which-the-fire-of-global-warming-burns>

Wall Street banks provide hundreds of billions of dollars in loans to the fossil fuel industry. Asset managers, which invest money for individuals, are the world's largest investors in fossil fuels. Insurance companies both invest in fossil fuel companies and provide the essential insurance for their projects.

One of my first climate campaigns was working with 350NYC and 350.org to successfully divest the New York City and New York State pension funds - the second and third largest in the U.S. - from fossil fuels. This was part of the international effort launched by 350.org in 2012 to get public pensions, college and church endowments, and other investments funds to stop seeking to profit from fossil fuels and divest from such companies. It was a conscious effort to replicate the successful campaign which contributed to the demise of apartheid in South Africa. (See more info at the end of Chapter 14, *The Art of Protest*.)

The divestment campaign has been incredibly successful, with more than 1,500 institutions globally, representing over \$40 trillion in assets, having committed to some level of fossil fuel divestment as of February 2022.⁶¹²

The success of the divestment campaign led to an expanded effort to address the financing of the fossil fuel industry and its projects, targeting Wall Street financiers and insurance companies. Although asset owners such as public pension funds manage trillions of dollars on behalf of their members and retirees, they are among the slowest financial actors when it comes to divestment from fossil fuels, representing only 12% of divestment commitments worldwide. For a comprehensive list of divestment commitments, see divestmentdatabase.org.⁶¹³

In January 2020, various divestment campaigns united to form Stop the Money Pipeline (STMP), which states:

⁶¹² <https://www.stand.earth/blog/divestment-40-trillion;>
<https://stand.earth/insights/climate-finance-2022/>

⁶¹³ <https://divestmentdatabase.org/>

“Since the Paris Agreement was adopted, Wall Street banks have provided \$1.4 trillion to the fossil fuel industry. Big asset managers are the world’s largest investors in coal, oil, and gas. Insurance companies provide insurance for new fossil fuel projects without which they could not be built.

The fossil fuel corporations driving the climate crisis depend on this support of the financial sector.

That is why we are pushing banks, insurance companies and asset managers to end fossil financing. If we stop the flow of money, we stop the flow of oil.

We demand that banks, asset managers, insurance companies and institutional investors stop funding, insuring, and investing in climate destruction.

They need to stop funding fossil fuels and deforestation and start respecting human rights and Indigenous sovereignty.”⁶¹⁴

According to a report by Banking on Climate Chaos, JPMorgan Chase is the largest bank financier of fossil fuels, having provided them with \$268 billion since the Paris agreement, which is greater than the value of BP, Shell and Chevron combined and more than the annual GDP of over 140 countries. Since the Paris Agreement, Wells Fargo has lent over \$151 billion to the fossil fuel industry, Citibank over \$129 billion, and Bank of America over \$106 billion. These four banks are the largest fossil fuel financiers in the world. The three biggest asset managers financing fossil fuels are Blackrock, Vanguard, and State Street.⁶¹⁵

The U.S. Government’s trade and development finance institutions provided \$51.6 billion in support for fossil fuels from 2010 to 2021, five times as much support as for renewables (\$10.9 billion). The Biden Administration has said it plans to end this international public financing of fossil fuels, including joining 38 other countries and institutions as signatories to the Glasgow Statement commitment to end new direct public support for unabated

⁶¹⁴ <https://stopthemoneypipeline.com/>

⁶¹⁵ <https://www.bankingonclimatechaos.org/>

fossil fuel use by the end of 2022, although details have not been finalized.⁶¹⁶

The U.S. Government has provided more than \$9 billion for oil and gas projects in Africa since the 2015 Paris climate agreement, while only committing \$682 million to clean energy developments such as wind and solar over the same period. This is two-thirds of all the money the U.S. has provided globally to fossil fuels in this time. Africa is a continent rich in various minerals, but where 600 million people live without electricity and where floods,⁶¹⁷ severe heatwaves,⁶¹⁸ and droughts⁶¹⁹ have inflicted an increasingly devastating toll.⁶²⁰

The World Bank has provided \$15 billion of finance directly to fossil fuel projects since the Paris Agreement and is likely to have spurred far greater investment indirectly.⁶²¹

The G20 countries from 2019 to 2021 invested at least \$55 billion per year in oil, gas, and coal projects. While this is a 35% drop compared to 2016-2018), it was nearly twice the funding for clean energy, which averaged \$29 billion per year.⁶²²

The Royal Bank of Canada provided \$9.2 billion of financing and underwriting to top fossil fuel expansionists like Enbridge, ExxonMobil, Chevron, TC Energy and Saudi Aramco from 2016 to September 30, 2022.⁶²³

⁶¹⁶ <https://priceofoil.org/2022/10/07/release-guidance-us-public-finance-backgroundunder-cop27/>

⁶¹⁷ <https://www.theguardian.com/world/2022/sep/19/nigeria-battling-worst-floods-in-a-decade-with-more-than-300-people-killed-in-2022>

⁶¹⁸ <https://www.carbonbrief.org/guest-post-why-africas-heatwaves-are-a-forgotten-impact-of-climate-change/>

⁶¹⁹ <https://www.who.int/publications/m/item/situation-report-greater-horn-of-africa-drought-and-food-insecurity-28-august-2022>

⁶²⁰ https://www.theguardian.com/environment/2022/oct/31/two-thirds-of-us-money-for-fossil-fuel-pours-into-africa-despite-climate-goals?CMP=tw_t_a-environment_b-gdneco

⁶²¹ <https://www.theguardian.com/business/2022/oct/06/world-bank-has-given-nearly-15bn-to-fossil-fuel-projects-since-paris-deal>

⁶²² <https://priceofoil.org/2022/11/01/g20-at-a-crossroads/>

⁶²³ <https://stand.earth/resources/royal-bank-of-canada-surgin-finance-of-fires-floods-climate-chaos/>

Private equity firms — a subset of asset managers, a more secretive class of investors hyper-focused on maximizing profits — have invested at least \$1.1 trillion into the energy sector since 2010 — double the combined market value of three of the world’s largest energy companies, Exxon, Chevron, and Royal Dutch Shell. The overwhelming majority of those investments were in fossil fuels, with only about 12% put into renewable energy. As public pressure over climate change prompted some oil companies to begin shedding some of their dirtiest assets, private equity firms have been buying them up. The NY Times reported that “By bottom-fishing for bargain prices — looking to pick up riskier, less desirable assets on the cheap — the buyers are keeping some of the most polluting wells, coal-burning plants and other inefficient properties in operation.”⁶²⁴

Insurance companies support the fossil fuel industry in several ways, including providing insurance to dangerous fossil fuel infrastructure like tar sands pipelines and fracking wells; and investing billions of their customers’ premiums in fossil fuel companies. Fossil fuel companies cannot build new pipelines, extraction sites, or other infrastructure without insurance. Insurers also often seek to deny insurance for people living in climate-vulnerable areas, while continuing to support the fossil fuel industry.

Wall Street in recent years has been investing almost equally in green energy and fossil fuels. The amount of funds raised through bonds and loans for green projects and by oil and gas companies was nearly identical at about \$570 billion in 2021. Investors predict that oil and gas companies will make money for years to come and will control emerging energy technologies. They argue that fully avoiding fossil fuel investments is impractical since oil, gas and coal still account for about 80% of the world’s energy. Energy and food shortages driven by the war in Ukraine⁶²⁵ have highlighted how much

⁶²⁴ <https://www.nytimes.com/2021/10/13/climate/private-equity-funds-oil-gas-fossil-fuels.html>

⁶²⁵ https://www.wsj.com/articles/europes-energy-crisis-threatens-to-slow-green-transition-11659346200?mod=article_inline

of world, starting with Europe, is still dependent on fossil fuels. Wall Street defends its actions by pointing to the “all of the above” energy strategy openly pursued by the Obama Administration and which the Democrats largely embraced in the recent Inflation Reduction Act. The Act is seen as a boon for the largest fossil-fuel companies, banks and investment firms that have the money to back all types of energy projects.⁶²⁶

Wall Street and insurance companies could certainly halt the future use of fossil fuels if they decided it was too great a risk to their financial future – a decision that they have clearly not yet made.

Swiss Re, a major player in the insurance industry, reported in 2021 that rising temperatures are likely to reduce global wealth significantly by 2050, as crop yields fall, disease spreads and rising seas consume coastal cities. They estimated that climate change could reduce global economic output by 11 to 14% by 2050, as much as \$23 trillion. They predicted that losses would be minimal (5% or under) if warming was kept below 2 degrees Celsius. However, for poorer nations, which tend to have warmer temperatures but less ability to adapt their infrastructure and economies, the consequences would be far more dire.⁶²⁷

Loss of life and extinction of species are seldom factored into such financial studies.

Investor Led Efforts to Deal with Climate Change

The Paris Aligned Investment Initiative (PAII) was established in May 2019 to explore how investors can align their portfolios with the goals of the Paris Agreement to keep warming below 1.5 degrees C. The Net Zero Investment Framework is a guide for investors to “decarbonize investment portfolios and increase investment in climate solutions.” Investors are urged to adopt a “net zero investment

⁶²⁶ <https://www.wsj.com/articles/wall-street-like-the-climate-bill-bets-on-both-green-energy-and-fossil-fuels-11660345793>

⁶²⁷ <https://www.nytimes.com/2021/04/22/climate/climate-change-economy.html>

strategy” based on five components: objectives and targets, strategic asset allocation and asset class alignment, policy advocacy and, investor engagement activity and governance.⁶²⁸

These initiatives are part of the United Nations Race to Net Zero campaign, described as “a global campaign to rally leadership and support from businesses, cities, regions, investors for a healthy, resilient, zero carbon recovery that prevents future threats, creates decent jobs, and unlocks inclusive, sustainable growth.”⁶²⁹

The Glasgow Financial Alliance for Net Zero (GFANZ), co-chaired by UN climate envoys Mark Carney and Michael Bloomberg, was launched in 2021 prior to COP26. Composed of major financial institutions committed to accelerating the decarbonization of the economy, its goals are to expand the number of net zero-committed financial institutions and to address sector-wide challenges with the net-zero transition.⁶³⁰

Stop the Money Pipeline reported in September 2021, “JPMorgan Chase & Co., Morgan Stanley, Bank of America, and other unnamed U.S. banks were threatening to leave the GFANZ over it strengthened criteria that would restrict their fossil fuel financing.”⁶³¹ Banks have begun to worry that GFANZ requirements for decarbonization would make them legally vulnerable. Republican politicians and state officials in the U.S. are targeting Environmental, Social, and Governance (ESG) guidance for investments as an extension of liberal overreach. For instance, GFANZ says that members should not support any new coal projects, leading some banks to worry that they could face legal challenges from some U.S. states that effectively require lenders to finance coal.⁶³² This partisan divide has also been evident in the divestment effort.

⁶²⁸ <https://www.parisalignedinvestment.org/>

⁶²⁹ <https://unfccc.int/climate-action/race-to-zero-campaign>

⁶³⁰ <https://www.gfanzero.com/>

⁶³¹ <https://stopthemoneypipeline.com/banks-threaten-to-abandon-climate-commitments-bank-ceos-grilled-in-congressional-hearing/>

⁶³² <https://abcnews.go.com/US/wireStory/political-spat-climate-risks-investments-hotter-92472697;>

Outside observers have numerous concerns with the approaches taken by such investor groups. The net-zero framework is very weak when it comes to scaling down fossil fuel production and provides giant loopholes for investors to continue to support fossil fuel. Needed changes to the framework include: Recommending divestment from companies that plan any new fossil fuel project; Targeting the whole coal chain and all unconventional fossil fuels (e.g., the framework leaves out coal mining and coal-related infrastructures); and requiring Paris Agreement-aligned phase-out dates for each fossil fuel. Other concerns are that the framework allows targets to be set on carbon intensity only – not absolute emissions - and it prioritizes engagement without linking it to a clear escalation strategy. Investors could meet PAII’s engagement goals by merely reaching out to companies or becoming members of collective engagement groups. It also fails to require its members to act against companies that engage in anti-climate lobbying.⁶³³

Financial Overview of the Fossil Fuel Industry

The divestment campaign started with the argument that it was morally wrong – especially for religious groups, schools, and governments (public pension funds) – to seek to profit by investing in fossil fuel companies that were threatening future life on the planet. Divestment seeks to accelerate the adoption of the renewable energy transition through the stigmatization of fossil fuel companies while increasing the cost of raising financing for fossil fuel companies.⁶³⁴

<https://www.hklaw.com/en/insights/publications/2022/12/dol-issues-final-rule-on-climate-change-esg-factors-for-retirement> ;

<https://www.bloomberg.com/news/articles/2022-09-21/banks-may-leave-mark-carney-s-climate-alliance-on-legal-risks>

⁶³³ <https://reclaimfinance.org/site/en/2021/03/25/net-zero-investment-framework-the-paris-aligned-investment-initiative-forgets-about-fossil-fuels/>

⁶³⁴ <https://www.business-school.ed.ac.uk/about/news/research-shows-fossil-fuel-divestment-works>

As the campaigns went on, it also became clear that fossil fuels were a bad investment, especially as the world governments began to commit to ending their future use. For much of the prior decade, fossil fuels have been the worst performing sector of Wall Street. For instance, in 2018 the New York State Common Retirement Fund would have an estimated \$22.2 billion more in value had it divested its fossil fuel stocks 10 years previously, according to an analysis performed by Corporate Knights.⁶³⁵

Even though the performance of fossil fuel stocks has reversed in the last year due to the post-pandemic rebound in oil prices combined with price gouging and the impact of the war in Ukraine on gas supplies, fossil fuels are still a bad long-term investment.⁶³⁶

The likelihood of stranded assets – assets that can no longer be used – are a major risk for fossil fuels. To avert the worst impacts of climate change, most of the world’s known fossil fuel reserves must remain untapped rather than burnt and converted to greenhouse gas emissions. 350.org’s divestment campaign was launched with Bill McKibben’s 2012 Do the Math Tour, where he highlighted that to keep global warming below 2 degrees Celsius the world would have to keep 80% of the known fossil fuels in the ground.⁶³⁷

A more recent study found that 90% of coal and nearly 60% of oil and natural gas must be kept in the ground to maintain a 50% chance that global warming will not exceed 1.5 degrees Celsius. One study by MIT estimated the value of such stranded assets as being between \$21,5 trillion and 430.6 trillion.⁶³⁸

⁶³⁵ <https://www.corporateknights.com/responsible-investing/divestment-made-ny-pension-fund-22b-richer/>; <https://ieefa.org/wp-content/uploads/2019/02/Divestment-Brief-February-2019.pdf>

⁶³⁶ <https://www.nytimes.com/2022/06/03/business/stock-market-energy-climate-change.html>; <https://ieefa.org/resources/two-economies-collide-competition-conflict-and-financial-case-fossil-fuel-divestment>

⁶³⁷ <https://www.rollingstone.com/politics/politics-news/global-warmings-terrifying-new-math-188550/>

⁶³⁸ <https://news.mit.edu/2022/stranded-assets-could-exact-steep-costs-fossil-energy-producers-investors-0819>

Despite the need to keep fossil fuels in the ground, fossil fuel companies are continuing to invest in finding new reserves. Twenty of the world's biggest oil and gas companies, including Shell, Exxon, and Gazprom (Russia), are projected to spend \$932 billion by the end of 2030 developing new oil and gas fields.⁶³⁹ This despite the warning by the International Energy Agency in 2021 that the use and development of new oil and gas fields must immediately stop, and no new coal-fired power stations can be built. Unfortunately, only a few governments have committed to halt new exploration for fossil fuels.⁶⁴⁰

There is also a significant difference in the strategies between European and American energy companies. BP, Royal Dutch Shell, and other European energy companies are selling off some oil fields, planning a sharp reduction in emissions, and investing billions in renewable energy. Chevron and Exxon Mobil are doubling down on oil and natural gas while making investments in speculative technology such as small nuclear power plants and carbon capture. Major U.S. oil companies continue to invest in a long-term future for oil and gas, while European companies seek a future as electricity providers anticipating a future world with stronger environmental safeguards.⁶⁴¹

Financial Disclosure of Climate Risk

In May 2021 President Biden issued a “Climate-Related Financial Risk” Executive Order (#14030), that among other things directed his climate staff to develop, within 120 days, “a comprehensive government-wide climate-risk strategy to identify and disclose

⁶³⁹ <https://www.globalwitness.org/en/press-releases/worlds-biggest-fossil-fuel-firms-projected-to-spend-almost-a-trillion-dollars-on-new-oil-and-gas-fields-by-2030/>

⁶⁴⁰ <https://www.theguardian.com/environment/2021/may/18/no-new-investment-in-fossil-fuels-demands-top-energy-economist>

⁶⁴¹ <https://www.nytimes.com/2020/09/21/business/energy-environment/oil-climate-change-us-europe.html>

climate-related financial risk to government programs, assets, and liabilities. This strategy will identify the public and private financing needed to reach economy wide net-zero emissions by 2050.” While climate groups welcomed the order, they worried that the term net-zero would allow false solutions, such as offsets, to be used as examples of minimizing risk, rather than stopping the actual expansion of fossil fuels.⁶⁴²

The groups also worried that the Biden Administration would primarily study the issue rather than take concrete action, a concern they expressed after the Secretary of Treasury released a follow-up report in October 2021. They said the report, “while laying out preliminary steps to make the financial industry more transparent and accountable for their growing climate risks, was a missed opportunity to recommend actions that actually reduce climate risk and limit Wall Street’s toxic investments in fossil fuels.”⁶⁴³

In contrast, in November 2021 the United Kingdom announced that there will be new requirements for U.K. financial institutions and companies to publish net zero transition plans that detail how they will decarbonize as the U.K. moves towards a net zero economy by 2050.⁶⁴⁴

For insurance companies, the climate risks include: physical risk due to financial losses from damages from climate change, such as sea level rise or increased extreme weather events; risk due to losses in the value of assets they have invested in as government policies and private actions shift toward a low-carbon economy; and liability risk resulting from climate related litigation. However, the extent of such risks is unknown due to a lack of data.

The various federal and state insurance regulators have taken initial steps to increase the disclosure about such risks and assess the extent of the climate-related financial risk. New York’s Department

⁶⁴² <https://stopthemoneypipeline.com/press-release-stop-the-money-pipeline-coalition-responds-to-bidens-executive-order-on-climate-related-financial-risk/>

⁶⁴³ <https://stopthemoneypipeline.com/fsoc-stmp-response/>

⁶⁴⁴ <https://www.gov.uk/government/news/chancellor-uk-will-be-the-worlds-first-net-zero-financial-centre>

of Financial Services recently issued guidance to companies on disclosing climate-related risks.⁶⁴⁵ The Federal Insurance Office of the Department of Treasury issued a request in 2021 for information on climate risk; and in April 2021, the National Association of Insurance Commissioners (NAIC) updated its survey for disclosing climate risks.⁶⁴⁶

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https://www.dfs.ny.gov/industry_guidance/industry_letters/il20201029_climate_change_financial_risks; https://www.dfs.ny.gov/industry_guidance/climate_change

⁶⁴⁶ <https://home.treasury.gov/news/press-releases/jy0337>;

<https://www.americanprogress.org/article/regulators-should-identify-and-mitigate-climate-risks-in-the-insurance-industry/>

CHAPTER 10

PLASTICS, DEGROWTH, MILITARY, CRYPTO MINING

The last chapter in the first section of the book examines four key issues and their impact on climate: plastics, degrowth, military and crypto mining.

The fossil fuel industry is investing heavily in plastics as a way to continue their operations. More than 99% of plastics are made from fossil fuels, both natural gas and crude oil.⁶⁴⁷ In the United States, plastic is primarily made from ethane,⁶⁴⁸ which is a waste byproduct of the fracking of natural gas.

Degrowth seeks to reduce emissions by transforming to a new economic model that does not depend upon growth, with its reliance on over consumption and extreme extractions of resources such as fossil fuels. Others worry that a call to halt growth locks in energy poverty and a reduced standard of living for poorer communities and nations.

The U.S. military remains the single largest user of oil. Access to fossil fuels still remains a significant factor in military conflict, as highlighted by the war in Ukraine. Others argue that imperialism and the drive for militarization, starting with the U.S., is an even bigger obstacle to creating a sustainable world.

The use of massive computer farms for proof-of-work crypto currency mining has had an enormous climate impact. China has already pushed such farms out due to both climate concerns and worry

⁶⁴⁷ <https://news.climate.columbia.edu/2020/02/20/plastic-production-climate-change/>

⁶⁴⁸ <https://www.mothersoutfront.org/news/how-plastic-is-made/>

over the financial risks posed by this currency. Such farms are rapidly spreading in the U.S., starting with New York State, including buying up mothballed fossil fuel plants in order to reduce their costs for electricity.

Plastics – The New Coal

With the world agreeing on the need to end the burning of fossil fuels, the industry is increasingly investing in plastic production as a way to continue their operations.

Much of the material here is based on the work of Beyond Plastics, including their report *Plastics is the New Coal*.⁶⁴⁹ The Center for International Environmental Law has also put out a major study on plastics and climate.⁶⁵⁰

“The fossil fuel industry is losing money from its traditional markets of power generation and transportation. They are building new plastics facilities at a staggering clip so they can dump their petrochemicals into plastics. This petrochemical buildout is cancelling out other global efforts to slow climate change,” noted Judith Enck, a former EPA Regional Administrator and President of Beyond Plastics.⁶⁵¹

Fracking is a major driver in the increase in plastic production since it generates substantial amounts of the plastic feedstock ethane as a waste product. With many fracking operations losing money, they have been eager to find a use for the ethane.

Plastic generates greenhouse gas emissions at every stage of its life cycle. If plastic were a country, it would be the world’s fifth largest greenhouse gas emitter. As of 2020, the U.S. plastics industry was responsible for at least 232 million tons of CO₂e gas emissions annually, the equivalent to 116 average-sized (500-megawatt) coal-

⁶⁴⁹ <https://www.beyondplastics.org/>; <https://www.beyondplastics.org/plastics-and-climate>

⁶⁵⁰ <https://www.ciel.org/plasticandclimate/>

⁶⁵¹ <https://www.beyondplastics.org/press-releases/report-plastics-is-the-new-coal>

fired power plants.⁶⁵² It was estimated in 2019 that production and incineration of plastic globally would add 850 million metric tons of greenhouse gases to the atmosphere – equivalent to 189 coal-fired power plants. By 2050 this could rise to 2.8 gigatons of carbon dioxide per year – or 615 coal plants' worth.⁶⁵³

New plastic plants in the U.S. are predominantly designed to use natural gas, as opposed to the oil-based production favored by much of the rest of the world. The U.S. is exporting this technology worldwide.

Companies like ExxonMobil, Shell, and Saudi Aramco are stepping up their plastic production — which is made from oil and gas, and their byproducts. Petrochemicals, which includes plastic, now account for 14% of oil use, and according to the International Energy Agency, are expected to drive half of oil demand growth between now and 2050. The World Economic Forum predicts plastic production will double in the next 20 years. Since 2010, companies have invested more than \$200 billion in 333 plastic and other chemical projects in the U.S. Shell for instance is building a \$6 billion ethane cracking plant — a facility that turns ethane into ethylene, a building block for plastic —25 miles northwest of Pittsburgh.⁶⁵⁴

There are more than forty ethane cracker plants in the U.S. and another nine are proposed. A major ethane cracker plant, which is only the first step in transforming ethane into plastics - costs around \$5 billion to build, creating about 10,000 jobs during construction. But since they are heavily automated, they only create between 350 and 1,200 permanent jobs once completed.⁶⁵⁵

⁶⁵² <https://www.beyondplastics.org/plastics-and-climate>

⁶⁵³ <https://www.weforum.org/agenda/2022/01/plastic-pollution-climate-change-solution/>

⁶⁵⁴ <https://e360.yale.edu/features/the-plastics-pipeline-a-surge-of-new-production-is-on-the-way>

⁶⁵⁵ <http://archive.alleghenyfront.org/story/frequently-asked-questions-about-ethane-crackers.html>

The Many Other Problems with Plastic

Extraction, fracking, production of plastics and chemical additives release substantial amounts of toxic substances into the air and contaminate the local environment. Humans are exposed to a large variety of toxic chemicals and microplastics (fragments of any type of plastic less than 5 mm in length) through inhalation, ingestion, and direct skin contact throughout the plastics lifecycle. The toxic chemical additives and pollutants in plastics threaten human health, include causing cancer or changing hormone activity (endocrine disruption), which can lead to reproductive, growth, and cognitive impairment. Many of the toxic chemical additives have several other known health impacts, persist in the environment, and bioaccumulate in exposed organisms. Microplastics not only can harm our health, but act as vessels for pathogens to enter our system, increasing the spread of diseases.⁶⁵⁶

An estimated 10 to 12% of all plastic is incinerated, releasing more greenhouse gases as well as dangerous toxins, including dioxins and heavy metals. Industry is promoting an expansion of incineration in waste-to-electricity plants, which it argues is renewable energy. Research suggests plastic in the environment releases greenhouse gases as it degrades — a potentially vast source of emissions. Petrochemical production can release airborne toxins such as 1,3-Butadiene, benzene, and toluene, causing cancer and other illnesses. Many plants are in impoverished areas, often communities of color.⁶⁵⁷

Beyond Plastics notes that 90% of the reported climate change pollution from plastics occurs in just eighteen communities (mainly in Louisiana and Texas) where residents earn 28% less than the average U.S. household and are 67% more likely to be people of color.⁶⁵⁸

⁶⁵⁶ <https://www.genevaenvironmentnetwork.org/resources/updates/plastics-and-the-environment/>

⁶⁵⁷ <https://e360.yale.edu/features/the-plastics-pipeline-a-surge-of-new-production-is-on-the-way>

⁶⁵⁸ <https://www.theguardian.com/environment/2021/oct/21/plastics-greenhouse-gas-emissions-climate-crisis>

One estimate from 2018 found that single-use plastics - like plastic bags and utensils that are designed to be thrown away after only a few minutes of use - accounted for between 60 and 95% of the planet's marine plastic pollution.⁶⁵⁹ One widely cited estimate is that Americans use 500 million straws a day, which ends up as waste in minutes (other estimates range from 300 to 700 million).⁶⁶⁰

The U.S. plastic waste stream also has a global negative impact on environmental justice. The U.S. shipped 1.4 billion pounds of plastic trash overseas in 2020, with the majority ending up in developing countries without the infrastructure and markets to deal with it. Plastic trash exported from the U.S. is often burned in the open, damaging the health of local communities or discarded in waterways or in open pits in low-income communities far away.⁶⁶¹

Plastics end up as litter everywhere, even in the wilderness as it is blown by wind currents. They are a major threat to wildlife. Turtles wind up with straws in their noses, and dead whales have been found with almost one hundred pounds of plastic in their stomachs. Over time, plastic breaks down into tiny particles known as microplastics, which contaminate our food, the air, and water. They also accumulate in our bodies, increasing our risk of chronic inflammation and other ills. When plastic particles such as microplastics are exposed to sunlight, they continue to emit greenhouse gases.⁶⁶²

Research indicates the microplastics in the ocean may be inhibiting one of the world's most important carbon sinks, preventing planet-warming carbon molecules from being locked away in the seafloor. This sequesters up to 12 billion metric tons of carbon at the bottom of the ocean each year, potentially locking away one-third of

⁶⁵⁹ <https://grist.org/climate/the-selective-accounting-behind-the-plastic-industrys-climate-friendly-claims/>

⁶⁶⁰ <https://www.nps.gov/articles/straw-free.htm>;
<https://fronterasdesk.org/content/694062/qaz-do-americans-really-use-500-million-plastic-straws-day>

⁶⁶¹ <https://www.beyondplastics.org/plastics-and-climate>

⁶⁶² <https://www.consumerreports.org/environment-sustainability/the-big-problem-with-plastic/>

humanity's annual emissions. Without it, scientists estimate that atmospheric CO₂ concentrations, which hit a new record high of 421 parts per million, could be up to 250 parts per million higher.⁶⁶³

The average person may be eating up to five grams of plastic a week. Microplastics have been found in human organs and in the placentas of unborn babies. Toxic chemicals such as phthalates and BPA are present in plastic foods packaging. It is estimated that by 2050, there will be more plastic in our oceans than fish.⁶⁶⁴

The American Chemical Industry counters that plastic delivers many benefits, such as making cars lighter and therefore more efficient, insulates homes, reduces waste by extending food's life, and keeps medical supplies sanitary. They point out the alternatives like steel, glass, and aluminum have negative impacts of their own, including carbon footprints that can be greater than plastic's. And they create jobs and make tax payments to local governments.⁶⁶⁵

In the spring of 2022, the California Attorney General (AG) launched an investigation into the role the petrochemical and fossil fuel industries have played regarding plastic pollution. A subpoena was issued by the AG to ExxonMobil to determine whether it has lied to the public about both the negative effects of plastics and the effectiveness of plastics recycling.⁶⁶⁶

Plastics are Not being Recycled

A recent study found a recycling rate of 5 to 6% for post-consumer plastic waste in the U.S. for 2021 – lower than the EPA prior estimate

⁶⁶³ <https://grist.org/science/all-that-plastic-in-the-ocean-is-a-climate-change-problem-too/>

⁶⁶⁴ <https://www.plasticfreejuly.org/the-plastic-pollution-issues/>

⁶⁶⁵ <https://www.americanchemistry.com/chemistry-in-america/chemistry-in-everyday-products/plastics>

⁶⁶⁶ <https://www.beyondplastics.org/press-releases/the-real-truth-about-plastics-recycling>

of 9%. While plastics recycling is on the decline, the per capita generation of plastic waste has increased by 263% since 1980.⁶⁶⁷

As the public and government becomes more aware of the extremely low rate of plastic recycling, the plastics industry is promoting technologies that it misleadingly calls “chemical recycling” (also known as advanced recycling, molecular recycling, and chemical conversion).

Engineering and Technology reports that “Chemical recycling aims to turn plastic waste back into its molecular building blocks, in contrast to mechanical recycling, which does not alter the chemical structure of the plastic. By far the most prevalent type of chemical recycling, pyrolysis is a process in which plastics are broken down into a range of basic hydrocarbons by heating in the absence of oxygen. The primary product is pyrolysis oil, which can be refined into fuels or further processed to create chemicals or plastic. Gasification uses high temperatures with low volumes of air or steam to degrade plastic. The primary product is a gas called ‘synthesis gas,’ which can be processed into fuels or chemicals. Other forms of chemical recycling include solvent-based processes, which dissolve plastics and separate polymers from other components. Chemical depolymerization uses thermal and chemical reactions to break the plastic polymer chain into individual monomers.”⁶⁶⁸

A recent study by National Resource Defense Council found that “(1) most ‘chemical recycling’ facilities in the United States are not recycling any plastic, (2) ‘chemical recycling’ facilities generate hazardous air pollutants and large quantities of hazardous waste, and (3) ‘chemical recycling’ facilities tend to be located in communities that are disproportionately low income, people of color, or both.”⁶⁶⁹

⁶⁶⁷ <https://www.beyondplastics.org/reports/the-real-truth-about-the-us-plastics-recycling-rate>; <https://bit.ly/US-plastics-recycling-rate>

⁶⁶⁸ <https://eandt.theiet.org/content/articles/2022/11/is-chemical-recycling-greenwashing>

⁶⁶⁹ <https://www.nrdc.org/resources/recycling-lies-chemical-recycling-plastic-just-greenwashing-incineration>

Many environmentalists contend that chemical recycling is primarily incineration.

Ending Single Use Plastics vs. Increasing Recycling

Environmental groups are seeking to halt the production of single use plastics. Numerous communities have banned plastic bags at retail outlets⁶⁷⁰ and have sought to limit the use of plastic straws and utensils (making them available upon request to accommodate individuals with disabilities).⁶⁷¹ They have also sought to pass laws to mandate reductions in plastic starting with packaging.

As of 2018, at least thirty-two countries had plastic bag bans. Some eighteen countries had a tax in place. ResuseThisBag.com notes that “Nearly half are in Africa, where plastic bags frequently clog drains, leading to increased mosquito swarms (and, as a result, bouts of malaria). In China, plastic bag waste was so bad that it led to the coining of the term ‘white pollution.’ A full ban was adopted in 2008 — and since then, plastic bag waste has dropped by 60% to 80%. In India, where an estimated twenty cows per day die from plastic ingestion, a ban has been in effect since 2002.”⁶⁷²

France in 2022 banned plastic packaging for nearly all fruit and vegetables, eliminating more than one billion items of unnecessary plastic packaging annually. Other measures will also begin in 2022 and 2023, such as providing water fountains to reduce the number of plastic bottles. France had previously banned plastic straws, cups, and cutlery, as well as polystyrene foam (such as Styrofoam) takeaway boxes.⁶⁷³

⁶⁷⁰ <https://www.forbes.com/sites/trevornace/2018/09/20/heres-a-list-of-every-city-in-the-us-to-ban-plastic-bags-will-your-city-be-next/?sh=2d4a64cd3243>

⁶⁷¹ <https://www.nytimes.com/2018/03/03/climate/plastic-straw-bans.html>;
<https://www.greenmatters.com/p/where-are-plastic-straws-banned>

⁶⁷² <https://www.reusethisbag.com/articles/where-are-plastic-bags-banned-around-the-world>

⁶⁷³ <https://www.weforum.org/agenda/2021/10/how-france-plans-to-significantly-reduce-its-plastic-waste-from-2022>

In March 2022, the United Nations Environmental Assembly approved a resolution to write a treaty to end plastic pollution. One hundred and twenty-four countries met later that year to begin work. The treaty is expected to include provisions to promote sustainable production and consumption of plastics through, among other things, product design and environmentally sound waste management, including through resource efficiency and circular economy approaches; and promote national action plans to work towards the prevention, reduction, and elimination of plastic pollution.⁶⁷⁴

One way to deal with plastics is to establish a circular economy. Plastic that cannot be eliminated needs to be reusable, recyclable, or compostable, which would require significant investment in collection and reprocessing infrastructure. A circular economy could cut the volume of plastics entering our oceans by 80% each year, while generating annual savings of \$200 billion, reduce greenhouse gas emissions by 25% and create 700,000 net additional jobs by 2040.⁶⁷⁵

In 2018, the European Union began to use the circular economy approach, developing waste guidelines to overhaul the way plastic products are designed, used, and recycled. All plastic packaging on the E.U. market must be recyclable by 2030, and the use of microplastics circumscribed.⁶⁷⁶

In the U.S., the plastic industry's strategy has been to call for the increased recycling of plastic despite the limited progress over decades. They have drafted a model law using the term Extended Producer Responsibility (EPR). Environmentalists for decades have promoted the concept of EPR, making producers responsible, including financially, for the disposal of the waste they produce. As usual, the details on how to accomplish this have been challenging.

⁶⁷⁴ <https://www.ciel.org/momentum-towards-a-global-plastics-treaty-update-after-the-open-ended-working-group/>

⁶⁷⁵ <https://www.weforum.org/agenda/2022/01/plastic-pollution-climate-change-solution/>

⁶⁷⁶ <https://www.pbs.org/newshour/science/bold-single-use-plastic-ban-kicks-europes-plastic-purge-into-high-gear>

The industry's model EPR bill, a version of which passed California in 2022, includes providing a revenue stream for local governments' recycling efforts to attract their support. The industry targets environmental groups which are not experts on waste issues but who support recycling to endorse the proposal. The model legislation creates a committee dominated by industry representatives to write the rules related to packaging, which is like giving tobacco companies the power to right the rules related to smoking. While the legislative sponsors often state that they are not supportive of chemical plastic recycling, groups like Beyond Plastics contend the model law includes loopholes allowing it to occur. Groups working on plastic have urged governments instead to mandate reduction in the amount of plastic and other wastes and to be explicit in banning chemical recycling.⁶⁷⁷

Beyond Plastics argues that EPR legislation should include specific reduction requirements for waste products like plastic while establishing standards for recyclability, recycled content, and elimination of toxic substances. They note that the European Union has had an EPR for packaging directive in place for years but has seen no reduction in packaging waste although recycling rates have improved. Many E.U. countries are now adding specific waste reduction targets to their EPR systems to try to improve the effectiveness of their programs. The group notes that in a recent global survey, 75% of respondents said they want single-use plastics banned. The industry's response to the call for bans is to co-opt EPR by throwing their support behind weak bills that make it look like they are doing something without doing much of anything.⁶⁷⁸

For several years the carbon fee and dividend proposal supported by the Citizens Climate Lobby in Congress even included a proposal to provide a tax credit for plastic production as a way to sequester carbon. Most climate groups were appalled, and it was not included in the most recent version.

⁶⁷⁷ <https://insideclimatenews.org/news/12102022/california-plastics-pollution-bill/>

⁶⁷⁸ <https://www.beyondplastics.org/epr>

California groups have sought to impose a tax on plastic production.⁶⁷⁹

Climate Change and Degrowth

Many climate change advocates believe that building a sustainable society requires more than pulling the plug on energy input from fossil fuels and plugging instead into wind and solar. They argue that we must radically scale back our global consumption of resources. They contend that we need to shrink rather than grow economies, using less of the world's energy and resources and putting wellbeing ahead of profit.

The idea that a finite planet cannot sustain ever-increasing consumption challenges the belief of many economists that growth is the best route to prosperity.⁶⁸⁰

In April 2022, the Intergovernmental Panel on Climate Change (IPCC) concluded that outright cuts to consumer demand were needed to reduce carbon emissions, saying that relying on renewable energy was not enough. IPCC members said that “Accepting a lower consumption lifestyle is almost the only fast-acting policy move we have left to prevent the disastrous impacts of climate change.” This “demand-side mitigation” would require governments to pass policies that incentivize sustainable choices, such as investing in bike lanes and public transport while blocking cars from city centers. Food was also cited (e.g., eat less beef and lamb, more vegetables). Ruminant meats (beef and lamb) have emissions per gram of protein that are 250 times those of legumes. Consumers will need to reduce their carbon footprint from a global average of around six tons of CO₂ equivalent (CO₂eq) per person to 2-2.5 tons by 2030 and to 0.7 tons by 2050.⁶⁸¹

⁶⁷⁹ <https://www.wired.com/story/should-governments-slap-a-tax-on-plastic/>

⁶⁸⁰ <https://www.reuters.com/business/sustainable-business/climate-change-scarcity-chip-away-degrowth-taboo-2022-08-08/>

⁶⁸¹ <https://www.reuters.com/business/environment/now-or-never-only-severe-emissions-cuts-will-avoid-climate-extremes-un-report-2022-04-04/>;
[https://www.unep.org/emissions-gap-report-2020](https://www.unep.org/emissions-gap-report-2020;);

Overconsumption is a related problem. “Many economists believe consumption is essential to economic growth since the demand for things makes companies profitable and provides employment. Companies plan obsolescence of their products by changing how they look, such as in the fashion industry, or updating the design or software of products and discontinuing support for older models. Only one percent of “stuff” is still in use six months from its purchase, according to Annie Leonard’s film *The Story of Stuff*.”⁶⁸²

At the first international conference on degrowth in Paris in 2008, degrowth was defined as a “voluntary transition towards a just, participatory, and ecologically sustainable society,” and proposed as the process that the wealthiest countries should go through in order to achieve a “right-sizing” of both national economies and the global economy. Degrowth means the abolition of economic growth as a social objective. Degrowth challenges the concept of sustainable development, where economic output progressively uses less energy and raw materials because of increases in efficiency.⁶⁸³

Many degrowth advocates want to discard the concept of the Gross Domestic Product (GDP) as the primary way to evaluate the well-being of a country. GDP is the global standard in assessing economic performance, a major guidepost for government policy and economic planning. Yet GDP fails to address the negative impacts of externalities such as climate change and inequalities, as well as failing to account for other measures of well-being, including health and happiness. GDP focuses on productive capacity and tax revenues, which can push economic planning in unsustainable directions.⁶⁸⁴

<https://www.brookings.edu/blog/future-development/2021/11/23/missing-from-cop26-lifestyle-choices-of-middle-class-and-rich-consumers/>;
<https://www.un.org/en/academic-impact/consumerism-and-climate-change-how-choices-you-make-can-help-mitigate-effects>

⁶⁸² <https://news.climate.columbia.edu/2020/12/16/buying-stuff-drives-climate-change/>

⁶⁸³ <https://www.opendemocracy.net/en/degrowth-case-for-constructing-new-economic-paradigm/>

⁶⁸⁴ <https://earth.org/gdp-climate-change/>

The Break Through Institute notes that “the increase in human wellbeing in recent decades has come from rapid economic growth driven by government industrial policies, particularly in poor-to-middle income countries. But historically, economic growth has been closely linked to increased energy consumption — and increased CO₂ emissions in particular.” There is significant debate about the extent to which the adoption of clean energy technology can allow emissions to decline while economic growth continues. Some point out that the emissions per unit of GDP have been falling for the past 60 years - though global emissions have continued to climb (by 56% from 1990 to 2019). Since 2005, 32 countries with a population of at least one million people have been able to reduce emissions while still experiencing economic growth.⁶⁸⁵

Others contend that a more effective way to increase overall wellbeing would be to focus on reducing economic disparity.

Ecosocialists have a mixed response to degrowth. They generally agree that simply substituting the right technology into the present political economy of capitalism will not be sufficient to meet human and nature’s needs. But many argue that at a minimum, proponents of degrowth need to account for the varying differences in wealth and prosperity, both between the Global South and North and between classes within industrial nations, the global working class. They oppose approaches that would relegate poorer nations to continuing energy poverty. They note that a major shift away from the massive investments in the military-industrial complex would free up vast quantities of materials, especially metals, for the growth need for the creation of a global wind and solar power infrastructure.⁶⁸⁶

Rich countries and individuals of course have a far greater carbon footprint than the poor. The average U.S resident emits about 17.6 tons of CO₂ equivalents per capita, more than double that of Europe

⁶⁸⁵ <https://thebreakthrough.org/issues/energy/absolute-decoupling-of-economic-growth-and-emissions-in-32-countries>

⁶⁸⁶ <https://climateandcapitalism.com/2022/01/05/a-critique-of-degrowth/>

(7.9 tons), and ten times as much as India (1.7 tons).⁶⁸⁷ The richest one percent of the global population emit more than twice the amount than the poorest 50 percent.⁶⁸⁸

Proponents of degrowth such as Jason Hickel argue that they understand the need for a just transition that raises up the poor rather than leaving them behind. “In an actual degrowth scenario, the goal would be to scale down ecologically destructive and socially less necessary production, while protecting and indeed even enhancing parts of the economy that are organized around human well-being and ecological regeneration...Capitalism is highly inefficient when it comes to meeting human needs; it produces so much, and yet leaves 60% of the human population without access to even the most basic goods...It is irrational to expect that a system organized around increasing extraction and accumulation will somehow automatically improve social outcomes.”⁶⁸⁹

Military and Climate

The American military has long recognized that climate change is a significant national security threat.

Severe weather events and global warming will destabilize countries, especially those with already unstable governments and under resourced infrastructure such as in Africa and Asia. The competition for land, water, and food, as well as dealing with potentially tens of millions of climate refugees, increases the likelihood of military conflicts between countries. Rising sea levels are already causing flooding at some military bases, especially naval ones located on coasts, with billions of dollars in damages. Changing weather patterns (drought, floods, rain, heat waves) impacts upon the

⁶⁸⁷ <https://www.brookings.edu/blog/future-development/2021/11/23/missing-from-cop26-lifestyle-choices-of-middle-class-and-rich-consumers/>

⁶⁸⁸ <https://news.climate.columbia.edu/2020/12/16/buying-stuff-drives-climate-change/>

⁶⁸⁹ <https://www.jasonhickel.org/blog/tag/degrowth>

conditions that military personnel and equipment must operate in and threatens supply chains.⁶⁹⁰

The Defense Department is the world's single largest consumer of oil, though its emissions have declined from 85 million metric tons of CO₂ equivalent in 2004 to 59 million in 2017. It has accounted for as much as 80% of the federal government's carbon footprint since 2001. The largest sources of military greenhouse gas emissions are buildings and fuel. The Defense Department maintains over 560,000 buildings at 500 domestic and overseas military installations, which account for about 40% of its greenhouse gas emissions. In fiscal year 2016, for instance, the Defense Department consumed about 86 million barrels of fuel for operational purposes. Its equipment are such gas guzzlers that their consumption is often calculated in gallons per mile (for example, B-2 bombers uses more than four gallons per mile.) Wars such as those in Afghanistan and Iraq also contribute to major spikes in emissions.⁶⁹¹

The American military does have plans to reduce its carbon footprints, partially to reduce reliance upon fossil fuels that can become harder to obtain during conflicts. It also needs to protect its bases from rising seas and various forms of extreme weather. In February 2022, the U.S. Army released its climate strategy, aiming for net-zero emissions by 2050, to electrify its combat and non-tactical vehicles, to power its bases with "carbon-free" electricity, and to

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https://obamawhitehouse.archives.gov/sites/default/files/docs/National_Security_Implications_of_Changing_Climate_Final_051915.pdf;

<https://www.nextgov.com/policy/2022/09/climate-change-poses-threat-us-national-security-gao-says/377330/>;

<https://www.npr.org/2021/10/26/1049222045/the-pentagon-says-climate-change-is-having-a-negative-impact-on-national-security>

⁶⁹¹ <https://theconversation.com/the-defense-department-is-worried-about-climate-change-and-also-a-huge-carbon-emitter-118017>;

<https://www.thenation.com/article/world/us-military-climate-mitigation/>

develop clean global supply chains. But critics point out that its carbon footprint will still be massive, and war is destructive of nature.⁶⁹²

The military budget is enormous, tying up taxpayer funds that could be utilized to support the transition to a clean energy future. The U.S. national security budget runs somewhere from \$700 billion to a trillion dollars annually (depending on what categories are included), and accounts for more than half of the discretionary federal spending. As the Transnational Institute points out, “Every dollar spent on the military not only increases greenhouse gas (GHG) emissions, but also diverts financial resources, skills and attention away from tackling one of the greatest existential threats humanity has ever experienced.”⁶⁹³

The world’s militaries, and the industries that provide their equipment, are estimated to create as much as 6% of all global emissions (though Prof. David Schwartzman argues it is considerably less). A large loophole in the Paris Agreement allows countries to avoid full data on greenhouse gases being emitted by their military. Under the Kyoto Protocol, militaries were exempt from CO₂ targets, after lobbying by the U.S.⁶⁹⁴

Climate change impacts upon military strategy and the ability of the military to conduct their operations. The Center for Climate and Security notes that “Climate change can place significant burdens on the supply chains and logistical capacity of armed forces engaged in ‘theater.’ Extreme drought or flooding in areas where militaries are engaged in warfighting, for example, can compromise water supply

⁶⁹² <https://www.theguardian.com/us-news/2022/mar/10/pentagon-us-military-emissions-climate-crisis>

⁶⁹³ <https://www.tni.org/en/publication/climate-collateral/>;
<https://www.nationalpriorities.org/analysis/2020/militarized-budget-2020/>;
<https://executivegov.com/articles/u-s-defense-budget-2022-how-much-does-the-united-states-spend-on-its-defense-budget/> ;

⁶⁹⁴ <https://www.theguardian.com/environment/2021/nov/11/worlds-militaries-avoiding-scrutiny-over-emissions>; <https://theecologist.org/2015/jan/06/missing-paris-agreement-pentagons-monstrous-carbon-boot-print>;
<https://ceobs.org/estimating-the-militarys-global-greenhouse-gas-emissions/>;
<http://www.globalecosocialistnetwork.net/2022/04/10/revisiting-military-greenhouse-gas-ghg-emissions/>

lines, and thus threaten military personnel directly. Climate change can impact military strategy through increasing the possibility of destabilizing conditions in strategically significant regions of the world. In the Arctic, a melting ice cap, coupled with increasing tensions between Russia and other Arctic nations, could increase the likelihood of conflict. In the Middle East and North Africa, climate change effects on water security may increase the probability of instability in the future.”⁶⁹⁵

War for Oil

While some observers argue that the concept of war for oil is overstated,⁶⁹⁶ a study from the Kennedy School at Harvard found that oil was a factor in between $\frac{1}{4}$ and $\frac{1}{2}$ of the wars fought around the world since 1973. And even if oil or fossil fuels are not the direct cause of war, they can impact on the pre-conditions that lead to war, such as the overall geopolitics of the conflict. This includes countries using revenues from oil to fund groups or activities that other countries find threatening (including funding of terrorists and favoring sides in civil wars.)⁶⁹⁷

The seizure of oil fields was a major factor in the U.S. invasion of Iraq, far more than the political spin related to weapons of mass destruction or a role in the September 11th attacks.⁶⁹⁸

Wars themselves result in increased greenhouse gas emissions, including the use of fuels for airplanes, trucks, tanks, etc. Oil infrastructure has often been a target of fighting, as we saw in Colombia, Libya, Syria, and Iraq. Fires and spills generate emissions.

⁶⁹⁵ <https://climatesecurity101.org/faqs/why-do-militaries-care-about-climate-change>

⁶⁹⁶ <https://www.cornellpress.cornell.edu/the-oil-wars-myth-and-international-conflict/>

⁶⁹⁷ <https://www.belfercenter.org/publication/oil-conflict-and-us-national-interests>

⁶⁹⁸ <https://www.cnn.com/2013/03/19/opinion/iraq-war-oil-juhasz;>
https://powerbase.info/index.php/Project_for_the_New_American_Century_and_the_Iraq_War

It is estimated that the 1991 Gulf War's oil fires contributed more than 2% of global fossil fuel CO₂ emissions that year. And if existing energy infrastructure is damaged, even more polluting forms may be brought into service to replace them. Controlling emissions is seldom a priority during military conflicts. The delivery of humanitarian aid also can drive up emissions. War has negative impacts on the food system, vegetation, forests, and more.⁶⁹⁹

Russia's invasion of Ukraine highlighted their role as one of the world's three largest suppliers of natural gas. Access to gas was used as a leverage point with European countries in NATO and had a global impact, including on gas prices in the U.S. While climate activists cited the conflict as further evidence of the need for a rapid transition to renewable energy, many countries turned in the short-term to other sources of fossil fuels, including coal to meet their energy needs. Rising prices for gas also curtailed politicians' willingness to take climate actions that would further drive-up costs for consumers (voters). Climate change action overall became less of a priority for politicians in Europe and the U.S. The Russians also targeted Ukraine's nuclear power plants in the conflict.

Some peace activists argue that the most negative impact from militarism/imperialism is not the level of greenhouse emissions but rather its ongoing wars and its block on global cooperation needed to reduce global warming.⁷⁰⁰

Crypto Mining PoW has Major Climate Impact

Crypto currency has emerged as a major problem for climate, particularly for the system known as "proof of work" (PoW).

⁶⁹⁹ <https://ceobs.org/how-does-war-contribute-to-climate-change/>

⁷⁰⁰ <http://www.globalecosocialistnetwork.net/2022/04/10/revisiting-military-greenhouse-gas-ghg-emissions/>; <https://jacobin.com/2019/05/green-new-deal-fight-militarism-imperialism>;
<https://www.theguardian.com/commentisfree/2019/mar/06/progressive-agenda-us-military-funding>

As I wrote this book, the crypto currency industry was teetering on collapse after the spectacular collapse of FTX, one of the major crypto players, while the value of Bitcoin has dropped more than 50% since 2021.⁷⁰¹

Proof of work crypto⁷⁰² mining is one of several ways that crypto currency (such as Bitcoin) is created. Participants solve complex mathematical challenges. The more computer power one brings to bear, the likelier that one will “win” the currency which can be worth tens of thousands of dollars. Warehouse operations full of thousands of computers have been set up, which require enormous amounts of electricity to operate, and which increases the demand for electricity by fossil fuels.

Some crypto mining operations have bought old and mothballed fossil fuel plants as a cheaper way to provide electricity for their operations.⁷⁰³ PoW cryptocurrency mining is so energy intensive that it has been shown to use the same amount of energy as entire countries like Argentina and New Zealand.⁷⁰⁴

Owners of the energy intensive crypto currency operations have responded to complaints about its climate impact by seeking to utilize more renewable energy. According to *The New York Times*, “Globally, estimates of Bitcoin’s use of renewables range from about 40 percent to almost 75 percent. But in general, experts say, using renewable energy to power Bitcoin mining means it will not be available to power a home, a factory, or an electric car.”⁷⁰⁵

The reality is that most such mining operations draw their power from the local grid. When they tap into the local grid, the increased

⁷⁰¹ <https://www.investopedia.com/crypto-crash-what-investors-need-to-know-5272147>; <https://www.cnbc.com/2022/11/22/bitcoin-btc-hits-2-year-low-as-ftx-collapse-contagion-fears-linger.html>

⁷⁰² <https://earthjustice.org/news/press/2022/icymi-three-new-reports-paint-damning-picture-of-climate-killing-community-impacts-of-cryptocurrency-mining>

⁷⁰³ <https://earthjustice.org/blog/2022-october/cleaning-up-crypto;>

<https://www.curbed.com/2021/07/crypto-currency-mining-old-power-plants.html>

⁷⁰⁴ <https://www.bbc.com/news/technology-56012952>

⁷⁰⁵ <https://www.nytimes.com/interactive/2021/09/03/climate/bitcoin-carbon-footprint-electricity.html>

demand can drive up costs for other customers. A 2021 study estimated “the power demands of cryptocurrency mining operations in upstate New York push up annual electric bills by about \$165 million for small businesses and \$79 million for individuals.”⁷⁰⁶

“The Energy Bomb: How Proof-of-Work Cryptocurrency Mining Worsens the Climate Crisis and Harms Communities Now,” from Earthjustice and the Sierra Club, documents “the explosive growth of cryptocurrency mining in the United States and examine how this industry is impacting utilities, energy systems, emissions, communities, and ratepayers. Cryptocurrency mining is an extremely energy-intensive process that threatens the ability of governments across the globe to reduce our dependence on climate-warming fossil fuels.”⁷⁰⁷

After China⁷⁰⁸ cracked down on cryptocurrency mining in 2020 due to concerns over its financial risks and its negative climate impact, Earth Justice reported that “the amount of mining operations exploded in the United States. In the year prior to July 2022, Bitcoin consumed an estimated thirty-six billion kilowatt-hours (kWh) of electricity, as much as all of the electricity consumed in Maine, New Hampshire, Vermont, and Rhode Island put together in that same time period. The past two years have demonstrated that the industry preferentially seeks readily available energy and minimal regulation, re-starting defunct coal and gas plants, flooding the restructured electricity market in Texas, and tapping into power grids where regulators have little oversight.”⁷⁰⁹

⁷⁰⁶ <https://newsroom.haas.berkeley.edu/research/power-hungry-cryptominers-push-up-electricity-costs-for-locals/>

⁷⁰⁷ https://earthjustice.org/sites/default/files/files/energy_bomb_bitcoin_white_paper_101322.pdf; <https://earthjustice.org/features/cryptocurrency-mining-environmental-impacts>

⁷⁰⁸ <https://news.climate.columbia.edu/2021/09/20/bitcoins-impacts-on-climate-and-the-environment/>

⁷⁰⁹ <https://earthjustice.org/feature/cryptocurrency-mining-environmental-impacts>

Scientific Reports looked at the climate impact of Bitcoin over five years. It found that: “Per coin climate damages from Bitcoin were increasing, rather than decreasing as the industry grew. During certain time periods, Bitcoin climate damages exceed the price of each coin created. On average, each \$1 in Bitcoin market value created was responsible for \$0.35 in global climate damages, which as a share of market value is in the range between beef production and crude oil burned as gasoline.”⁷¹⁰

In September 2022, the Biden Administration issued a report confirming the many problems with PoW. “Crypto-asset mining operations can also cause local noise and water impacts, electronic waste, air, and other pollution from any direct usage of fossil-fired electricity, and additional air, water, and waste impacts associated with all grid electricity usage. These local impacts can exacerbate environmental justice issues for neighboring communities, which are often already burdened with other pollutants, heat, traffic, or noise. The growth of energy-intensive crypto-asset technologies, when not directly using clean electricity, could hinder the ability of the United States to achieve its National Determined Contribution under the Paris Agreement, and to avoid the most severe impacts of climate change.”⁷¹¹

In 2022, the New York State Legislature passed a two-year moratorium on new PoW cryptocurrency mining operations to give the state time to examine its climate impact, including how it relates to the state’s recently enacted climate goals to cut emissions.⁷¹²

While many climate activists support an end to PoW systems, since alternative mining methods exist, the crypto industry has tried to improve its green image. The Crypto Climate Accord, supported by 40 projects, has “the goal of making blockchains run on 100 percent renewable energy by 2025 and having the entire cryptocurrency

⁷¹⁰ <https://www.nature.com/articles/s41598-022-18686-8>

⁷¹¹ <https://www.whitehouse.gov/ostp/news-updates/2022/09/08/fact-sheet-climate-and-energy-implications-of-crypto-assets-in-the-united-states/>

⁷¹² <https://earthjustice.org/news/press/2022/moratorium-on-fossil-fuel-power-plants-for-cryptocurrency-mining-passed-by-senate-gov-hochul-can-protect-nys>

industry achieve net zero emissions by 2040. It aims to decarbonize blockchains through using more energy efficient validation methods, pushing for proof of work systems to be situated in areas with excess renewable energy that can be tapped.”⁷¹³

⁷¹³ <https://news.climate.columbia.edu/2021/09/20/bitcoins-impacts-on-climate-and-the-environment/>; <https://cryptoclimate.org/>

CHAPTER 11

CLIMATE ADVOCACY OVERVIEW

The first half of this book provided a fact-based introduction to climate change and key issues such as the political and economic barriers to transitioning to renewable energy, carbon pricing, false climate solutions, a Green New Deal, buildings and transportation, agriculture, and climate justice.

The second half provides an overview of how we as a society can build support for the comprehensive actions needed to limit global warming as much as possible and to take the steps toward a livable future.

Many have pointed out that it's not science or technology that presents the biggest barriers to creating a renewable energy future, but rather political power and the role of money.

Educating our political and economic decision makers about climate change has not been enough to convince them to make the radical changes that are necessary - nor will it be. The fossil fuel industry has been one of the dominant economic and political powers of the last century. It will not willingly relinquish that power.

The next few chapters will explore the theory and practice of social change. We are taught in school about the role of the three main branches of the American government. The real world is more complex, and the role of money is far more dominant than we are taught.

The more revolutionary the changes are, the greater the disruption in the social and political order will be. This book provides insights into the traditional roles of lobbying, litigation, and education in

making change. It shows how protests, art, and media can assist in such efforts. Many of those who recognize the need for system change feel that will not come from convincing elected officials. Instead, it will require more fundamental mass mobilizations, resulting in structural changes in society.

Some of those who support the need for comprehensive system change advocate for the concept of building a new economy, a new world, within the shell of the old. Another approach is to start or work for a business that is part of the clean energy transition. Others focus on reducing their personal carbon print by changing their consumer behavior.

There is no blueprint for accomplishing revolutionary change. History provides many examples of radical change being the exception rather than the rule. Many of the more successful revolutionary moments have been unraveled by a successful counterrevolution, as most recently seen in places like Egypt during the Arab Spring.

In many cases, the approaches reviewed here will be utilized simultaneously. For instance, while lobbying legislators to pass a climate bill, groups can also utilize protests, media, and public education.

Cut Greenhouse Emissions as Fast and as Deeply as Possible

The overriding need is to cut greenhouse gas emissions. That may seem obvious but focusing on building more renewable energy has not always led to a corresponding reduction in emissions, at least not at the levels one would have expected. We also need a plan to shut down / phaseout sources of emissions.

As of 2021, the increase in renewable energy is still lower than the increase in global energy demand overall, resulting in ongoing and increased demand for fossil fuels.⁷¹⁴

⁷¹⁴ <https://www.cnbc.com/2021/11/04/gap-between-renewable-energy-and-power-demand-oil-gas-coal.html>

Whack-A-Mole

It is usually easier to mobilize community opposition to a proposed project with clearly defined threats of negative environmental, public health, noise, water, and climate impacts, than it is to build support for initiatives that will have positive but less immediate impacts upon individuals. Harmful projects can often be defeated by only a handful of people who are willing to commit to sustained political, legal, and protest actions. This is especially true if local government – more susceptible to grassroots pressure than state legislatures or Congress - is the decision-maker.

Fighting bad local projects however can feel like playing whack-a-mole, where a defeated project repeatedly pops up someplace else, sometimes with a new lead sponsor, until it finally wins approval.

Abstract policy changes (“cut emissions” or “build more solar”) are less likely to generate the same level of passionate, ongoing support. Most people focus on their families and jobs. Climate action is often low on the list of concerns for those struggling merely to survive, starting with nearly half of America who live paycheck to paycheck. Yet if positive changes are not enacted, more negative projects driven by the desire for profit will continue to emerge to fill the void.

It is Now or Never

How you approach impacting upon climate action will depend upon your views on social change, as well as how dire you feel the situation is.

António Guterres, Secretary-General of the United Nations, has made it clear that there is no time left for incremental change. It is now or never for governments to take bold climate action. “This abdication of leadership is criminal. The world’s biggest polluters are guilty of arson of our only home.” The IPCC concluded that any further delay

would force humanity to miss the “brief and rapidly closing window of opportunity to secure a livable and sustainable future for all.”⁷¹⁵ Guterres also said the world must end its “addiction to fossil fuels.”⁷¹⁶

However, at least some large mainstream climate groups – and the foundations and others that fund them – still stress the value of incrementalism despite its limitations. The core argument is that we have to get the trains turned around and headed in the right direction. Once that happens, hopefully the successes will convince officials to step on the accelerator. Unfortunately, while many officials, especially Democrats, are willing to invest some additional resources into renewable energy, battery storage and efficiency – all of which produces jobs and economic activity – they often pursue an all-of-the-above energy strategy with various fossil fuel uses and other false solutions rather than working to shut off the fossil fuel industry.

While there is a compelling case for the need for a radical transformation, indeed a revolution, few climate groups incorporate that vision or demand into their work. Of course, there is no clear path for how to accomplish a revolution. Yet most recognize that 30 years of pleading with elected officials to adequately respond to climate change has been unsuccessful.

Many feel it is long past time for the climate movement to up its game, and that targeting lawmakers, who often rely on money raised from special interests such as the fossil fuel industry, may not be a logical way to achieve the needed changes.

Social Change and Climate: Theories, Strategies, Tactics and History

When I taught a course on climate change and advocacy at Bennington College in the spring of 2022, I reached out to various professors for suggestions of books to use.

⁷¹⁵ <https://www.washingtonpost.com/climate-environment/2022/02/28/ipcc-United-nations-climate-change-adaptation/>

⁷¹⁶ <https://news.un.org/en/story/2022/09/1126931>

Bill McKibben, author and climate activist extraordinaire, suggested *This Is An Uprising: How Nonviolent Revolt is Shaping the Twenty-First Century* by Mark and Paul Engler. The book jacket says “There is a craft to uprising — and this craft can change the world. From protests around climate change and immigrant rights, a new generation is unleashing strategic nonviolent action to shape public debate and force political change.”

The Englers ask, “Should we fight the system or ‘be the change we wish to see?’ Should we push for transformation within existing institutions, or should we model in our own lives a different set of political relationships that might someday form the basis of a new society?” As the Englers have written elsewhere, “Where strategic politics favor the creation of organizations that can marshal collective resources and gain influence in conventional politics, prefigurative groups focus on the creation of liberated public spaces, community centers and alternative institutions — such as squats, co-ops, and radical bookstores.” The anti-nuclear Clamshell Alliance, which successfully fought the Seabrook plant in New Hampshire in the ‘70s, “established much of the current tradition for direct action. Many of its techniques — such as affinity groups, spokes councils, and general assemblies — became fixtures in the global justice movement.”⁷¹⁷

Many who want to build a new world seek to create democratic and cooperative institutions from the ground up. As the Symbiosis Research Collective has written, “These include structures for political democracy, such as neighborhood councils and assemblies, networked into grassroots confederations, and structures for economic democracy, such as housing cooperatives, worker-owned cooperatives, and community land trusts...New institutions of a cooperative economy can ensure that people are fed and sheltered, their human potential developed and their minds nourished, all while fostering the spirit of community and solidarity we so sorely need...By growing a cooperative economy that provides for all, we

⁷¹⁷ <https://organizationunbound.org/expressive-change/should-we-fight-the-system-or-be-the-change/>

can weaken our dependence on and steadily displace the capitalist economy. By networking together institutions of genuinely democratic and participatory community governance, we can assemble a parallel political system that can challenge—and, in time, transform and replace—the various oligarchies of our day.”⁷¹⁸

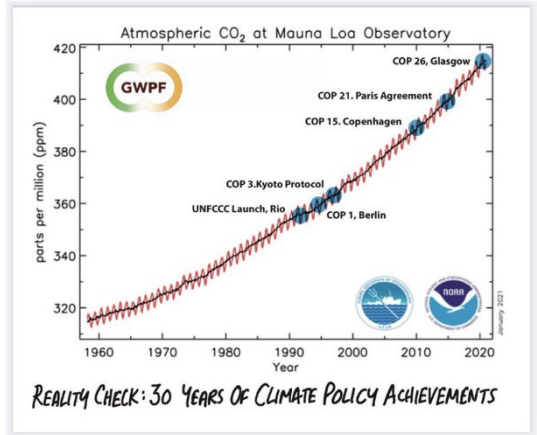
Another long-time colleague, Brian Tokar, suggested *Shut it Down: Stories from a Fierce, Loving Resistance* by Lisa Fithian. The last time I saw Lisa was in October 2019 as she was being arrested by the police, as she was the one directing us with a bullhorn, as I laid on my back on the street in front of the NY Stock Exchange covered in fake blood as part of a climate die-in organized by Extinction Rebellion. In the intro to the book, Naomi Klein wrote, “It is more important than ever that our movements also stay mobilized, disobedient, and in the streets.”

In her intro, Lisa notes that “The most common way people give up their power is thinking they don’t have it.” She advocates for the use of “civil disobedience and other forms of nonviolent direct action as the primary means of dismantling and battling today’s oppressive power structure while simultaneously creating structures that embody love and liberation...Sometimes there are aha! Moments when the entire world shifts, and sometimes change is long and slow.”

David Bond, the professor who invited me to teach the course, suggested *How to Blow up a Pipeline: Learning to Fight in a World on Fire* by Andreas Malm. Malm writes “The science on climate change has been clear for a very long time. Yet despite decades of petitions, intergovernmental conferences, and peaceful demonstrations, we are still in thrall to a booming fossil fuel industry.” Malm “makes an impassioned call for the climate movement to escalate its tactics in the face of ecological collapse. We need to force fossil fuel extraction to stop – with our bodies and or actions – by disabling or destroying its tools.”

⁷¹⁸ <https://theecologist.org/2018/apr/23/how-build-new-world-shell-old>

This chart shows how atmospheric carbon levels have continued to increase despite decades of the present advocacy methods used by the climate movement. (From the Global Warming Policy Foundation.)



In his book, Malm, based in Sweden, outlines what he sees as three distinct phases in the history of climate activism (at least recently). The first occurred in northern Europe between 2006 and 2009, with activists organizing massive “climate camps” near airports, power plants, and financial districts, with an immense “People’s Climate Summit” in Copenhagen in 2009. Following the world financial collapse in 2008 and resulting austerity policies, a second phase emerged in the U.S. following the failure of President Obama to deliver on his climate promises. Thousands of activists launched sit-ins to protest the Keystone XL pipeline, gathered in the streets of New York for the “People’s Climate March” in 2014, and camped in the cold in North Dakota to fight the DAPL pipeline. Trump’s election in 2016 ended this phase.

The third phase began in the record heat of the summer of 2018, when 15-year-old Greta Thunberg sat down in front of the Swedish parliament and declared a school strike for the climate. “The picture of vulnerability and defiance,” Malm wrote, “touched a nerve in her generation.” Students around the world instigated rolling waves of school strikes in 2018 and 2019, with millions marching in “what might have been the largest coordinated youth protest in history.” At roughly the same time, British activists launched Extinction Rebellion, shutting down much of central London in a remarkable act of civil disobedience.

Rebellious Revolution

Extinction Rebellion⁷¹⁹ is an international movement that uses non-violent civil disobedience in an effort to halt mass extinction and stave off social collapse. While local groups have been organized in the U.S., XR has been most visible – and disruptive – in its home base of the United Kingdom. “At the core of Extinction Rebellion’s philosophy is nonviolent civil disobedience. We promote civil disobedience and rebellion because we think it is necessary. We are not focused on traditional systems like petitions or writing to our MPs... We are promoting mass ‘above the ground’ civil disobedience – in full public view. This means economic disruption to shake the current political system and civil disruption to raise awareness.”

XR cites historical evidence compiled by a Harvard professor that “nonviolent protests are twice as likely to succeed as armed conflicts – and those engaging a threshold of 3.5% of the population have never failed to bring about change.”⁷²⁰

The problem with such analysis is that the change that occurs often falls short of the initial demand, which for climate change means failure to avoid climate collapse. The Arab spring for instance was able to topple a number of political leaders, most notably in Egypt. But relatively rapidly counter revolutions largely restored the prior power structure.⁷²¹

Probably the most successful such uprising in the United States was the civil rights movement in the sixties. However, while that movement led to a number of critical reforms and changes, especially in overt racism, it ultimately failed to end systemic or even individual racism. It certainly fell far short of the goals of ending militarism and

⁷¹⁹ <https://extinctionrebellion.uk/>

⁷²⁰ <https://www.bbc.com/future/article/20190513-it-only-takes-35-of-people-to-change-the-world>

⁷²¹ <https://www.taylorfrancis.com/chapters/edit/10.4324/9780429494581-3/revolution-counterrevolution-egypt-jeannie-sowers-bruce-rutherford>

economic inequality that Dr. King was promoting prior to his assassination.⁷²²

The nature of, and reasons for, a revolution have long been debated by scientists and philosophers.

National Geographic Society says “a revolution is a radical change in the established order, usually the established government and social institutions. The people who start revolutions have determined the institutions currently in place in society have failed or no longer serve their intended purpose. Revolutions are born when the social climate in a country change and the political system does not react in kind. People become discouraged by existing conditions, which alters their values and beliefs. A wave of revolutions took place in the 1700s. In all these countries, the revolutions not only changed the political systems and replaced them with new ones, but they altered public belief and brought about sweeping changes in society as a whole.”⁷²³

Revolutions emerge “from the social order becoming frayed in many areas at once. There are five elements that create an unstable social equilibrium: economic or fiscal strain, alienation and opposition among the elites, widespread popular anger at injustice, a persuasive shared narrative of resistance, and favorable international relations.”⁷²⁴

One cautionary note. Revolutions occur when the vast majority of citizens are unhappy with the present situation. Many social change movements in the U.S. highlight the need to address injustices inflicted upon minority members of the population. However morally correct that position is, by itself it unfortunately is not a path to revolutionary change. The average person must believe that not only are they also victims of injustice but that they will benefit from the proposed changes. That is what the call for a Just Transition is about,

⁷²² <https://segregationinamerica.eji.org/report/how-segregation-survived.html>

⁷²³ <https://education.nationalgeographic.org/resource/revolution>

⁷²⁴ <https://academic.oup.com/book/28409/chapter-abstract/228830631?redirectedFrom=fulltext>

making everyone understand that we are building a future that is concerned about their well-being.

Communications psychologist John Marshall Roberts said there are “three ways of converting people to a cause: by threat of force, by intellectual argument, and by inspiration. He said that the most effective of these methods is aligning communication about your cause with the most deeply held values and aspirations of your friends and fellow citizens. Rather than trying to cajole them judgmentally or convince them forcefully, we should inspire them toward a vision that they—not we—can really care about. We need to listen to and understand the people we are trying to convince. Then, we can marshal the facts that show how our cause can help support their values.”⁷²⁵

⁷²⁵ <https://www.yesmagazine.org/issue/science/2017/02/23/what-it-takes-to-change-hearts-and-minds>

CHAPTER 12

CLIMATE ADVOCACY PRACTICES

The first part of this chapter examines the difference between mobilizing support for climate action and focusing on long-term organizational development and membership building. It explores the role of direct action and public education. It provides basic information on how to organize climate groups and develop and implement campaign plans.

I became a full-time activist in the spring semester of my first year at college, co-founding the Ralph Nader inspired Public Interest Research Group (PIRG), first at my college (RPI - Rensselaer Polytechnic Institute), then statewide in New York, and finally as the first chair of national PIRG in 1977. By the time I graduated from law school, the limitations of the legislative process had become all too clear to me.

Politicians throughout human history have been dealmakers that the wealthy and powerful utilize to further enrich themselves. There is a reason why politicians are held in such low regard by the public (though people tend to like the local ones they personally know). Money is the universal language of politicians. My work with the PIRGs convinced me of the need for outside community organizing to make change.

After law school, I hitchhiked to Texas to become a community organizer for the Association of Community Organizations for Reform Now (ACORN), an outgrowth of the National Welfare Rights Organizations that followed the organizing strategies of Saul Alinsky.

Throughout my activist career I have employed the lessons I learnt from PIRG and ACORN.

Power concedes nothing without a demand. As abolitionist and freed slave Frederick Douglass wrote on the eve of the Civil War, “If there is no struggle there is no progress. Those who profess to favor freedom and yet deprecate agitation are men who want crops without plowing up the ground; they want rain without thunder and lightning. They want the ocean without the awful roar of its many waters.... If we ever get free from the oppressions and wrongs heaped upon us, we must pay for their removal. We must do this by labor, by suffering, by sacrifice, and if needs be, by our lives and the lives of others.”⁷²⁶

Power is central to the debate over whether it is better to focus on organizing or mobilizing. Community organizers understand that the level of changes needed will require their members to have far more power to make critical decisions than they presently have. They focus on a long-term strategy to build that power, rather than just on winning the next issue.

Each of us must answer the question of how to balance incrementalism versus fundamental reform. That balance can shift depending upon the issue and circumstances. It is important to win concrete changes today that improve the lives of the average person and protect the environment. But such changes are often Band-Aids that provide some relief but fail to cure the underlying illness. Winning the needed radical change is invariably a long, complicated process with no guarantee of ultimate success.

One key lesson I have (only slowly) learned is the importance of social skills in organizing and advocacy. I feel I have seldom made mistakes in the policy positions I have taken, as I have come to acknowledge that the more radical solution is usually the correct one. Far more often, my mistakes have been in not investing the time and attention needed to bond with allies. We must treat our fellow activists with respect and kindness, build trust and solidarity - become friends.

⁷²⁶ <https://www.blackpast.org/african-american-history/1857-frederick-douglass-if-there-no-struggle-there-no-progress/>

We can disagree with fellow activists' positions, but we should recognize that they are usually motivated by a desire to do good. We need to be willing to challenge ourselves and others, to take risks and move beyond our comfort zones, and always be willing to listen, learn, and grow. We should be mindful of our own privileges and work to help lift up the voices of those who are often ignored and dismissed.

Always be willing to speak truth to power – including in activist circles.

“Never doubt that a small group of thoughtful committed individuals can change the world. In fact, it’s the only thing that ever has,” Margaret Mead said.

“When you see something that is not right, not fair, not just, you have to show up. Speak up, speak out, and find a way to get in the way and get in trouble,” Civil Rights leader and Congressman John Lewis said. “Good Trouble. Necessary trouble.”

Mobilization vs. Community Organizing

One of the philosophical debates within the climate movement is whether climate advocacy should focus on mobilizing climate activists to advocate on specific issues or invest in community organizing to build long-term power for the group and its members.

The two approaches reflect different assessments about how best to influence decision makers: whether to work within existing power relationships or try to change those relationships. Many groups seek to blend the two approaches together.

This debate is often more relevant for groups with significant resources, including staff. To date, much of the foundations funding climate work have favored groups that focus on staff advocacy and mobilization rather than community organizing. Frontline communities that are directly impacted by climate change, such as

communities of color, have also been largely underfunded, though that is slowly changing.⁷²⁷

Mobilization

Mobilization campaigns focus on a specific demand – pass a bill, deny a permit for a particular project, increase funding for renewable energy. They usually have a core group of leadership and/or staff develop the campaign plan, tactics, and strategy. Their target is largely the traditional decision makers - legislators, agency executives, business owners. Such campaigns then focus on mobilizing individuals and groups concerned about climate to participate in the various campaign activities – call-ins to lawmakers, rallies or marches, showing up for lobby days. The participant is helping the cause but is making a minimal time commitment and not developing a long-term relationship with the group.

Mobilization is a numbers game, so groups that focus on mobilization try to recruit a lot of supporters. They can be recruited through fundraising, emails, events, or social media. One of the primary techniques is circulating online petitions. Elected officials tend to give little weight to petitions, since signing a petition is a low-level commitment; instead, petitions have primarily become data collection tools. National groups (e.g., Sierra Club) with large memberships may have local chapters with core groups that engage in organizing but mobilize their much larger membership base on issue campaigns.

Most groups that focus on mobilizing do recognize the value of developing the skills and commitments of their supporters. They often hold meetings (via Zoom these days) to brief participants on the issues. While they generally work to make the presentations dynamic with a focus on diversity, the flow of information tends to be one way (even if they break participants out into chat rooms).

⁷²⁷ <https://www.greenbiz.com/article/climate-philanthropists-dont-make-vc-mistake-invest-people-color>

Community Organizing

In contrast to campaign-based mobilization, community organizing is a long-term approach to social change, with a focus on building organizations and power, and a commitment to democratic principles and empowering individuals.

Many community organizing groups that work on climate started as multi-issue groups, working to improve the economic status of their members. They are often launched with a geographic focus (e.g., a neighborhood), with a number of local chapters or affiliates. As the group develops, the membership realizes how climate impacts their broader agenda. That evolution may be driven by an extreme weather event, opposition to a local polluting facility (e.g., fossil fuel infrastructure) or the recognition that investing in climate action is a job-creation strategy.

Community organizing has a central focus on empowering individuals, with actions that involve mass participation rather than relying on a delegation of leaders.

According to the Center for Community Change, “Community organizing is the process of building power through involving a constituency in identifying problems they share and the solutions to those problems that they desire; identifying the people and structures that can make those solutions possible; enlisting those targets in the effort through negotiation and using confrontation and pressure when needed; and building an institution that is democratically controlled by that constituency that can develop the capacity to take on further problems and that embodies the will and the power of that constituency.”⁷²⁸

Pete Sikora, the climate change organizer for NY Communities for Change, a low-income multi-racial group, explains it this way: “Having public opinion on your side and electing Democrats isn’t

⁷²⁸ <http://comm-org.wisc.edu/papers97/beckwith.htm>

nearly enough. For one thing, you're up against a gauntlet of lobbyists defending corporate profits and executive compensation. They hire ex-governors, ex-legislators, and Albany insiders. Especially if you don't wield a giant checkbook for campaign contributions and Super PACs, there's only one reliable way to overcome this resistance. You have to make the issue so publicly prominent that politicians know that if they don't act, they might lose their jobs. The inside game will never work on issues that seriously threaten deep-pocketed corporate interests. For major change, you need relentless outside mobilization."⁷²⁹

The Role of Direct Action

One of the most influential books on organizing is *Rules for Radicals: A Pragmatic Primer for Realistic Radicals* by community organizer Saul Alinsky.⁷³⁰ It is a how-to guide for low-income communities to win power and enact needed change. The key focus was on direct action: identifying the person (not institution) that has the ability to deliver the change that it is need and then create a campaign using a variety of creative tactics, often utilizing humor, to pressure the target publicly and directly to agree to the changes.

In my organizing days with ACORN in the late 70s, several times a week I would organize an event, often at a site in the neighborhood, at which local residents could meet directly with government officials or business to demand action, often with signs and media in tow. This might include disrupting a place of business or work until the target comes out to negotiate. One ACORN rule was that residents, never the staff organizer, did all the talking with the target and public officials.

Alinsky's 13 rules are:

⁷²⁹ <https://www.nysfocus.com/2021/06/12/albany-ignores-climate-again/>

⁷³⁰ https://en.wikipedia.org/wiki/Rules_for_Radicals

“Power is not only what you have but what the enemy thinks you have.”

“Never go outside the expertise of your people.”

“Whenever possible go outside the expertise of the enemy.”

“Make the enemy live up to its own book of rules.”

“Ridicule is man’s most potent weapon. There is no defense. It is almost impossible to counterattack ridicule. Also, it infuriates the opposition, who then react to your advantage.”

“A good tactic is one your people enjoy.”

“A tactic that drags on too long becomes a drag.”

“Keep the pressure on.”

“The threat is usually more terrifying than the thing itself.”

“The major premise for tactics is the development of operations that will maintain a constant pressure upon the opposition.”

“If you push a negative hard and deep enough it will break through into its counterside; this is based on the principle that every positive has its negative.”

“The price of a successful attack is a constructive alternative.”

“**Pick the target, freeze it, personalize it, and polarize it.**” – Probably his most famous rule.

Three fundamental principles of direct action include: Win concrete improvements in people’s lives; make people aware of their own power (by winning some quick victories); and alter the relations of power between people, the government, and other institutions by building strong permanent local, state, and national organizations. One of the controversial things about ACORN was that if it came to a choice between winning an issue or building power for the organization, the latter was preferred since the real goal was fundamental change in the lives of people, which requires power, not winning a short-term issue.

Giving people “a sense of their own power” means that people themselves are involved in winning the issue. If an advocate goes out and speaks for you, or if a lawyer sues for you, you get a sense of their

power but not your own. Direct Action Organizing brings people directly into the situation in large numbers so that they know that they have won. People who develop a sense of their organized power are more likely to stay active and take on larger issues. When we say that we want to “alter the relations of power,” we mean building organizations that those in power, at all levels of government, will always have to worry about, even after the initial issue is resolved.⁷³¹

Climate activists tend to have a different concept of direct action than traditional community organizers. The latter focuses on direct engagement with the person able to make the needed decisions. Climate activists often use direct action to refer to civil disobedience.

One note. As a community organizer, it was relatively simple to get low-income people and people of color engaged in the group. That was because we went directly to the person’s door, asked them what they were concerned about, listened to the response, and then asked them to join to worked with their neighbors to prioritize the local problems we could work on together to solve, via direct action. And then we would win. And then win another issue. And they were the spokespeople, giving them ownership of the group.

That approach is harder to accomplish if the initial recruitment effort is on a pre-selected issue such as climate - unless you are organizing around a specific project (say, to stop the siting of a polluting facility). But as noted earlier, groups can incorporate many of the democratic organizing principles developed by prior movements, such as the anti-nuclear Clamshell Alliance - affinity groups, spokes councils, and general assemblies.

Building Your Climate Group – Organizing Guides

If you are new to the climate movement and are looking for how to get involved, there is a good chance there is already a climate organization in your community that could use your help. Some

⁷³¹ <http://breadrosesfund.org/wordcms/wp-content/uploads/2014/12/Direct-Action-OrganizingUPDATED.pdf>

groups that work on climate – Sierra Club, Climate Reality Project, Citizens Climate Lobby (focused on carbon tax / fee and dividend), 350.org, Third Act – have chapters and affiliates all over the country that welcome members. It is probably a good idea to work with an existing group initially before launching a new organization, partially to avoid duplication of effort and spreading people too thin in trying to maintain multiple groups with small numbers of members.

There are many good books, manuals, and how-to guides that outline how to build an organization and run campaigns and explain the various activities. Si Kahn's *Organizing: A Guide for Grassroot Leaders*, though initially written in 1982, is a very good basic introduction (you can buy a used copy online). 350.org has a free, downloadable *Climate Resistance Handbook*⁷³² online, as well as a wealth of training materials at <https://trainings.350.org>. Sierra Club has a downloadable *Movement Organizing Manual*.⁷³³ MomentumCommunity.org and midwestacademy.com/training provide trainings in movement organizing.

After a half-century of organizing, I don't usually learn much new from such trainings, but they are invaluable reminders of the steps and planning process that groups should follow in any campaign.

A few key points:

You should develop a plan to build both membership (ownership) in your group and engage in leadership development. Volunteer recruitment and retention is often key. One of the first lessons I was taught in community organizing is to ask people as soon as possible to do something with your group – stuff envelopes, make phone calls, hand out leaflets, etc. Volunteering to do something builds an individual's commitment to, and ownership of, the group. Actively recruit members to play a role in meetings (e.g., rotate facilitation). Having people passively listen breeds boredom and may cause participants to drift away.

⁷³² https://trainings.350.org/?super_pages=climate-resistance-handbook

⁷³³ <https://www.sierraclub.org/ready-for-100-toolkit/sierra-club-movement-organizing-manual>

A second lesson I was taught was to provide positive reinforcement to the people that do show up, rather than focusing on complaining about who is not there. Attendance at regular meetings invariably drops off as the group becomes older. Think of ways to generate more interest (e.g., invite a well-known speaker, or an official you are trying to impact upon). Personal communication works best. People are more likely to show up when they receive a call from someone as opposed to a mass email.

Too many groups and individuals equate meetings with action, a false perception. Initial meetings can serve as a recruitment device, explaining to new participants about what the group is about, and outline ways to get involved. Larger groups may hold a regular general membership meeting for members and then smaller committee meetings (e.g., coordinating, fundraising, outreach) to focus on the details of planning, brainstorming and work activities. But some sort of concrete action should always be the goal.

Meetings should have clear agendas, preferably with timelines. Meetings need to move the group towards action, not have open-ended rambling discussions with no end product. Have someone take notes. At the end of the meeting, review the agreed-upon action steps and repeat who has agreed to do what. Follow-up is key in determining whether a meeting has been productive.

Encourage everyone to participate, and avoid having a handful of people dominate the discussion at meetings. Groups may use “progressive stacking” to give priority to hearing from members who are underrepresented or who tend to be quiet. Many climate groups utilize the Jemez Principles (more info in EJ section).⁷³⁴

Climate groups generally understand the need for diversity. While they work to diversify the speakers at their events, they are usually less successful in diversifying the audiences. (A big exception are campaigns led by frontline groups to address problems in their own community.) One approach is for local climate groups to “adopt”

⁷³⁴ <https://www.ejnet.org/ej/jemez.pdf>

some area low-income and/or EJ community groups. Mobilize your membership to support their causes. By showing up over time to offer support, you gain their trust and build the relationships needed to attract them to help with your climate. Look for opportunities to show how climate impacts on their own lives and communities.

Groups need a means of communicating with their members. A lot of groups have two listservs. One is a low-volume (e.g., once a week) one for group announcements, promoting events, call-ins, etc. Generally, only the group's leaders have posting privileges. Then there is a second, higher-volume listserv, for day-to-day coordination of the group's work and/or open-ended discussion. Listservs that allow unmoderated postings should have some general guidelines to promote civility and respect, and to avoid ceaseless back and forth among a few individuals that can drive others to unsubscribe. Many groups use Facebook for general updates, which are quicker and easier to modify than webpages. Some groups utilize communication platforms such as Slack or Discord.

It is helpful to designate a few individuals to assist with volunteer recruitment and retention. When a new individual attends a meeting or otherwise joins your group, have a process to welcome them, find out what they are interested in and what skills they may have, and make them feel part of the group.

One way to promote leadership development is to offer skills training to your members on an ongoing basis – how to work with media, how to do research, how to speak in public.

Other key coordinating skills to recruit for include database management (keeping track of your members and contacts), social media, media, financial, secretary, graphic design (leaflets, signs at rallies) and web manager.

Always have sign-up sheets at your events. At rallies, have someone carry the sign-up sheet around to ask people to fill it out. Name, email, and phone are essential, and it is also helpful to have at least some address information (zip code) to help identify who lives in what legislative districts.

Most climate groups do at least some work in coalition with other groups. The easiest coalitions to build are around a single event or issue. However, coalitions created to organize major one-time events like a rally seldom endure past the particular event, even if the desire is to be ongoing. Many climate groups work in informal coalitions with other groups in their area, cross-endorsing each other's rallies, etc. Coalitions are easier to pull together for such events once the groups have had the experience of working together.

Coalition members are normally organizations rather than individuals (at least for decision making). The more successful coalitions are the ones that are clear upfront about what being a core member of the coalition entails in terms of commitment of time and resources. It is generally a good idea to establish basic decision-making rules early on in the coalition. While many coalitions operate with an informal sense of "consensus," there may be moments when decisions have to be made. You should determine how the coalition will vote and who gets to vote (e.g., one vote per group?) *before* the need arises.

Coalitions sometimes adopt a loose collaboration model that seeks to foster increased cooperation and communication among groups working on a similar issue but avoids taking formal positions. Such an approach allows groups to work together but also empowers them to sometimes take their own organizational approaches without violating the group process.

Campaign planning

A written campaign plan should be developed by your members, using an inclusive process. An outside facilitator can help with the planning process.

Your plan should answer the following six key questions: 1. What are your long- and short-term goals? 2. What are your organizational strengths and weaknesses? 3. Who cares about this problem? 4. Who are your allies? 5. Who has the power to give you what you want? 6.

What tactics can you use to apply your power and make it felt by those who can give you what you want?⁷³⁵

Key first steps in developing your campaign include identifying the problem you are addressing and then what action / solution you want. Campaign management involves developing a campaign strategy; identifying who you are targeting; determining what advocacy methods you plan to utilize; creating a timeline for each step, including who will take responsibility; and, determining what resources or funding you need to mobilize. A campaign should clearly identify what you are trying to win while prioritizing building your organization.

Successful campaigns generally utilize multiple tactics to win.

The Toxics Action Center and RE-AMP (a Midwest network of 160 groups working on energy) have downloadable campaign planning guides.⁷³⁶ Also useful is *Path to Power* by Community Change, which works “to win economic justice, racial equity, and immigrant rights, building the power it will take to achieve bold, structural change in light of the disruptive forces that are reshaping the world.”⁷³⁷

Midwest Academy is among the oldest and best-known training centers. I first worked with them half a century ago to provide training to the nationwide student PIRG movement. They support the building of infrastructure in the progressive movement for social justice, which “means fostering the creation of democratically governed organizations which win real improvements in people’s lives, give people a sense of their own power to improve society, and alter the unequal relations of power to build more democracy and participation for freedom and justice for all. The Midwest Academy advances

⁷³⁵ <http://breadrosesfund.org/wordcms/wp-content/uploads/2014/12/Direct-Action-OrganizingUPDATED.pdf>

⁷³⁶ <https://communityactionworks.org/wp-content/uploads/Workbook1-CampaignPlanning-1.pdf>; <https://reamp.org/files/the-art-of-campaign-planning/?bp-attachment=The-Art-of-Campaign-Planning.pdf>

⁷³⁷ <https://communitychange.org/wp-content/uploads/2018/12/Path-to-Power.Community-Change.112718.pdf>

movements for progressive social change by teaching strategic, rigorous, results-oriented approach to social action and organization building.”⁷³⁸

One of the most widely used Midwest Academy tools is their

The Midwest Academy Strategy Chart

Goals	Organizational Considerations	Constituents, Allies and Opponents	Decision Maker (Target)	Tactics
<p>Long-Term Goals Your overall goal to solve the problem, reflecting your values and worldview. Example: All workers receive livable wages!</p> <p>Intermediate Goals What you are trying to win in the current campaign. Example: \$15 state minimum wage law.</p> <p>Short-Term Goals Partial victories toward the Intermediate Goal. Example: Get Rep. Smith to vote yes.</p> <p><i>Goals are always concrete improvements in people's lives!</i></p>	<p>What resources can you put in now?</p> <ul style="list-style-type: none"> • Number of people, paid and unpaid? • % available time? • Social media lists? • Mtg space, copiers, etc. • Money? <p><i>Be Specific! Use numbers!</i></p> <p>How can the campaign strengthen the organization?</p> <ul style="list-style-type: none"> • Values-based unifying message • How many new members? Leaders? • Money to raise? • Public recognition <p><i>How much? How many? Be specific!</i></p> <p>Internal challenges?</p> <ul style="list-style-type: none"> • How to solve/reduce. 	<p>Constituents/Base</p> <ul style="list-style-type: none"> • Who is most directly impacted? • What power do they have over the Target? <p>Allies</p> <ul style="list-style-type: none"> • Who else will be an ally on this issue? • What power do they have over the Target? • Is that enough power or do you need to recruit more broadly, to find unexpected allies? <p><i>What messaging will help you recruit and motivate the people you need?</i></p> <p><i>How many? Be specific!</i></p> <p>Opponents</p> <ul style="list-style-type: none"> • Who opposes this & why? • What do they lose? • What will they do/spend? • Can you neutralize or divide any opponents? 	<p>Person with power to say yes to the intermediate goal!</p> <ul style="list-style-type: none"> • Elected or appointed or corporate? • Do you have electoral or consumer power? • What will it cost them in money or political capital to say yes? • Analyze election outcomes / profits, etc. • Analyze your potential power over them very concretely so you can use it strategically! • What messaging will make target most nervous about the power you can build? <p><i>Always a person with a name, not an institution!</i></p>	<p>How you will show power to DM so they will say yes to the goals?</p> <p>Tactics that exercise power over the Decision-Maker</p> <ul style="list-style-type: none"> • Letter writing • Petitions • Phone calling • Social Media Tactics • Group Visits to Target • Media Events • Rallies, Actions • Public Forums • Strategic Civil Disobedience • Etc. – be creative! • Values-based message <p>Tactics that educate, recruit, build your organization</p> <ul style="list-style-type: none"> • Media events, etc. • Social Media • What's the message? • Teach-ins • Rallies/Banners <p><i>Put tactics on a timeline!</i></p>

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strategy chart (aka power mapping). Groups answer a series of questions to create a roadmap for action: goals; organizational considerations; constituents, allies, and opponents; targets; and tactics.⁷³⁹

Educating the Public about Climate Change

The more people understand about climate change and the threats it poses, the more likely they will be willing to support action to address

⁷³⁸ <http://www.midwestacademy.com/>

⁷³⁹ http://www.tcs.org/sfelp/toolkit/MidwestAcademy_01.pdf

the problem – and hopefully, invest their own time and resources to support climate advocacy.

The United Nations says that education on climate change is as important as making progress in reducing greenhouse gas emissions and formulating effective government policies.

350.org is one group that believes it is more important to build public support for the need for climate action, rather than focusing on winning specific policy changes.

Most Americans (72% to 14%) believe that climate change is occurring. A smaller percentage (57%) believe that it is being caused by human activity (30% believe it is natural). Only 57% however believe that scientists agree that warming is occurring (23% believe there is significant disagreement). There are generally high levels of support for various government actions to deal with climate change (ranging from 2/3 to 3/4).⁷⁴⁰

Some 64 percent of Americans say that reducing the effects of climate change is “a top priority,” even if that means less resources for resolving other problems. Less than 40 percent gave that response five years ago. However, there are strong partisan differences. 87% of Democrats want action on climate change to be a priority, while 61% of Republicans say that efforts to reduce climate change need to be a lower priority. There are sizeable generational divisions among Republicans, with about half of younger Republicans wanting climate action to be a priority. Only about 1/3 of Americans support phasing out fossil fuels, though there are sharp differences based on age and party affiliation.⁷⁴¹

However, when polls are done for elections, and voters are asked to choose among various priorities, economic issues (including gas prices) continue to dominate, with only minimal support for climate.⁷⁴²

⁷⁴⁰ <https://climatecommunication.yale.edu/visualizations-data/ycom-us/>

⁷⁴¹ <https://www.pewresearch.org/science/2021/05/26/climate-energy-and-environmental-policy/>

⁷⁴² https://www.monmouth.edu/polling-institute/documents/monmouthpoll_us_070522.pdf

The 2022 midterm elections showed increased support for climate, though pollsters still frequently fail to directly ask voters for their positions on climate. Young voters, who strongly support climate action, overwhelmingly voted for the Democrats, enabling them to avoid the expected national Republican landslide. Although many Democrats were lukewarm in their support of climate action, it was at least a positive sign that Republicans largely avoided campaigning against climate. And several Democrats with strong climate agendas won Governors' races - a particularly good development, since state-level climate action is more likely in the near future than any action in a very divided Congress.⁷⁴³

Many climate activists contend that the American corporate-owned mainstream media has inaccurately portrayed the level of scientific disagreement as to the reality of climate warming. However, recent studies have found that 90 percent of media coverage now accurately represents the scientific consensus that human activity is driving global warming.⁷⁴⁴ (See chapter on media).

It is extremely unlikely that America can move forward with effective climate action when there is such stark partisan division among voters and elected officials. Certainly, the dramatic swings in climate perspectives from the Obama administration to Trump and now Biden are not helpful in building the long-term support needed for effective climate action. Other countries in Europe and South America are also seeing such major policy shifts between liberal and conservative governments.

Increased public understanding of climate change could help overcome the radical culture divide America has experienced in recent decades. This is one reason why the concept of a Just Transition is so critical: making people feel comfortable that their quality of life will be protected and improved by a transition to a clean energy future.

⁷⁴³ <https://www.climatesolutions.org/article/2022-11/climate-election-2022-was-wave-some-kind>

⁷⁴⁴ <https://grist.org/science/good-news-the-media-the-facts-on-climate-change-bothsidesism/>

Surviving climate change will require a radical transformation of our present society and economy, with massive investments in new infrastructure and technologies, and that requires a high level of broad public support.

Educating children on environmental matters and developing a culture of caring for the climate is critical. One report from the University of Stanford that examined teaching pupils from nursery school through high school on such issues found that 83% of pupils improved their environmental behavior.⁷⁴⁵ Education of course is also needed to train workers for the new clean energy economy. It also requires increased teaching of math and science skills.

One concern is that attempts to educate the public about climate change sometimes relies too heavily on scare tactics, focusing on superstorms, massive floods, and extreme weather to generate fear. Such fear can inhibit the desire to learn more and act – particularly in young people.⁷⁴⁶

Probably the best-known climate education effort in the U.S. is the Climate Reality Project, started by former Vice President Al Gore. Gore estimates that he has shown his PowerPoint presentation *An Inconvenient Truth* to more than 1,000 audiences. In addition to its education efforts, Climate Reality trains” people to become powerful activists, providing the skills, campaigns, and resources to push for aggressive climate action and high-level policies that accelerate a just transition to a cleaner and greener world.”⁷⁴⁷

Education starts with educating yourself about climate change, its causes, and the solutions. There are many resources for this, starting with this book. You can also contact a group like Climate Reality Project to give a presentation about climate change at a community center, school, place of worship, or your own home.

⁷⁴⁵ <https://www.iberdrola.com/social-commitment/climate-change-education>

⁷⁴⁶ <https://www.theguardian.com/commentisfree/2014/sep/19/its-time-to-teach-climate-change-in-school-heres-how>

⁷⁴⁷ <https://www.climaterealityproject.org/>

Once you've educated yourself, you can then share what you've learned. Reach out to existing groups to see if they would like a presentation. Consider contacting civic groups, social organizations, business associations, faith groups, etc. that might not normally present such a program to their members.

Public Speaking

Various groups have suggestions about how to talk to an audience. You want to create a safe space for both you and your audience, which starts with listening. You want to encourage people to ask questions and engage. Avoid guilt shaming them for not doing enough. Realize and respect that there will be some differences of opinions. Admit that you don't know everything and offer to follow up with them when you can't answer a question on the spot.

If you use PowerPoint (some climate groups provide them for local use), don't just read words from the screen but use the slides to make visual points and then talk to the audience. Avoid over-reliance on technical terms and statistics. Try to make the issue personal for your audience. The public responds better to how the issue impacts them and their grandchildren, less so to the polar bears.

Tell your story: how you became engaged and why you are concerned are some of the most powerful tools you have. Find out what climate change means to them. Give space for reflection. Listen and show you have heard. Respect your audience and find common ground and shared values. Focus on building trust, not on having an argument. Emphasize how climate change affects us here and now, in our everyday lives. Focus on benefits of climate change engagement. Creatively empower people to take meaningful and purposeful action.⁷⁴⁸

⁷⁴⁸ <https://www.hennepin.us/climate-action/what-we-can-do/talking-climate-tips;>
[https://blogs.scientificamerican.com/observations/how-to-talk-effectively-about-climate-change/;](https://blogs.scientificamerican.com/observations/how-to-talk-effectively-about-climate-change/) https://apha.org/-/media/files/pdf/topics/climate/climate_storytelling_guide.ashx

Communication Skills

How you communicate about climate change will impact how your audience accepts the message. Facts alone are not what compels most people to act. Facts may tell the impacts of climate change, but a story shows how climate change affects real people and what can be done about it. People acquire their scientific knowledge by consulting others who share their values and whom they therefore trust and understand. Through emotion and connection to common values, stories create empathy and understanding. Stories make climate change relatable by drawing on common experience, generating empathy and understanding. They need to offer a sense of hope that inspires positive change.

George Lakoff is a well-known college professor who has written several books (*Moral Politics*, *Don't Think of an Elephant*) contending that liberals and conservatives have very different ways of responding to information. Lakoff described conservative voters as paying attention when the message is framed by the “strict father model,” while liberal/progressive voters are influenced by the “nurturant parent model.” For example, “conservatives think that adults should refrain from looking to the government for assistance lest they become dependent,” while liberals want the government to make sure that all citizens are protected and assisted to achieve their potential.”⁷⁴⁹ These mindsets and preconceptions will influence how the message will be heard.

One challenge is how to convey the grim reality of climate change and the need for radical action now without creating a sense of fear and despair that paralyzes the listener into inaction.⁷⁵⁰

⁷⁴⁹ https://en.wikipedia.org/wiki/George_Lakoff

⁷⁵⁰ <https://news.climate.columbia.edu/2020/05/19/climate-stoicism-overcome-despair/>

Some are critical of the scientific community for not being more assertive in conveying how desperate the situation really is.⁷⁵¹ This led to the creation of XR Scientists, scientists who agree with Extinction Rebellion that it is time to take direct action to confront catastrophic climate and ecological breakdown.⁷⁵²

Climate change is already happening, so the real questions are how bad will it be and to what extent humanity will be able to adapt to it. And the sooner we act, the greater the chance that future generations will have an opportunity for a decent quality of life. We can never know exactly how the planet will react to ever increasing levels of greenhouse gas emissions, but climate activists must spur far more dramatic action while also conveying a sense of hope rather than doom.⁷⁵³

⁷⁵¹ <https://www.theguardian.com/commentisfree/2019/oct/25/the-real-reason-some-scientists-downplay-the-risks-of-climate-change>

⁷⁵² <https://www.scientistsforxr.earth/about-us>

⁷⁵³ <https://www.concernusa.org/story/is-it-too-late-to-stop-climate-change/>

CHAPTER 13

LOBBYING: LEGISLATURE, EXECUTIVE, AGENCIES, LOCAL GOVERNMENTS

This chapter reviews the various roles the executive and legislative branches play in climate policies, including the role of administrative agencies and permits. It introduces the basics of lobbying.

Advocacy directed at some of the decision makers and administrative processes outlined here often involve the utilization of tactics beyond lobbying. The fight for permits against fossil fuel infrastructure for instance, will often involve various forms of protests, rallies, and even litigation.

Most groups engaged in lobbying increasingly also commit resources to strategies designed to mobilize support for their proposals. Laying out the facts for lawmakers is not what convinces them to act. In making their decisions, many lawmakers focus on how it will impact their campaign donations and re-election chances.

Lobbying is normally a long, slow process spread out over many years, especially for climate activists. As the head of the United Nations has repeatedly warned, elected officials are failing to act with the speed needed to avoid climate catastrophe.

In the real world, the Executive is usually far more powerful than the Legislature, starting with the role in the budget. Even when legislators pass a bill, it is up to the Executive to determine how well it is implemented. Most climate activists and public interest activists end up devoting far more resources to legislators rather than executives since they have easier access to rank-and-file lawmakers

(although not their leadership). Professional lobbyists for special interests devote more resources to the Executive.

Local governments have a vital role to play on climate, especially with the ongoing gridlock in Congress. An increasing number of local governments and activists are developing their own Green New Deal campaigns, often with a focus on decarbonizing buildings. Local governments also need to start providing leadership in the siting on renewable energy projects, rather than passively waiting for developers to make an unacceptable proposal.

The Branches of Government

In high school civics class, we learn the basic elements of the governmental process, including how bills are passed. At both the federal and the state level, power is divided among three branches of government – legislative, executive, and judiciary – with a series of checks and balances to prevent any one branch from becoming too powerful. What we are seldom taught is the true power relationships that determine what the government does.

The legislative body (city council, town board, county legislature, state legislature, Congress – states use different terms) passes bills to address particular problems. The executive (President, Governor, Mayor, County Executive, etc.) implements them once they decide to sign them into law. The legislative body also passes a budget to fund the various operations of the government, usually drafted by the executive, who is then responsible for its implementation and for supervising government employees. The courts have the power to step in when the legislature or executive is accused of overstepping or abusing their powers, and to resolve legal disputes among various parties.

Executives are in charge of the day-to-day operations of government, which usually includes overseeing dozens of (local, state, federal) agencies. Of particular importance to the climate are the

permits issued by various agencies, establishing the conditions under which fossil fuel companies and others are allowed to pollute.

Overview of Federal Climate Agencies

At the federal level, one critical agency for climate is FERC (Federal Energy Regulatory Commission), which regulates the transmission and wholesale sale of electricity and natural gas in interstate commerce and regulates the interstate transportation of oil by pipeline. FERC is somewhat different from a traditional federal agency since it is governed by a bipartisan appointed 5-member commission. (See section on FERC.)

Every state has its own environmental agency that oversees permits and is often the lead agency to implement the federal Clean Air Act and nonpoint sources under the Clean Water Act (otherwise overseen by the federal Army Corps of Engineers). Myriad other federal and state agencies play critical roles related to climate change (e.g., transportation, housing, etc.).

(Note: since this is about lobbying, this is not a detailed overview of the various agencies or their roles in climate policy. For more detailed information, see the footnote.⁷⁵⁴)

The federal Clean Air Act requires the Environmental Protection Agency (EPA) to work with states to reduce greenhouse gas emissions, including carbon dioxide and methane. The Department of Energy works with the private sector to develop and deploy clean energy technologies, and to set energy efficiency standards for appliances and equipment. The Department of Transportation sets fuel-efficiency standards for motor vehicles. The Department of Defense is the single largest user of fossil fuels and plans for the global security consequences of climate change.⁷⁵⁵ Federal Departments of Interior and Agriculture also play significant climate roles.

⁷⁵⁴ An overview of various federal agencies on climate.

<https://www.honoringthefuture.org/climate-smarts/government/>

⁷⁵⁵ <https://www.c2es.org/content/federal-action-on-climate/>

State Climate Plans

Thirty-three states have released or are developing climate plans.⁷⁵⁶ Such plans normally include greenhouse gas (GHG) emissions reduction targets and needed steps, along with resilience strategies, clean energy targets, and economic and social goals. Advocates always need to push for stronger and faster timelines, especially with respect to reducing emissions, while ensuring adequate funding to assist residents in the transition to a clean economy.

Follow the Money – the Budget

Money – the budget – is invariably the most important policy document adopted annually by a government. The executive (including executive agencies) is far more powerful than the legislature in the actual running of government, including determining how money is spent (and who gets what contracts). Besides spending the funds approved by the legislature, the executive has wide discretion in how laws are (or are not) implemented. Most climate and other public-interest advocates tend to spend too much time trying to influence legislators and not enough on the executive, partially because legislators are expected to meet with their constituents. But focusing on legislators rather than the executive, particularly at the state and local level, is not a mistake made by fossil fuel companies and other special interests.

⁷⁵⁶ <https://www.c2es.org/document/climate-action-plans/>;
<https://www.instituteforenergyresearch.org/renewable/cost-of-transitioning-to-100-percent-renewable-energy/>; see materials at Oct. 14, 2021 CAC meeting, cost benefit analysis, <https://climate.ny.gov/CAC-Meetings-and-Materials>

The Challenges of Lobbying

There are many articles and books that provide more detailed information about lobbying.⁷⁵⁷ Remember the differences in roles between the executive and legislative branches, both in developing legislation and enacting a budget.

It's often said that politics is the art of compromise (or the possible.)⁷⁵⁸ That is not a great way however to take the radical action needed to avoid climate collapse. Legislatures are not very democratic institutions. Power is concentrated in the hands of a few senior leaders. Those who rise to power do so by learning to accommodate the demands of campaign donors and special interests while responding to legislators in their caucus who feel pressure from local voters. Legislators who first come into office as reformers almost always undergo a major transformation if they attain leadership positions. They have to demonstrate not only a willingness but a talent for developing compromises. Such compromises often only appear at the last moment when a bill has gotten so much support that something has to be done. But grassroots advocates are usually not in the room when the final deals are cut.

Another lesson I learned early on is that passing a bill is not the end of the process. Next, you have to convince the executive to sign the bill into law, which usually means fighting the fossil fuel industry whose campaign donations give them much more access and influence than grassroots activists can ever hope to have. Then, if the bill is signed into law, you have to work to ensure that it's effectively implemented by the executive.

More than three years after New York passed one of the strongest climate laws in the country, the state had not even finished work on the "scoping plan" to guide implementation by state agencies (finally

⁷⁵⁷ <https://www.nrdc.org/stories/how-lobby-your-legislator>;
https://cawp.rutgers.edu/sites/default/files/library/how_to_lobby_your_legislator.pdf;
<https://nationalhomeless.org/four-ways-to-lobby-your-elected-official/>
⁷⁵⁸ <https://iop.harvard.edu/get-involved/study-groups/finding-middle-ground-art-governing-or-%E2%80%9Ccompromise%E2%80%9D-not-four-letter-word>

adopted on December 19, 2022). Legislatures usually delegate to government agencies the power to write the rules and regulations to actually implement legislation. This is even less of an open and transparent process than the legislature. It may require legal and scientific expertise in determining details. Industry has the resources to deploy teams of high-priced lobbyists and experts who make a living from engaging in such activities, while part-time citizen activists are left to scramble to figure out the rules of engagement. The agency may need to go back to the legislature to request additional funds to hire staff to oversee enforcement.

Setting goals for government action is one thing (e.g., cut emissions by 40% by 2030). Developing and implementing the steps, timelines, and funding to achieve such goals is another. Getting agencies to act invariably takes longer than expected, as they often engage in meeting after meeting, seek public comments, hold hearings, etc. Public input is good, but it can act as a cover to delay decision-making – and often the public comments are largely ignored. Special interests may also use the courts to challenge either a law or the manner in which the government implements it.

Most of my experience has been lobbying in the NYS Legislature, with somewhat less experience with Congress. I always remember the scene in Steven Spielberg’s movie, *Lincoln*, when the President, needing to get Congress to do something they don’t want to do – abolish slavery – tells his staff that he needs to “bring in some Albany lobbyists.”⁷⁵⁹ Large states (NY, California, Texas, Florida) tend to be more challenging for citizen advocates due to the large size of their economies and populations. Special interests, including the fossil fuel industry, tend to put more resources into lobbying in large states than in small. In the larger states, the legislature usually has central staff under the direction of the leadership that play the key role in developing policy and bills.

⁷⁵⁹ <https://archive.nytimes.com/cityroom.blogs.nytimes.com/2012/12/10/7-score-and-7-years-ago-a-similar-albany/>

Since they represent the leadership, they are critical to focus upon. Smaller states and local governments are often more open to input from citizen activists.

Remember that corruption still permeates our political systems. For instance, dozens of state officials in NY, including the top leadership, have been convicted of corruption in recent decades.⁷⁶⁰ Corruption of course is not limited to the U.S. Scandinavian countries and New Zealand are the least corrupt; the U.S. ranks 27th.⁷⁶¹

Unfortunately, state legislatures dominated by Republicans are unlikely at this point to enact climate legislation. This has also been true of Congress, which has been gridlocked by partisanship in recent decades, with the situation worsening in recent years. Most significant national environmental legislation was adopted by Congress during the Nixon administration - now half a century ago. While many Americans believe the U.S. is a world leader on environmental legislation and regulation, that has not been true for decades.⁷⁶² And the idea that environmental regulators in the U.S. are overly zealous is far from true, especially since the election of Ronald Reagan as president in 1980.

Many grassroots climate groups engage in lobbying by following the lead of other groups that develop and track proposed legislation. They call on their allies and members to call, write, and/or meet with elected officials; write memos of support or opposition to bills; testify (or just show up) at public hearings; attend rallies or press conferences; generate media coverage; organize lobby days.

⁷⁶⁰ <https://beta.gothamist.com/news/brian-benjamin-joins-long-line-of-nys-political-rogues-ousted-over-corruption>;
<https://www.politico.com/magazine/story/2015/05/how-new-york-became-most-corrupt-state-in-america-117652/>; <https://hls.harvard.edu/today/a-history-of-corruption-in-the-united-states/>

⁷⁶¹ <https://www.transparency.org/en/cpi/2021>

⁷⁶²

https://www.academia.edu/1613897/Ecological_modernisation_American_style

The Role of Money in Lobbying

I first began working with the New York State legislature in 1973 when, as a college student, I helped found NYPIRG (New York Public Interest Research Group). NYPIRG, part of the citizens' movement inspired by consumer and good-government advocate Ralph Nader, worked on a variety of consumer, environmental and educational issues. By the time I graduated from law school in 1977, I understood how limited community groups were in their ability to impact the legislative process, because they do not have the money (campaign donations) to effectively compete with wealthy special interests. Those lessons inspired me to become a grassroots community organizer so that I could help mobilize the general public to demand "*action for a change*" (that being the name of the book by Donald Ross on how and why to organize PIRGs).

The biggest priority for most elected officials, especially in the short-term, is to get re-elected. That places enormous pressure on them to raise funds for media buys, mailings, campaign staff, etc. Many state legislators, and all members of the U.S. House of Representatives, must stand for re-election every two years, meaning they're constantly fundraising. Congressmembers often spend more than half their time, sometimes 6-8 hours a day, dialing for dollars, not only for themselves but for their political parties.⁷⁶³

A campaign donation is the best investment that Wall Street can make. It is returned many times over in terms of favorable laws, tax breaks and subsidies, and government contracts. While state and federal governments prohibit outright bribery in obtaining government contracts, few states restrict campaign contributions from businesses seeking government contracts. Lobbying firms also often hire former elected officials, both to reward them for past services and

⁷⁶³ <https://www.termlimits.com/congress-fundraising-priority/>;
<https://issueone.org/articles/the-congressional-fundraising-treadmill-5-key-numbers-to-know-from-the-newest-house-and-senate-campaign-finance-filings/>

to help the firms open doors to meet with their colleagues still at their former agency.

One study found that a \$1 corporate campaign contribution is worth \$6.65 in lower state corporate taxes. Another found that an increase of 1 percent in lobbying expenditures reduced a corporation's next-year tax rate between 0.5 percentage points and 1.6 percentage points. The vast majority of money spent on campaign donations and lobbying comes from wealthy citizens and business interest groups. Businesses with the most to gain from favorable public policy engage in the most political activity. This is especially true on issues that have less public visibility.⁷⁶⁴

Drafting Legislation

If your group decides to take the lead on developing legislation, find someone who can explain to you how the process actually works in the legislative body you're targeting.⁷⁶⁵ A training for your group can be helpful. Some of the larger climate groups hire professional lobbyists to coordinate their efforts. Make sure you know the "protocols" of working with legislators - there are a lot of egos involved and you want to avoid creating problems by breaking one of the many "unwritten" rules.

If you are investing significant resources and funds in lobbying, you may need to register with the government you are seeking to influence and file financial reports. If your group is incorporated as a nonprofit, you are still allowed to lobby, though there are some restrictions for tax-exempt (501c3) groups. A general rule is that such groups cannot invest a significant portion of their budget (e.g., 20%) in legislative activities.⁷⁶⁶ (The main prohibition on c3 groups is on endorsing candidates in elections.)

⁷⁶⁴ <https://www.americanprogress.org/article/how-campaign-contributions-and-lobbying-can-lead-to-inefficient-economic-policy/>

⁷⁶⁵ Here is an overview of the Massachusetts state legislature and Congress.
https://www.naswma.org/page/legislative_process

⁷⁶⁶ <https://www.irs.gov/charities-non-profits/lobbying>

Be aware of timelines and deadlines in the legislative process (e.g., the last day to have a bill introduced). Most legislative bodies are highly partisan. If a legislator is a member of the minority party, they normally have no ability to get a bill passed (and in NY for instance, they are often not even allowed to co-sponsor bills introduced by members of the majority). In many legislatures, bills with the exact same language must pass both houses (this is not true in Congress, where there is a lot of negotiation after both houses pass their initial bill).

Most rank-and-file legislators have little actual power. Instead, ultimate decisions rest in the hands of the leadership, who weigh the concerns of individual legislators and campaign donors as well as the potential impact on elections. That is one reason why legislative leaders receive by far the largest donations.

Learn the rules about how a legislative bill is written. You may need someone with expertise in legislative bill drafting, such as figuring out what part of existing law to amend and what subjects can be covered by a particular bill (e.g., some states limit bills to one issue area).

Bills normally must go through a succession of various committees before getting to the floor of the legislature for a final vote. At the state level, this last step is often pro forma, with the decision having been made to pass it before it is allowed to come up for a vote. Committee chairs often have significant discretion as to what bills get out of their committee, so it is helpful to have the chair (or at least a member of the committee) as a lead sponsor. Bills can have multiple sponsors and the number of sponsors is a sign of the level of support.

A bill first goes to the committee that most covers the subject matter addressed by the bill. Figure out what committees the bill has to go through as soon as possible; you may want to try to steer the bill to a committee with a sympathetic chairperson. Learn who heads each of the committees, who are the members, and when do they meet. Are

the committee meetings open to the public? Is a public hearing required on the bill?

If the bill has a financial impact, it will probably eventually have to go through a finance committee. Usually if a bill seeks to allocate a specific amount of funds, it will have to be part of the budget, which is normally adopted once a year. And if your bill does require funding to implement, you may then have to lobby to include that in the subsequent budget.

In many legislative bodies, the political parties meet by themselves behind closed doors to discuss what they want to do. It is important to get legislative supporters to raise your bill in these meetings, urging their colleagues to pass it. Legislators are limited in the number of times they can speak up in such meetings to support a bill.

Choosing the right lead sponsor (one in each house) is critical. Will they be willing to devote the time and energy to pass the bill, which often can require trading favors with other legislators? Is the legislator well-liked by other members and the leaders? How many other bills are they the lead sponsor on? Leaders like to have members in competitive districts pass a few bills to show local voters that they have clout.

It often takes several years before a new bill can be passed (a real problem given the speed that climate change is occurring). For climate groups, passing a bill tends to be a long and laborious process, with each step taking weeks if not months. There is invariably a mad scramble in the last few weeks of the legislative session when everyone is rushing to get their bills across the finish line. This rush is especially pronounced at the state level, since many state legislative bodies meet only for half a year or less, and four meet only every other year.⁷⁶⁷ It is very frustrating to have spent months slowly moving your

⁷⁶⁷ <https://teacherscollegesj.org/how-often-do-state-governments-meet/>;
<https://www.ncsl.org/research/about-state-legislatures/annual-vs-biennial-legislative-sessions.aspx>

bill from one committee to another, and then to watch as some moneyed special interest swoops in at the last moment to get a bill passed (or killed) in a matter of days.

Even for major bills, legislative leaders often only pay attention at the last moment. This may also be the moment when the executive decides to intervene, telling the leaders what changes they would need before they would be willing to sign on. Major weakening compromises often are made in those closing moments, which can undercut much of the impact of the bill. This is a moment when you need to pressure your lead sponsor to stay strong (which can be a challenging task since the leaders hold most of the power).

Building Support for a Bill

In addition to getting as many legislators (from the correct party) as possible to co-sponsor the bill, you want as many organizations as possible to endorse the bill. Once again, find out the normal process in your city / state for showing support. In New York, you want to get as many groups as possible to write what are called memos of support (provide them with a sample to make it easy).

Remember that most legislation is driven by politics, not facts. Figure out who is likely to have problems with the proposal and see if there are changes that can get them to be at least neutral if not supportive. However, avoid the common mistake of “negotiating with yourself.” Do not amend a bill to seem “more reasonable” without having received an express agreement from legislators or key influencers to support the bill. If you unilaterally amend a bill to make it “more acceptable,” the opponents will continue to further weaken it before it is passed.

While it is highly unlikely that you can convince fossil fuel companies to support your bill, you do not want labor union, environmental justice, or other community groups opposing it. For instance, you may want to add labor standards (e.g., prevailing wages) or have a minimum amount of funding (e.g., 40%) that goes to

environmental justice communities. Talk to such potential allies early on to get their input and feedback.

Determine which groups legislative leaders pay particular attention to and try to get those groups to weigh in (e.g., attend legislative meetings with you, write memos of support). Get the phones at legislators' offices, especially leadership, ringing off the hook. Find constituents who live in key legislative leaders' districts to join the effort. Pay attention to caucuses within the legislature to get their support.

Be polite, be persistent, be visible. Be bold. Remember that the world no longer has any time left for incremental changes. Avoid yelling. Threatening legislators is usually a bad strategy. Avoid giving out false information; if you cannot answer their question on the spot, tell them you will get back to them. Remember that politicians get elected because they have perfected the art of making people believe they are on their side and are their friends.

Be clear about what your ask is of the legislator. Pledges to "vote for the bill when it gets to the floor" are not meaningful since as previously noted, in most legislatures (not Congress) decisions have already been made by the time a bill makes it to the floor. Legislators can be asked to co-sponsor the bill, or to talk to leadership to move the bill. Follow-up is key. Call the office in a week or two to see what the legislator (or their staff) has done or decided (try to determine which staff person the legislator pays the most attention to).

Lobby Days

Many groups organize lobby days (see how to guides ⁷⁶⁸) where they bring dozens if not hundreds of individuals to the Capitol or Congress to push legislation. Such days can be for one or a series of bills. In addition to scheduling appointments with legislators, central staff, and

⁷⁶⁸ https://climate-xchange.org/wp-content/uploads/2018/08/How-To-Organize-A-Lobby-Day_Climate-XChange-compressed.pdf;
<http://www.pnhp.org/sites/default/files/Planning-a-Lobby-Day.pdf>

the Governor's (executive) office, the day will normally include a media event (press conference or rally). Lobby days were changed to virtual meetings during COVID.

For lobby days, transportation (e.g., buses, vans, ride sharing) needs to be organized. You often need a meeting place beforehand to get participants divided into their lobby groups, get some food, and get a short legislative briefing. If a space is not available in the legislative building, find a nearby church, library, etc. Be mindful of transportation and parking issues.

Lobby day participants are divided into teams, with each having up to six meetings (though usually fewer). Speaking roles at the meetings are divided up beforehand among team members: who facilitates the meeting; who will explain the bill(s); who can represent various constituencies; who has a personal story; who lives in the legislator's district. The coordinator keeps time, keeps the discussion on track, and makes sure that the key 'demands' are focused on. Each legislator and staff should also receive a packet of information.

Start making appointments early – a month to six weeks beforehand. Figure out who your key targets are (e.g., members of the committee that the bill has to go through). Have a shared spreadsheet to keep track of the status of the request. You often need to make several calls, and may have to fill out a form or send an email with details as to the bills to be discussed and whether any constituents of the legislator will be attending.

Smaller lobby days can also be helpful, where key organizers meet with potential lead bill sponsors, central staff, legislative and executive leadership etc. Since fewer people are involved, the logistics are simpler, and meetings can be organized more quickly. Many groups will do a series of small lobby days leading up to one large mass mobilization that also includes rallies and media.

Keeping a record of each meeting is crucial (who was met with, what if anything did they commit to, what follow-up is needed). The follow-up after a lobby days is critical. Legislators and their staff will have multiple meetings every day when the legislature is in session

and often forget the details of the meeting soon after it is over. Following up with phone calls helps convince them that your group is persistent, and that they need to pay attention.

Getting a Bill Across the Finish Line

Getting an accurate count on the number of “yes votes” for your bill is critical but challenging, as lawmakers are often evasive as to their positions especially if there are competing interests. One of your first tasks is to line up support among the members of the committee where the bill will first be voted on. Committee chairs are usually reluctant to bring up bills that are not guaranteed to pass.

To track your legislation, you may want to create a shared online spreadsheet listing all the legislators you are targeting as co-sponsors and the members of your organization who are assigned to contact them, with a column for notes (e.g., what if anything the legislator - or more likely their staff - say).

While having a legislator sponsor a bill normally means they will vote for it, it is not guaranteed. Legislators may agree to co-sponsor a bill to appease a well-organized group of local constituents who are advocating for it. Special interests understand that legislators may take certain actions for show, but they are ok with that as long as they “do the right thing” when the real decision is made.

A GMO labeling bill in NY was blocked when a co-sponsor failed to vote to move it out of committee. The main legislative sponsor of the single payer healthcare bill in New York publicly complained in 2021 that co-sponsors in the closed-door conferences of the Democrat legislators were speaking against allowing the bill to come up for a vote after NYC public employee unions began opposing it. Both houses of the California legislature claimed a willingness to pass single-payer healthcare legislation when they knew that the

Republican governor would veto it; once a Democrat became governor, the bill stalled.⁷⁶⁹

A comparable situation occurred in the closing days of the 2022 NYS legislative session when the NYS Assembly refused to bring up a bill to enable the state's public power authority to build renewables even though the bill had passed the Senate and the bill sponsor contended that a majority of legislators had committed to vote for it. The Assembly Speaker said that his vote count was different.⁷⁷⁰

Climate groups often end up meeting with staff rather than the legislator. This is not necessarily a bad thing if the staff person has a real role, such as chief of staff or legislative director. Staff in legislative bodies, especially the central staff, are often more involved in determining the specifics of legislation than lawmakers. However, having to meet with an intern who is there only for the session is often a sign that the lawmaker is not taking the group seriously.

The chances of meeting with the lawmakers themselves are increased if you let them know when you call to set up the appointment that at least some constituents will be attending. You are also more likely to meet with them back in their district offices, which has the advantage of making it easier for local residents to attend ("Lobby days" at state capitols can often be mob scenes, with dozens of groups organizing visits). And always be nice to the secretaries and similar office staff as they serve as the gatekeepers and may try to get you in if you have a friendly relationship with them.

When it is essential to talk to a lawmaker directly and you cannot get an appointment, one strategy is to stand outside of the legislative chamber or committee meeting room when they are expected to show up and grab them on the run. Be prepared to quickly get to the point and the ask, as your time will be limited (practice your 40-second elevator pitch). You can often also send in your business card or other

⁷⁶⁹ <https://labornotes.org/blogs/2012/02/why-did-single-payer-health-care-fail-california>

⁷⁷⁰ <https://www.audacy.com/1010wins/news/state/assembly-speaker-refuses-to-bring-climate-bill-to-a-vote>

note to a legislator via the “sergeant of arms” outside the floor of state legislatures to meet with them “off the floor.”

One reason groups hire lobbying firms is to leverage their long-standing relationships with legislators and staff. Their access is also increased when the firms’ clients make campaign contributions or participate in get-out-the-vote efforts. Such firms often employ former legislators or legislative staff. But do not underestimate the power of dedicated and committed volunteers who are willing to (politely) be bulldogs in the pursuit of lawmakers.

Inside vs. Outside Advocacy

As climate groups have developed more experience with lobbying, they have become. For various reasons (starting with their funding), many of the larger climate groups with funding and staff are more committed to the pragmatic approach of trying to win whatever incremental reforms are possible. They argue that is how the real world of politics works and that it is important to begin moving in the right direction; hopefully, the government will accelerate its actions in the future. They contend that if you promote too radical an agenda, lawmakers and government officials will view you as out of touch with reality and will just stop listening. These are also often the groups that legislative leaders listen to, since they have been around for a longer period of time and are well known to the media and public.

I have always tried, especially in my “outside public role,” to advocate for what is necessary to solve the problem, not what I think legislators will feel comfortable in agreeing to. One advantage of strong campaigns that push the envelope is that they expand the range of what is considered possible, making it more likely that at least the more moderate positions pushed by others will succeed.

I always tell advocates to avoid negotiating with themselves. If you are going to weaken your position in order to increase the likelihood of getting something done, make sure you get *some* agreement from the other side (lawmakers, executive, etc.) in

exchange. Legislation always gets weaker as it goes through the legislative process. For instance, if you agree to extend the deadline for emission reduction in order to appear reasonable, usually even more time and wiggle room will be added before the final agreement. Start with a position that you feel is both correct and defensible and negotiate from there, rather than compromising with yourself before even engaging with decision makers.

In the 2021-22 effort for the Democrats' federal climate package, the Build Back Better proposal was far too weak to begin with and then shrunk to a tenth of its initial size by the time the Inflation Reduction Act was eventually passed. Yet the big climate groups applauded wildly every time the Democrats announced their proposals. By promoting each compromise as the Democrats negotiated with themselves, climate groups guaranteed that the final agreement would be that much weaker.

The Fossil Fuel Industry Invests Heavily in Lobbying

The fossil fuel industry invests tremendous resources in lobbying both federal and state governments. Concerns have been raised internationally about the massive number of their lobbyists at the international climate COPs (Conference of Parties). In addition to influencing government officials, the industry works hard to frame the narratives around climate issues through public advertising and the funding of third-party groups - and then tries assiduously to cover its tracks.⁷⁷¹

The five largest publicly traded oil and gas companies — ExxonMobil, Royal Dutch Shell, Chevron, BP and Total — together invested more than \$1 billion into “misleading climate branding and lobbying” in the three years following the Paris Agreement. This included portraying themselves as part of a solution to, rather than a

⁷⁷¹ <https://popularresistance.org/fossil-fuel-industry-dupes-media-quietly-funds-non-profits-to-block-renewable-energy/>

cause of, climate change, and highlighting their investments in clean energy while funneling far more money into dirtier fuel.⁷⁷²

The industry's lobbying is most effective if they can hide their role in it. In 2022, a bill to ban gas in new buildings in New York after 2024 was defeated, even though it initially was included in the Governor's budget proposals and then passed the state senate. The bill was killed in the lower house by an industry-financed lobbying campaign complete with TV ads, social media disinformation, campaign contributions, and high-priced lobbyists. The industry hid behind a fake "astroturf" group with a nice-sounding name – New Yorkers for Affordable Energy - that the industry created. They were also able to get labor unions representing workers in the gas industry to oppose the bill. The Texas Public Policy Foundation, which has received considerable funding from Big Oil and the Koch network, is a potent force obstructing the national transition to clean energy.⁷⁷³

Ahead of the 2022 midterm Congressional elections, when the Republicans were expected to regain control of at least one house (they did take the House narrowly, but Democrats kept the Senate), the fossil fuel industry was already lobbying to rescind parts of the climate agenda the Biden administration had passed. A key target if they had won control of both houses was going to be the \$4.5 billion earmarked for rebates of up to \$14,000 per household for low- and moderate-income families who install electric-powered heat pumps, water heaters, induction stoves and other devices that would replace appliances that use natural gas.⁷⁷⁴

⁷⁷² <https://www.dw.com/en/lobbying-threat-to-global-climate-action/a-59726541>

⁷⁷³ <https://www.nytimes.com/2022/12/04/climate/texas-public-policy-foundation-climate-change.html>; <https://www.nysfocus.com/2022/06/21/gas-ban-heastie-bad-sign-for-clcpa/>; <https://www.ny4affordableenergy.com/2022/03/29/new-yorkers-for-affordable-energy-coalition-launches-statewide-television-campaign/> ;

⁷⁷⁴ <https://www.nytimes.com/2022/10/20/us/politics/oil-gas-gop-midterms.html>

The Role of Local Governments

Think globally, act locally. Local governments have less power over policy and commerce issues than the federal and state governments, but they still have a significant role in the transition to clean energy - especially with Congressional action unlikely for the near future.

It is usually easier to gain access to local government officials (except in the largest cities) than to Congress or state legislators. Local governments are more likely to have various advisory committees which residents can join to provide input on issues such as sustainability, environmental issues and increasingly, climate planning.

Paid lobbyists for the fossil fuel companies are also less evident at the local level, except in the communities where there are large fossil fuel operations. Local governing bodies (city councils, etc.) also tend to meet year-round, so there is less time pressure than with state legislatures that adjourn for much of the year.

To be effective, first determine what powers and authority your local government has and does not have. Remember that federal law normally preempts state law when they conflict, and state law prevails over local laws that conflict.⁷⁷⁵

Local governments can also play a critical role in the siting of renewable energy projects, both utility-scale and those for individual homes and buildings (for instance, rooftop solar). This unfortunately is one area where local governments are sometimes a hindrance.⁷⁷⁶ States often develop model energy-reducing building codes that local governments are able to adopt. Local governments play a significant role in transportation issues, especially regarding mass transit including buses. They also have the power to lead by example, such as committing to purchase 100% renewable electricity for government buildings; retrofitting existing government buildings to zero

⁷⁷⁵ <https://www.law.cornell.edu/wex/preemption>

⁷⁷⁶ <https://grist.org/energy/does-your-state-want-to-cut-carbon-emissions-these-old-laws-could-be-standing-in-the-way-buildings-heat-pumps/>

greenhouse gas emissions; and, purchasing all-electric vehicles for government use, including school buses.

Local governments can also play a critical role in the siting of renewable energy projects, both utility-scale and those for individual homes and buildings (for instance, rooftop solar). This unfortunately is one area where local governments are sometimes a hindrance.⁷⁷⁷ Most local residents prefer the status quo over any new development on nearby vacant land, whether it is a few houses or a large-scale solar or wind farm. Many communities have enacted moratoriums on solar projects to give themselves time to “study” the issue.⁷⁷⁸ Some states have begun to take away local jurisdiction over renewable development, because of such foot-dragging.

Climate activists can help develop public support for such local renewable energy projects by working to get renewable developers to solicit community input at the beginning of the project rather than seeking approval after a site has been selected. Activists can also persuade their local governments to be proactive, working with local residents to determine the best local sites for renewable projects and then inviting developers to make it happen.

Climate groups in the Capital District of New York have compiled examples of actions that local governments have taken to promote climate action and sustainability.⁷⁷⁹ Many communities have launched programs to assist residents to decarbonize the buildings, such as the Green New Deal program in Ithaca NY.⁷⁸⁰

Many communities have adopted local Climate Action Plans,⁷⁸¹ often with the support of their state governments.⁷⁸² New York’s

⁷⁷⁷ https://www.brookings.edu/wp-content/uploads/2020/01/FP_20200113_renewables_land_use_local_opposition_gross.pdf

⁷⁷⁸ <https://www.lexology.com/library/detail.aspx>

⁷⁷⁹ <https://www.municipalsustainability.org/>

⁷⁸⁰ <https://ithacavoices.com/2021/10/ignd-ithacas-100m-plan-to-decarbonize-its-building-stock-headed-to-common-council/>

⁷⁸¹ <https://www.ca-ilg.org/pod/local-climate-action-plans-0>

⁷⁸² Some examples – PA - <https://www.dep.pa.gov/Citizens/climate/Pages/Local-Climate-Action.aspx>; MA - <https://www.pvpc.org/sites/default/files/files/PVPC->

Climate-Smart Communities program, for instance, assists local government in developing plans to inventory and reduce emissions; decrease energy use; shift to clean, renewable energy; implement climate-smart land use; enhance community resilience to climate change; support a green innovation economy; and inform and inspire the public.

Communities can assist residents in transitioning to a clean energy future. In addition to providing financial assistance, they can make residents aware of the various resources available to them, including reliable local contractors as well as federal and state grants. They can help obtain lower prices by taking bids from local vendors to provide discounted prices. They can develop local community solar farms.

Ten states now allow local governments to utilize Community Choice Aggregation (CCA) to purchase electricity. CCA allows local governments to procure power on behalf of their residents from an alternative supplier, while still receiving transmission and distribution service from their existing utility provider. If a municipality decides to join, all local residents are enrolled, though they can opt out. The idea is that by combining the purchasing power of tens of thousands of residents, prices will be lowered. CCAs are designed to give communities more local control over their electricity sources, more green power than is offered by the default utility, and/or lower electricity prices. CCAs can also bid to buy power from local renewable energy facilities.⁷⁸³

Many communities receive their electricity through municipal electric systems or rural cooperatives. These systems tend to charge lower rates than investor-owned utilities. To date, such systems have

VA - <https://cesp.gmu.edu/local-climate-action-planning/Municipal%20Climate%20Action%20Plans.pdf>; WA - <https://mrsc.org/Home/Explore-Topics/Environment/Sustainability/Climate-Action-Planning-Resources.aspx>; CA - <https://ww2.arb.ca.gov/our-work/programs/local-actions-climate-change/local-government-actions-climate-change>; NY - <https://climatesmart.ny.gov/>

⁷⁸³ <https://www.epa.gov/green-power-markets/community-choice-aggregation>

not been particularly aggressive in developing or utilizing renewable energy systems. Climate advocates can work to influence the local board to change that, and to promote the expansion of various conservation and efficiency measures.⁷⁸⁴

Impacting on Budgets

Follow the money. The budget is often the most important policy document a government adopts, reflecting what its real priorities are.

Budgets provide direct allocations for particular cost items, including grants, subsidies, procurements, and transfers to other governments. Funds are also allocated via tax credits and deductions.

It will cost a lot of money to make the transition to a clean energy future. A lot. Much of the funding will need to be included in various governments' budgets. Cost estimates for moving the U.S. to 100% renewable energy range from a few trillion⁷⁸⁵ to \$27 trillion.⁷⁸⁶

Less clear is how much of that is new money. A study done by the NYS Climate Action Council estimated that it would cost \$3 trillion to move to 100% renewable energy by 2050 but the authors assumed that 90% would come from redirecting existing energy expenditures (meaning at least \$300 billion in additional funding would be needed).⁷⁸⁷

However, the amount will be offset by reduced health care costs, lower energy costs, and increased productivity and jobs. A study by Prof. Mark Jacobson at Stanford University found that “a global effort to transition to 100 percent renewable energy by 2050 would cost

⁷⁸⁴ <https://climatecabineteducation.org/wp-content/uploads/2022/06/0-Full-Report-Climate-Cabinet-Ed-Clean-Energy-Future-munis-6-28-2022-.pdf>

⁷⁸⁵ <https://www.americanactionforum.org/research/what-it-costs-go-100-percent-renewable/>

⁷⁸⁶ <https://howiehawkins.us/overview-of-the-budget-for-the-ecosocialist-green-new-deal/>

⁷⁸⁷ <https://www.empirecenter.org/publications/greenscheme/>;

nations \$73 trillion upfront — but the expense will pay for itself in under seven years.”⁷⁸⁸

One source of funding is the 2022 Inflation Reduction Act. While far too small, is still the single largest investment in fighting climate change in American history.⁷⁸⁹

A budget request might be to provide financial support for low-income families who install heat pumps. Or to purchase electric buses for all schools. Or to energy retrofit all public buildings. Or to convert public housing to geothermal. Or to subsidize the construction of renewable energy. But whatever your proposal is, be prepared to detail its merits.

While legislative bodies have the power to change the budgets proposed by the executive, big changes are rarely made. Thus, advocates should try to impact initial climate related budget proposals. As with the legislative process, you need to understand your local government’s rules for adopting a budget. This includes the timeline; how specific items need to be (e.g., should individual projects be directly itemized); and how much ability does the legislative body have to make changes.

Have initial discussions with budget officials in the executive branch at least three months before the proposed budget is to be released. If the executive has the ability to amend the budget (e.g., within a month after submitting), continue to meet with budget officials until the final proposal is released. After that, target the legislative committees that put together their response to the proposals.

In New York for instance, the state budget is released around the third week of January. The Governor has 30 days to amend it. The legislature begins holding hearings on the budget in early February, where members of the public can testify (each for a few minutes, after

⁷⁸⁸ <https://e360.yale.edu/digest/the-global-price-tag-for-100-percent-renewable-energy-73-trillion>

⁷⁸⁹ <https://earthjustice.org/blog/2022-august/inflation-reduction-act-biggest-climate-investment-fight-doesnt-stop>

hours of waiting). Each house releases its proposed changes by mid-March. Any changes that advocates want must be included in the proposal of at least one of the houses. The Governor and representatives of the two houses then negotiate on a final budget, due by the first of April. (Local governments have their own timetables for their budgets.)

In New York for instance, the state budget is released around the third week of January. The Governor has 30 days to amend it. The legislature begins holding hearings on the budget in early February, where the public is allowed to testify (for a few minutes after hours of waiting). Each house releases their proposed changes by mid-March. It is essential that any changes advocates want be included in the proposals of at least one of the houses. The Governor and the two houses are then supposed to agree on the final budget by the first of April.

In New York, almost all of the funding for renewable energy has not been part of the In New York, almost all funding for renewable energy has come not through the state budget but instead from surcharges imposed on utility bills through the ratemaking procedures of the state's Public Service Commission (PSC). The PSC's administrative rules make it exceedingly difficult for the general public to have much input.

Congress has an even more complex process though they seldom meet the supposed deadline of late October. And once Congress has approved funding levels, there is a separate process to appropriate funds.⁷⁹⁰ The 2022 IRA climate funding was approved in the Senate by using the budget reconciliation process, which is allowed no more than twice a year and can be approved by fifty-one votes without the opportunity to filibuster (which would require sixty votes to overcome).⁷⁹¹

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<https://budget.house.gov/sites/democrats.budget.house.gov/files/documents/crs%20budget%20overview.pdf>

⁷⁹¹ <https://budget.house.gov/resources/fact-sheets/budget-reconciliation-basics>

Whether federal, state, or local, a government's overall fiscal condition has a major impact on what funding can be obtained. It is harder to get new or additional funds when the government is facing a projected deficit - especially if the budget must be balanced, as is true in most states and virtually all municipalities.

It can be helpful (though not essential) to look for ways to fund your request, either by transferring funds from an existing budget item (e.g., cutting tax breaks for fossil fuels) or suggesting a new funding stream. Groups in New York have tried unsuccessfully to raise \$10 billion annually for climate programs in the state budget, either through a version of a carbon tax / polluter penalty / climate superfund or by "taxing the rich." Now these groups are calling for the establishment of a \$10 billion fund for climate implementation, but leaving it up to legislators to determine how to fund it. The state's Climate Action Council, established via state law three years ago to develop a "climate scoping plan," has indicated that at least ten billion dollars is needed annually (and probably quite a bit more) to meet the state's climate goals.

Sometimes you can get lucky, and funds are made available either through a new funding stream from another level of government, or from a settlement reached in some enforcement case (e.g., Volkswagen's settlement of its Clean Air Act case⁷⁹²). However, tying the funding request to a controversial proposal (e.g., making funding dependent on enactment of a carbon tax) may undercut support for your funding request.

Building support for a funding request is similar to building support for proposed legislation. Show support from as many organizations and constituencies as possible. Politicians like to see how voters will benefit from the proposal. One advantage to requesting funding for particular action is that specific objections are less likely. For instance, fossil fuel companies will often not directly oppose subsidies for renewable energy, as long as the subsidies do not

⁷⁹² <https://www.epa.gov/dera/volkswagen-vw-settlement-dera-option>

directly undercut their own business operations. The NY Farm Bureau for instance generally opposes measures that require farms to be organic (e.g., the banning of pesticides), but will support financial incentives for farmers who want to go organic.

One grassroots campaign I was involved in successfully amended the NY state budget to require that \$88 million, originally allocated to build new fracked gas turbines in a low-income African American community to power the state capitol, instead be used “to the extent practical” for renewable energy projects.⁷⁹³

Another important budget strategy is to try to access the discretionary funding received from other levels of governments, such as federal grants to states and state grants to local governments. Such funding tends to allow for more direct support of individual projects. For instance, sixteen states plus DC and Puerto Rico allocated \$2.1 billion of their COVID relief funding in 2021 (American Rescue Plan) toward environmental initiatives.⁷⁹⁴ It’s also important to remember that promoters of corporate greenwashing and false climate solutions will be trying this tactic, especially as money and tax breaks become available under the Inflation Reduction Act. You’ll need to work to stop funding for these initiatives, in addition to seeking funding for your projects.

Agencies’ Administrative Powers

Federal and state agencies have more power to act on climate related matters than most people realize. Agencies, as the administrative arm of the executive, have the responsibility of implementing laws once they’re passed. This includes writing detailed rules and regulations clarifying the law as well as overseeing the expenditure of any

⁷⁹³ <https://sharealbany.org/wp-content/uploads/2020/06/August-2019-SHARE-newsletter1.pdf>

⁷⁹⁴ <https://www.cbpp.org/research/state-budget-and-tax/flexible-recovery-funds-offer-states-a-tool-to-advance-environmental> ; <https://www.nytimes.com/2022/06/30/us/epa-carbon-emissions-scotus.html#environmental>

allocated funds. Agencies can also develop policy recommendations for adoption by the legislature and the executive.

Agencies have quasi-legislative and quasi-judicial powers, the latter because of their authority to interpret laws, similar to a court.⁷⁹⁵

Agencies also have the power to issue permits, such as setting limits on the amount and kinds of pollution allowable under the Clean Air and Clean Water Acts, and levy fines (or potential to revoke permits) for noncompliance (see section on permits).

Legislative bodies lack the time and expertise to drill down into the “science” of particular issues (e.g., what level of exposure to a particular contaminant is safe for the public?) and have increasingly delegated that role to administrative agencies.

However, the U.S. Supreme Court in the summer of 2022 significantly limited the power of one such executive agency - the EPA - to write rules to regulate carbon emissions from power plants. This ruling (*West Virginia v. Environmental Protection Agency*) called into question how far agencies can go in writing regulations. One of President Obama’s most important climate initiatives (though with limited long-term impact due to political and legal challenges) was to direct the EPA to adopt carbon pollution standards for the power sector.⁷⁹⁶ In *West Virginia*, the Supreme Court reviewed the EPA’s approach and held more broadly that federal administrative agencies must point to “clear congressional authorization” when asserting the power to make decisions of “vast economic and political significance.”⁷⁹⁷

Many federal agencies have some jurisdiction over aspects of the environment; for instance, thirteen federal agencies are included in the U.S. Global Change Research Program which Congress mandated to

⁷⁹⁵ <https://www.capimpactca.com/2019/07/the-role-of-administrative-agencies-in-state-government/>; https://thebusinessprofessor.com/en_US/us-legal-system/function-of-administrative-agencies

⁷⁹⁶ <https://archive.epa.gov/epa/cleanpowerplan/clean-power-plan-and-carbon-pollution-standards-regulatory-actions.html>

⁷⁹⁷ https://www.supremecourt.gov/opinions/21pdf/20-1530_n758.pdf

coordinate federal research and investments in climate change.⁷⁹⁸ More than twenty federal agencies have published climate change adaptation plans.⁷⁹⁹ It remains to be seen whether these agencies' actions will be challenged under *West Virginia* or will face other attacks.

Executives may also use agencies to act when the legislative body is unwilling or unable to pass new laws.

Section 1 of Article II of the federal constitution (the Executive Power) is viewed as granting the President authority to issue executive orders and every president since George Washington has done so.⁸⁰⁰ With Congress paralyzed by partisan gridlock, climate advocates over the last decade have outlined executive actions that a president could take on climate, starting with declaring a climate emergency, which would unlock additional powers. ClimatePresident.org outlines dozens of executive actions that President Biden was urged to take.⁸⁰¹ By declaring a climate emergency, the president would unleash additional powers under the National Emergencies Act.⁸⁰²

“The authority for Governors to issue executive orders is found in state constitutions and states as well as case law or is implied by the powers assigned to state chief executives.”⁸⁰³

The powers and roles of agencies vary considerably from government to government. Kentucky, for example, places detailed restrictions on the extent to which state agencies can create laws, while California provides agencies with substantial rulemaking

⁷⁹⁸ <https://www.voanews.com/a/us-agencies-involved-in-climate-change-report/4672029.html>

⁷⁹⁹ <https://www.cnbc.com/2021/10/07/us-government-adapt-agencies-release-climate-adaptation-plans.html>

⁸⁰⁰

https://www.americanbar.org/groups/public_education/resources/teacher_portal/educational_resources/executive_orders/

⁸⁰¹ <https://www.epa.gov/laws-regulations/summary-administrative-procedure-act>; <https://www.climatepresident.org/Legal-Authority-for-Presidential-Climate-Action.pdf>

⁸⁰² <https://www.brennancenter.org/our-work/research-reports/declared-national-emergencies-under-national-emergencies-act>

⁸⁰³ <https://www.nga.org/governors/powers-and-authority/>

authority.⁸⁰⁴ You'll need to research which particular agency to target, and how, to reach your goals.

The Administrative Procedure Act governs how federal agencies develop and issue regulations, including publishing notices of rulemaking in the Federal Register and providing opportunities for public comment.

While agencies are normally under the control of the executive, a few agencies may have quasi-independent appointed boards to oversee their functioning, or which vote on major administrative actions or policy decisions. Some quasi-judicial agency actions may be under the direction of an administrative law judge, which is supposed to be free from direction by the executive or legislative branches.

Federal and state agencies that oversee the energy industry often have significant oversight of the production, sale, and distribution of electricity. This can include setting and/or enforcing Renewable Portfolio Standards as to how much renewable energy utilities under their jurisdiction have to obtain⁸⁰⁵, as well as efforts related to conservation, demand management, net metering, etc. These powers make these agencies significant players - in New York, for instance, almost all of the funding to subsidize renewable energy comes not through the state budget but through surcharges that the state Public Service Commission has imposed on utility customers.⁸⁰⁶

The California Air Resources Board⁸⁰⁷ has been a national leader in taking actions to reduce greenhouse gas emissions and promoting renewable energy. Its rules on fuel emission standards from vehicles are especially critical since federal law allows states to adopt either the California or federal rules, the former invariably being more

⁸⁰⁴ <https://www.justia.com/administrative-law/state-level-administrative-law/>

⁸⁰⁵ <https://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx>

⁸⁰⁶

<https://www3.dps.ny.gov/W/PSCWeb.nsf/All/58290EDB9AE5A89085257687006F38D1?OpenDocument>

⁸⁰⁷ <https://ww2.arb.ca.gov/about>

environmentally friendly.⁸⁰⁸ The stronger California standards also have a significant forcing effect on auto manufacturers, who tend to build their cars to meet those standards so as not to lose access to such a large market; thus, a car sold in Georgia may actually be “cleaner” than the law of that state requires.

Environmental groups from the nine states in the Northeast cap-and-trade program for electricity producers (the Regional Greenhouse Gas Initiative) worked together to convince the nine participating states to upgrade the provisions, particularly on the cap on emissions, during the once in every five years renewal process. Unlike most other states, RGGI was initially created by Governor Pataki in 2005 without legislative approval.⁸⁰⁹

Climate groups in New York have recently begun to intervene in utility rate cases to challenge their continued investments in fossil fuels, arguing that such investments contradict the greenhouse gas emission reductions established under the new state climate law. For instance, Con Ed in 2022 sought rate hikes amounting to 10% in electric bills and 15% in gas to pay for their ongoing fossil fuel investments, both for new projects and maintaining existing systems, including \$1.4 billion in spending next year.⁸¹⁰

Groups have also begun to challenge – both administratively and legislatively – the tremendous subsidy that comes from allowing utilities to provide gas hookups within one hundred feet of existing systems for free, rolling the tens of thousands of dollars for the cost into the underlying rate base for all customers.⁸¹¹

⁸⁰⁸ <https://www.washingtonpost.com/climate-solutions/2022/02/17/biden-california-cars-climate-change/>

⁸⁰⁹ https://eany.org/press_release/ny-rggi-states-move-on-power-plant-pollution-cuts/; <https://cei.org/sites/default/files/RGGI%20complaint.pdf>

⁸¹⁰ <https://www.nysfocus.com/2022/07/06/coned-energy-bills-fossil-fuel-investments/>

⁸¹¹ <https://grist.org/energy/does-your-state-want-to-cut-carbon-emissions-these-old-laws-could-be-standing-in-the-way-buildings-heat-pumps/>

One area to try to impact upon is whether any agency has to develop an energy master plan to oversee energy development, or more recently, climate action plans.

Impacting Administrative Actions

Unfortunately, the administrative process is usually more complex and even less transparent than the legislative process. Agencies are also confined by the parameters of the laws that they are charged with implementing. Proceedings related to rulemaking, rate decisions, and permits (see below) are highly structured, with requirements and procedures to participate that are difficult to understand or comply with, especially for novices. The level of technical detail on energy issues is often quite daunting and complex, focusing on the leaves rather than the forest (e.g., the broad policy concerns). The industry will often have dozens if not hundreds of high-priced lawyers, scientists and other experts who have extensive experience with the process, and usually only those climate groups with large professional staffs – or budgets to hire expert consultants – are able to effectively participate.

Climate groups often invest considerable resources in turning people out to testify or submit written comments in administrative proceedings. While such actions can have an impact, often the people hearing the testimony are low-level hearing officers who gather information but have little actual role in the final decision.

In New York State for instance, the staff of the Public Service Commission in its various proceedings often write long, detailed white papers outlining the many significant issues that must be addressed in resolving the proposed energy policy. But these white papers tend merely to outline questions rather than answering them. Then the conclusion, usually written by the executive office, states the three or four key decisions. The elected official often makes the decisions without reading the comments or hearing the testimony into which advocates poured so much time and energy.

Climate groups can often make better use of their time and resources by focusing on meeting with the top agency officials to advocate their policy recommendations, rather than getting sucked into the rabbit hole of the proceedings. Most climate groups will also utilize tactics such as rallies, protests, and media to impact the agency's determination, though these are not formally part of the proceedings.

Even when the legislature agrees to require some level of representation by labor, environmental justice, or climate groups on an advisory body, such as a Climate Council, the majority of voting members normally are from the various government agencies, meaning the executive still has the real decision-making powers.

Permits

One of the most critical functions of agencies is the issuing of permits – giving developers permission to build a project (pipeline, power plant, factory, building) and establishing various construction and operation conditions. Multiple permits, often from various agencies, are invariably required for major projects (water, air, fuel, land use, transmission, etc.). (See an overview of the permitting process for clean energy infrastructure projects.⁸¹²)

As part of the approval process, agencies have discretion (subject to the underlying law) to impose conditions on operations, such as allowable levels of pollution / emissions. At the local level, towns often negotiate modifications to project proposals as part of their approval process.

This section provides a brief introduction to permitting. It is far from a comprehensive overview of the various permits that apply to emissions, power production, and other climate changing activities. Nor is this a comprehensive explanation of the various federal

⁸¹² <https://www.brookings.edu/research/how-does-permitting-for-clean-energy-infrastructure-work/>

(National Environmental Policy Act or NEPA⁸¹³) and state environmental review processes. Twenty states have adopted some form of state environmental review laws.⁸¹⁴ Such laws are often part of legal challenges to energy projects. Those laws can require that alternatives be considered to proposed projects as a way to reduce harmful environmental impacts, and they provide activists with legal tools to challenge both agency and private actions.

In a recent positive development, the NYS Department of Environmental Conservation (DEC) used the newly passed Climate Leadership and Community Protection Act (CLCPA) and its emissions-reduction goals as justification to deny permits for two new fossil fuel power plants.⁸¹⁵

Many criticize the permitting process as simply giving permission to the company to pollute and contribute to climate change; and even those who accept the need for permitting must admit that enforcement is far from stellar. Even if the regulating agency eventually imposes fines for violations, it is often a long, drawn-out process, and critics argue that the polluters often treat the fines as simply a cost of doing business.

A climate group that plans to oppose a particular project should identify, early on, all the permits the project will need to obtain. Fortunately, the developer generally will have to disclose that information in its filings with various agencies. Often there will be multiple federal, state and even local permits for the various aspects of the project. The local level often starts with the zoning process.

The “side deal” that Senator Manchin sought in 2022, in exchange for his support for the Inflation Reduction Act, focused on the permitting process. Manchin and his industry supporters want to speed up the issuance of permits by reducing the level of environmental review, prioritizing certain big-ticket projects, and

⁸¹³ <https://www.epa.gov/nepa>

⁸¹⁴ <https://ceq.doe.gov/laws-regulations/states.html>

⁸¹⁵ <https://www.law.georgetown.edu/environmental-law-review/blog/new-york-begins-to-honor-its-climate-commitments-by-rejecting-permits-for-new-natural-gas-plants/>

limiting state powers in permitting related to electric transmission and clean water protection. As of this writing, that “side deal” seems finally to be dead, but it (or some version of it) will probably be resurrected at some point.\

FERC

The Federal Energy Regulatory Commission (FERC) is one of the most critical permitting agencies when it comes to climate. FERC is an “independent agency” that regulates the interstate transmission of electricity, natural gas, and oil. FERC also issues permits to build liquefied natural gas (LNG) terminals and interstate natural gas pipelines as well as hydropower projects. FERC does not: approve construction of electric generation facilities; regulate public power systems; regulate nuclear power; Issue State Water Quality Certificates; or oversee the construction of oil pipelines.⁸¹⁶

FERC also does not issue state water quality certificates, which is a critical fact for climate activists attempting to block a gas pipeline that crosses more than one state. Water quality certificates are invariably needed since an interstate pipeline is likely to cross dozens if not hundreds of streams and other waterways. The state denial of such a certificate blocks the project, *regardless* of other decisions by FERC. States also have authority over the siting and construction of electric transmission facilities, generation facilities and distribution systems, as well as gas pipelines just within their state.⁸¹⁷

The siting and construction of offshore wind is largely under the jurisdiction of the federal Bureau of Ocean Energy Management.⁸¹⁸

FERC is called independent because it is governed by up to five commissioners who are appointed by the President with the advice and consent of the Senate. Commissioners serve five-year terms. No

⁸¹⁶ <https://www.ferc.gov/what-ferc-doe>

⁸¹⁷ <https://content.next.westlaw.com/practical-law/document/1eb49d7b91cb511e38578f7ccc38dcbee/Electricity-regulation-in-the-United-States-overview>

⁸¹⁸ <https://www.boem.gov/>

more than three commissioners at any one time can be from the same party. Thus, the actions of the Commission are largely determined by which party has the majority in this constant 3 to 2 split. An incoming president from a different party may have to wait a few years before they can make an appointment and flip the majority.

Critics charge that FERC is far too cozy with the fossil fuel industry, with a history of rubber-stamping fossil fuel infrastructure projects. Groups like Beyond Extreme Energy propose that FERC be repealed and replaced with an agency focused on developing renewable energy – FREC or Federal Renewable Energy Commission.⁸¹⁹

Indeed, one of the problems with regulatory agencies like FERC is that they often are “captured” by the industry they are set up to regulate. Employees often move back and forth between the agency and the industry. The agency itself may be dependent on the fees from the industry to pay for its operation, providing a financial incentive to approve the project. Regulated industries have a major stake in influencing regulators and invest considerable resources to do so, while ordinary citizens are not as well-resourced and are less motivated.⁸²⁰

Federal Clean Air Act Permits

Under the Clean Air Act, EPA sets limits on certain air pollutants, including setting limits on how much can be in the air anywhere in the United States. The Act also gives EPA the authority to limit emissions of air pollutants coming from sources like chemical plants, utilities, and steel mills. The permitting process is a major way this is enforced. Individual states or tribes may have stronger air pollution laws.⁸²¹ The Title V Program requires local and state air quality agencies to issue

⁸¹⁹ [https://beyondextremeenergy.org/why-we-focus-on-ferc/;](https://beyondextremeenergy.org/why-we-focus-on-ferc/)

<https://beyondextremeenergy.org/ferc-into-frec-campaign/>

⁸²⁰ <https://www.investopedia.com/terms/r/regulatory-capture.asp>

⁸²¹ <https://www.epa.gov/regulatory-information-topic/regulatory-and-guidance-information-topic-air#climatechange>

operating permits to facilities that emit significant amounts of air pollutants. The regulated contaminants are carbon monoxide, ground-level ozone, lead, nitrogen oxides (a major greenhouse gas), particulate matter, and sulfur dioxide.

In the absence of new federal legislation on climate change, the Clean Air Act has provided the primary basis for federal regulation of greenhouse gas emissions. Unfortunately, EPA has been slow to develop such regulations and the efforts by the Obama administration to address greenhouse gas emissions from power plants were curtailed by the U.S. Supreme Court, though EPA continues to try to address the court's concerns.⁸²² In June 2022, the court ruled that EPA cannot require existing fossil fuel power facilities to shift to lower CO₂ emitting sources of electricity without express Congressional authority.⁸²³

⁸²² <https://www.epa.gov/nsr/clean-air-act-permitting-greenhouse-gases>

⁸²³ <https://www.whitecase.com/insight-alert/supreme-court-rules-epa-cannot-require-existing-fossil-fuel-power-facilities-shift>

CHAPTER 14

THE ART OF PROTEST

This chapter provides an overview of various protest techniques, including basic how-to information, and a discussion on the the role of art in protests. It describes what makes a successful campaign, and reviews some of the most impactful climate protest efforts in the United States.

Organizers should always be clear about what is the purpose of a protest. What is the demand you are trying to win? How does this particular protest contribute to the effort to win that demand? What is the next step?

Protests should empower their participants. Humor, creativity and art help make protests more successful and impactful. A picture is worth a thousand words. Many climate groups utilize art buildout teams for their events.

The use of civil disobedience has become more prominent in the climate movement in recent years as the world's governments and businesses delay taking the necessary steps to keep global warming below 1.5 degrees C. Extinction Rebellion in England has taken a lead in elevating the use of this tactic. When I turned 65, I decided to get arrested three times during the coming year at various climate protests. Unfortunately, COVID has dampened the entire climate movement but especially the use of civil disobedience.

This chapter ends by profiling some of the major climate protest campaigns in the U.S.: the effort to ban fracking in New York State; the Keystone XL, DAPL, and Line 3 pipeline fights; and divesting the New York City and State pension funds from fossil fuels.

Art of Protest

The Anti-Defamation League (ADL) describes a protest as “an event or action where people gather with others to publicly express their opinions about something that is happening in society. There are a variety of potential goals for a protest: influence public opinion, draw attention to and share information about a perceived injustice, gain a wide audience for the cause, push public policy or legislation forward, learn more about an issue, connect with others who feel passionate about the issue, speak one’s truth and bear witness. Protests can also provide inspiration and a sense of being part of a larger movement. The overarching purpose of protests is to demand change.”⁸²⁴

As with all advocacy, protests should be part of a campaign plan that has a clear goal. How does the protest fit in with the rest of the plan? Organizing plans can utilize escalating confrontational tactics as your initial efforts fail to provide the desired results. Traditionally, groups have moved to using civil disobedience only after other pressure activities failed to produce the needed response.

Pulling together any event can make organizers nervous about how well it will go, how many people will show up, what will the weather be like, will the media be interested, etc. Be willing to step outside your comfort zone to challenge yourself and your organization, while making sure you do the organizing steps to make the event successful. My experience has been that climate protests usually draw more people than expected if they are well-publicized and their reason is clear.

Some ways to protest include: organizing a picket line; holding a rally or march; organizing a sit-in or die-in; blocking traffic; disrupting a meeting or public hearing (have people stand up and speak or hold a banner); holding signs at events; engaging in performance art; hanging a banner from a building or overpass; organizing a call-in; leafleting; hunger striking; blocking an entrance

⁸²⁴ <https://www.adl.org/education/resources/tools-and-strategies/the-purpose-and-power-of-protest>

to building or work site; dressing up as polar bears and other animals threatened by climate change; using music or other performance; organizing a festival, vigils and readings; putting up posters; banging pots and pans; sidewalk chalking, and more.

Protests are normally nonviolent. Be clear with participants ahead of time as to whether the event is committed to nonviolence (which also requires participants commitment if they're participating).

This book focuses on nonviolent protests. Violent protests can involve destruction of property (like disabling a bulldozer) or even harm to individuals. Some dispute whether destruction of property is inherently violent. Some believe that movements can be effective when they a variety of property destruction and nonviolent protests.⁸²⁵ In *The Ministry for the Future*, a well-regarded 2020 climate fiction novel by Kim Stanley Robinson, the author envisions a world where climate activists employ terrorist acts, including assassinations of fossil fuel executives and shooting down airliners.⁸²⁶ The use of violence is often more acceptable to the public when it is in response to systemic oppression by the government.⁸²⁷

Also be clear with participants about whether there is a chance of arrest. In most cases, police officers are not interested in arresting nonviolent protestors (they like to avoid the paperwork) and usually will provide several warnings before arrests are made. The police however can be more aggressive and confrontational when dealing with people of color or if they have a close relationship to a local business being protected. (See the section on civil disobedience)

The COVID crisis and the need to isolate was a major impediment to climate protests,⁸²⁸ especially during the first few

⁸²⁵ <https://www.pnas.org/doi/10.1073/pnas.2118990119>

⁸²⁶ https://en.wikipedia.org/wiki/The_Ministry_for_the_Future

⁸²⁷ <https://www.newyorker.com/news/q-and-a/how-violent-protests-change-politics>

⁸²⁸ <https://www.nytimes.com/2020/03/19/climate/coronavirus-online-climate-protests.html>; <https://www.dw.com/en/coronavirus-fridays-for-future-fff-covid-19-pandemic-climate-strike/a-56911641>

years, leading to the need to think of new creative ways to protest and organize.⁸²⁹

The Right to Protest

The right to protest is one of the fundamental guarantees in the U.S. Constitution. That is not true for every country however, and can be met with violent repression. Despite our right to protest, people of color and other marginalized people in the U.S. can face physical and other repercussions from protests.

The American Civil Liberty Union states: “Your rights are strongest in what are known as “traditional public forums,” such as streets, sidewalks, and parks. You also likely have the right to speak out on other public property, like plazas in front of government buildings, as long as you are not blocking access to the government building or interfering with other purposes the property was designed for... You do not need a permit to march in the streets or on sidewalks, as long as marchers do not obstruct car or pedestrian traffic.”⁸³⁰

The courts have allowed governments to impose “reasonable” time, place, and manner restrictions on protests, especially when sound amplification is used. Large rallies and marches with lots of people and a sound system normally require a permit.⁸³¹

Your local National Lawyers Guild or American Civil Liberties Union chapter can help provide you with information about protesting in your community. They may also provide a legal observer to monitor the behavior of police. For larger events, recruit experienced people to act as liaisons with the police to negotiate what you can or cannot do during the protest. There may also be prior local court rulings that detail how the police and government should respond to protests.

⁸²⁹ <https://www.brookings.edu/blog/order-from-chaos/2020/06/04/civil-society-creativity-around-the-world-can-sustain-protests-in-the-coronavirus-era/>

⁸³⁰ <https://www.aclu.org/know-your-rights/protesters-rights>

⁸³¹

https://www.law.cornell.edu/supreme_court_of_the_united_states_2013%E2%80%932014_term_in_review/first_amendment_freedom_of_speech

Fossil Fuel Industry Seeks to Curtail Protests

Many states are seeking to crack down on protests in response to climate and Black Lives Matter activism. These crackdowns tend to be aimed at larger direct action and civil disobedience events.

As of 2021, eight states had passed laws cracking down on protests and twenty-one had pending laws. New Arkansas, Kansas and Montana laws increase penalties for protesting near oil and gas pipelines and other infrastructure. Republican bill sponsors and police groups say increasing penalties for crimes committed during a protest (such as blocking traffic), will help prevent violence and protect law enforcement officers.⁸³²

In 2019, the National Lawyers Guild reported that in the prior two years, twelve states had considered bills to designate fossil fuels as critical infrastructure and allow greater latitude in prosecuting those who protest against fossil fuel infrastructure. Lawsuits are also routinely brought against protestors by private companies with the goal of keeping them occupied in long and expensive lawsuits.⁸³³

Mother Jones reports that many states are considering anti-protest “legislation...based on a model bill that the American Legislative Exchange Council (ALEC), a right-wing policy shop funded by corporations and conservative billionaires, drafted, and began promoting to Republican state lawmakers in the wake of the fight over the Dakota Access pipeline project. State disclosure records routinely show lobbyists for companies such as Enbridge, Exxon Mobil Corp., Koch Industries and Marathon Petroleum consulting lawmakers on the legislation.” Louisiana’s Republican-controlled legislature passed a bill in May 2022 that would have imposed mandatory three-year prison sentences for trespassing on fossil fuel facilities, but it was vetoed by the Democratic Governor.⁸³⁴

⁸³² <https://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2021/06/21/eight-states-enact-anti-protest-laws>

⁸³³ <https://www.earth.com/news/crack-down-environmental-protests/>

⁸³⁴ <https://www.motherjones.com/politics/2021/02/four-states-propose-harsh-new-penalties-for-fossil-fuel-protesters/>

In 2016, Jessica Reznicek, a member of the Des Moines Catholic Worker Movement, sought to stop the construction of Dakota Access Pipeline. Jessica attended public comment hearings, gathered signatures, and participated in civil disobedience, hunger strikes, marches and rallies, boycotts, and encampments. When all of that failed to stop the pipeline, she began dismantling construction equipment and pipeline valves. In 2021 she was sentenced to eight years in prison with a “domestic terrorism enhancement” that more than doubled her sentence.⁸³⁵

The treatment of protestors in other countries, especially those with authoritarian governments, can be far more brutal, with beatings, assaults, long jail terms, or even killings. For instance, more than 320 land and environmental defenders have been killed in Columbia over the last decade.⁸³⁶ Certainly, many countries suppress dissent. The U.S. falls out of the top ten in worldwide ranking for human freedoms (measuring both personal and economic freedom.)⁸³⁷ China, the world’s largest greenhouse emitter, ranks 150, although it has become slightly more tolerant of environmental protests in recent years.⁸³⁸

Globally, nations are cracking down on protests. A letter signed by more than 400 scientists, including more than a dozen with the Intergovernmental Panel on Climate Change (IPCC), stated “around the world today, those who put their voices and bodies on the line to raise the alarm are being threatened and silenced by the very countries they seek to protect. We are gravely concerned about the increasing

⁸³⁵ <http://supportjessicareznicek.com/about>

⁸³⁶ https://www.globalwitness.org/en/press-releases/global-witness-welcomes-colombia-ratifying-key-agreement-protection-land-and-environment-defenders-after-322-killed-colombia-last-decade/?utm_source=hootsuite&utm_medium=twitter

⁸³⁷ <https://worldpopulationreview.com/country-rankings/freedom-index-by-country>

⁸³⁸ <https://www.theguardian.com/world/2019/sep/18/china-young-climate-heroes-fight-apathy-party-line>; <https://lithub.com/can-environmental-activism-succeed-in-china/>

criminalization and targeting of climate protestors around the world.”⁸³⁹

In June 2022, Human Rights Watch said the Australian state of New South Wales was disproportionately punishing climate protesters in violation of their basic rights to peaceful protest. Proposed anti-protest laws in the states of Victoria and Tasmania would also invoke harsh penalties for non-violent protest.⁸⁴⁰ The courts threw out a 2019 ban of protests by Extinction Rebellion in London.⁸⁴¹ In 2017, Poland, the host of COP24, passed a law to curtail the rights of environmental activists to protest at the United Nations climate talks and subjected them to government surveillance. During the climate talks in Paris, protestors were placed under house arrest and had to report to police three times a day.⁸⁴²

Organizing a Successful Protest

The short-term focus of most protests is to draw media and public attention to an issue. Optics matter. A photo (or short video) is worth a thousand words. Protests that utilize humor are often effective.

The long-term focus of any protest should be to win a particular demand or action, usually as part of a larger campaign. A direct-action protest (discussed later) is when you directly confront the decision maker seeking agreement.

There are many good organizing guides for protests.⁸⁴³ Different types of protests have different needs. Some, such as civil disobedience (covered separately), require a high level of commitment among the participants.

⁸³⁹ <https://www.theguardian.com/environment/2021/apr/19/environment-protest-being-criminalised-around-world-say-experts>

⁸⁴⁰ <https://www.hrw.org/news/2022/06/22/australia-climate-protesters-rights-violated>

⁸⁴¹ <https://www.bbc.com/news/uk-50316561>

⁸⁴² <https://www.earth.com/news/crack-down-environmental-protests/>

⁸⁴³ <https://www.activisthandbook.org/en/organising/protest;>
<https://streetcivics.com/an-organizers-guide-to-protests-and-political-change/>

While some protests are spontaneous, most involve planning. Be inclusive in the planning process. The most successful protests have a number of people who agree to help with the coordination. Committees can be established to accomplish various tasks. Draw up a timeline for the event and assign various people to coordinate the various aspects. Develop an outreach strategy for the event and set goals for the number of participants. If you ask other groups to co-sponsor (always a good idea), ask them to help mobilize people by sending notices to their members, allies, or the media.

Be mindful of diversity. Recruit speakers that are dynamic, inspirational, and can help impact the decision makers you are targeting. You want speakers to represent both important constituencies and those who can tell the personal stories of average people most impacted by the issue. Develop an outline for the event and be clear who is doing what and when. For major events, you'll want to at least have a few people to do a walk through the site beforehand to identify possible problems (or opportunities).

If it's a march, assign peacekeepers to help with traffic safety. They should have some form of marking, like an armband, to make them visible to the organizers and participants. Agree how sudden decisions will be made in the event of emergencies or last-minute changes, for example, if police bar you from part of the route. Be mindful of time. Even the most active people will begin to drift away if the event (or a particular speaker) is too long. For marches and rallies, have designated chant leaders and chants distributed to participants.

Large events require sound systems, which can require a permit (especially if you need electricity). You know a local musician who can donate the use of their sound system and assist with assessing your sound needs. Battery-operated sound systems can work for a crowd of a few hundred. Bullhorns are good for chants, but not great for speeches. Check batteries ahead of time and bring extras.

Like other advocacy, protests must communicate clearly about why you are protesting and what changes you desire. Demands can be

spelled out on your signs. Have a press release explaining the issues and the demands to distribute to the media. Have people assigned to deal with the media, even as others may be designated to speak to the press. It's often helpful to have leaflets for curious onlookers.

Plan to publicize your protest digitally. You can livestream your event on social media. Make sure someone is responsible to get photos and have participants take pictures (or videos) and post them to their own feeds. Develop social media hashtags.

Call-ins that target decision makers is a common tactic. Some large groups set up toll-free numbers that people can call to hear a short message and then get connected to the target; this enables you to keep track of the number of calls. Some campaigns have different organizations take responsibility for different days of the week, so the target gets calls throughout the week. Others have people sign up for the time slot they will call, plus ask them to text the next person on the list once the call is completed. Such call-ins provide the caller with a sample message as well as some short background (and possibly a link for more info).

Petitions are not an effective means of protest, because politicians know it requires a low-level of commitment to do it. Petitions this days are mainly a way to generate names for future contacts.

Groups can have stamped and pre-address postcards that they asked supporters (say at a table at a farmers' market) to write a short message to the target.

Creative Protests

Be creative in your protests. Interesting events, especially ones that incorporate humor, tend to draw more media coverage and interest by the general public. Many climate groups incorporate colorful images and performance art into their protests.

In May 2015, five hundred climate activists took to kayaks, canoes, paddleboards and even a solar-powered party barge at the Port of Seattle to swarm around a huge drilling rig that Shell had brought

there. The company planned to use the port as a staging ground for oil drilling operations in the Arctic over the next two years.⁸⁴⁴ Climate groups around the country were inspired to organize similar protests against climate targets.

The Civil Rights Movement utilized creative protests to highlight the unfairness and brutality of segregation. Sit-ins at lunch counters brought national attention to the movement.⁸⁴⁵ The South American tradition of protesters taking to the streets banging pots and pans, dates back to the early 1970s in Chile, when food shortages led people to turn their empty utensils into instruments of mass mobilization.⁸⁴⁶

When I was working for the Iowa Association of Community Organizations for Reform Now (ACORN), one of our neighborhoods had a noxious meat rendering plant. We discovered that the publisher of the local paper, the *Des Moines Register and Tribune*, was on the board of the company. For Valentine's Day, we brought to his office a four-foot valentine that said, "Roses are Red / Violets are Blue / We are Sure Tired / Of Smelling You." The head of the company was outside our office at 8 a.m. the next morning.

When cotton farmers were spraying their fields near a low-income Mexican American neighborhood in South Phoenix, killing animals and making people sick, we brought some children and their parents to the neighborhood of the Chair of the State Pesticide Control on Halloween. Going door-to-door trick-or-treating, they handed out onions (which is what the pesticide smelled like) to his neighbors and said that if they did not like the smell, call him. They did, mainly to say "I don't know what this is about, but deal with it so they don't come back").

When we were protesting high utility bills, activists brought bags of pennies to the utility's office to pay their bills. When a park superintendent was slow in cleaning up a neighborhood park, the

⁸⁴⁴ <https://grist.org/climate-energy/you-have-to-see-these-pictures-of-seattles-kayaking-climate-protesters/>

⁸⁴⁵ <https://kinginstitute.stanford.edu/king-papers/documents/creative-protest>

⁸⁴⁶ <https://www.globalcitizen.org/es/content/11-crazy-protests-that-really-made-a-statement/>

residents presented him with the Slow Turtle award. He was so slow that it took him a few minutes to realize what was going on. The park cleaning crew was out the next day.

For April Fool's Day a few years ago, I played Exxon CEO Rex Tillerson in a press conference the climate group 350NYC held outside of their publicist office. We announced that Exxon was stopping the use of fossil fuels.⁸⁴⁷ Groups often go into the busy offices of banks financing fossil fuels and perform plays and musical skits about the climate crisis until they are thrown out.

In Europe in November 2022, young climate activists began throwing soup on the glass coverings to famous artwork.⁸⁴⁸ It generated a lot of attention and eventually a fair number of people took the time to figure out why they were doing it. Others disrupted major sporting events.

Art and Climate Activism

A picture is worth a thousand words. Protestors have always used creative signs and props to illustrate their concerns about climate change – and hopefully to get their sign in the media. Art is multi-media and includes songs and music, posters, and plays or skits.

Climate change has inspired artists to create works that express anything from people's fears to the scientific consensus around the issue. Art provides a way for people to connect with these emotional and personal aspects of climate change. Studies have found climate change art is capable of changing people's opinions, especially if the message is hopeful, and provides ideas for change. One role of art is to make scientific data more accessible. Art is also participatory, giving people more ownership of an event. There is an increasing

⁸⁴⁷ <https://www.youtube.com/watch?v=PJ4NmBeRd7o>

⁸⁴⁸ <https://www.theneweuropean.co.uk/the-art-of-protest-just-stop-oil-climate/>

trend for scientists and artists to co-create work to help communicate climate change research.⁸⁴⁹

The group Artists and Climate Change observes that art and culture “provoke and encourage us to think bigger and beyond ourselves, it strengthens community and empathy, and, most critically, it connects us to our common humanity. In all its diverse expressions, culture belongs to everyone, and it is a tool for social change.” As Bertolt Brecht wrote: “Art is not a mirror to reflect reality, but a hammer with which to shape it.”⁸⁵⁰

Many climate groups and coalitions establish art committees and organize art building volunteer gatherings to generate signs, banners, puppets, and props for major events. Sane Energy, a leader in the art building community in New York, explains that “Art speaks faster than words. Art is a way to quickly explain an often-complicated story: what the issues and solutions are. It starts conversations, engages the public, and changes consensus. Art builds community.” They added, “we know getting the word OUT is a big part of all of our work. More people will read our message if it is designed with an attractive, eye-catching image.”⁸⁵¹

Art was a major component of the 400,000 person People’s Climate March in 2014 in New York City. Their toolkit explains that making art is a way to bring people, spread the word about the event, and make clear why your community is organizing. Bringing people together to create art provides the opportunity to: invite coalition partners and potential allies to a fun event to deepen relationships; bolster interest in the event; recruit volunteers to support your outreach and longer-term work; and, tell your community’s stories through powerful and inspiring images. They suggest that the best way to ensure that your art communicates the full power of the people

⁸⁴⁹ <https://www.forbes.com/sites/evaamsen/2019/09/30/climate-change-art-helps-people-connect-with-a-challenging-topic/?sh=19a4345375d0>;

<https://www.un.org/en/academic-impact/new-virtual-magazine-art-climate-action>

⁸⁵⁰ <https://artistsandclimatechange.com/2019/04/23/the-creative-climate-movement/>

⁸⁵¹ <https://www.saneenergy.org/art>

you are organizing with is to have a planning meeting first (see their Telling Your Story page for suggestions on how to lead a “Visioning Session” to plan your art.)⁸⁵²

Performance art is designed to be acted-out in front of an audience. It can encourage the viewers to become participants. It seeks to touch people emotionally. It is very visual and usually provocative, thought provoking, urging viewers to think about the issue being addressed. It includes plays, often short humorous ones designed for public places; musical skits; and/or dancing. Some performance art may seek to provide viewers with the information needed to take political action; others focus directly on mobilizing the audience to take specific advocacy steps.

The Red Rebel Brigade, which grew out of the Extinction Rebellion protest in London in the spring of 2019, is “an international performance activist troupe dedicated to illuminating the global environmental crisis and supporting groups and organizations fighting to save humanity and all species from mass extinction.... These ethereal otherworldly beings came from a slow-motion mime show called Blanco that Invisible Circus toured for many years as a street show in the 90’s. Red Rebel Brigade is an evolution of these ghostly all white characters that first processed for the Anti-Iraq war demonstrations in 2003. This show had a very powerful mesmerizing effect on audiences with slow motion movements synchronized and performed in static tableaux, utilizing existing architecture and reclaiming public spaces.”⁸⁵³ They are an example of how political art often transcends the barrier of language.

⁸⁵² <https://peoplesclimate.org/resources/>;
<https://docs.google.com/document/d/1ET9VWa84MfmuT3lbUbYV5OZ639G49kCBUAfKQ4GVZ9s/edit>

⁸⁵³ <http://redrebelbrigade.com/>

Civil Disobedience

Civil disobedience means breaking the law to protest injustice. Such acts can be intended to protest the overall lack of effective action to curtail climate change, or it can be directed at a specific action or target, such as the construction of fossil fuel infrastructure.

The use of civil obedience by climate groups was significantly curtailed during the Covid crisis as a precautionary health measure.

As outlined earlier, Extinction Rebellion relies on historical research that shows that nonviolent revolutions are more successful than those that utilize violence and that the critical mass is participation by 3.5% of the population. “Civil disobedience is the active, non-violent refusal to accept the dictates of governments,” they say. “It informs them that unjust actions will be opposed, and the people will act illegally if pushed to do so. Civil disobedience causes disruption and focuses attention, while forcing debate with the aim of bringing about fundamental and progressive changes within our societies and our world.”⁸⁵⁴

Just Stop Oil is another United Kingdom-based group that takes direct action (civil disobedience) to get the government to halt fossil fuel production. While this has included various blockades, occupation, and stunts like climbing bridges to halt traffic, they received international media attention in October 2022 when two of its members threw soup on the glass protecting a Van Gogh painting.⁸⁵⁵

In *Civil Disobedience*, Henry David Thoreau wrote that there is a higher law than civil law which compels the obedience of the individual. In cases where there is conflict, the individual must follow his conscience and, if necessary, disregard human law.⁸⁵⁶

⁸⁵⁴ <https://rebellion.global/blog/2020/11/03/civil-disobedience-examples/>

⁸⁵⁵ <https://www.theguardian.com/environment/2022/oct/18/just-stop-oil-van-gogh-national-portrait-gallery-climate-emergency-fund>; <https://juststopoil.org/>

⁸⁵⁶ <https://www.cliffsnotes.com/literature/t/thoreau-emerson-and-transcendentalism/thoreaus-civil-disobedience/major-themes>

Civil disobedience, also called passive resistance, is the refusal to obey the dictates of a government or a ruling power, without resorting to violence; its usual purpose is to force concessions from those with power. Civil disobedience has been a major tactic and philosophy of nationalist movements in Africa and India, in the American Civil Rights Movement, and of labor, anti-war, and other social movements in many countries. Civil disobedience is usually a symbolic or ritualistic violation of the law. The protestor, finding legal avenues of change blocked, ineffective or nonexistent, feels obligated by a higher, extralegal principle to break the law.⁸⁵⁷

Famous successful acts of civil disobedience include Rosa Park's bus boycott; the Civil Rights sit-ins at lunch counters; Mahatma Gandhi's salt march in India; the women's suffrage movement in the United States; and the Singing Revolution in Estonia, Latvia, and Lithuania to win independence from the Soviet Union.⁸⁵⁸ Civil disobedience arrests at the South African embassy in Washington, D.C., New York City, London and other cities played a role in the overthrow of Apartheid.⁸⁵⁹

Climate change threatens the quality of life on this planet, even threatening the extinction of humans and other species. Saving life on the planet is viewed by many as a greater need than accepting decisions by governments and corporations to continue to allow the burning of fossil fuels.

Some advocate that the threat from climate change is so great that it justifies uncivil disobedience. There is debate however whether the targeted destruction of property (for example, destroying equipment used in building fossil fuel infrastructure) qualifies as violence if no one is hurt. Many protestors argue that damaging property should not be considered violence, saving that label for harm to individuals.⁸⁶⁰

⁸⁵⁷ <https://www.britannica.com/topic/civil-disobedience>

⁸⁵⁸ <https://examples.yourdictionary.com/famous-examples-of-civil-disobedience-in-history.html>

⁸⁵⁹ <https://www.washingtonpost.com/archive/politics/1985/01/04/more-than-30-arrests-made-at-south-african-embassy/7bcacbc4-1b15-422a-945d-fe8620996b9f/>

⁸⁶⁰ <https://www.currentaffairs.org/2020/06/why-property-destruction-isnt-violence>

Civil disobedience is normally an intensification of an ongoing campaign, after other activities and protests have failed to achieve the desired goal. There are numerous books and how-to-guides on the use of civil disobedience. It normally requires participants to undergo training to ensure there are agreed upon standards of behavior for events. This might include a commitment to nonviolence; deciding whether and at what level participants will resist when arrested; how to react to the misbehavior of police; and how decisions will be made during the event if needed. Protests with a lot of potential arrestees usually divide into smaller affinity groups to provide mutual support. Participants should fully understand what is likely, or possible, to happen at events in which civil disobedience is employed. They can be quite stressful, especially for those who have not participated in civil disobedience before.

Some civil disobedience protests inform the authorities beforehand about the event and negotiate how it will unfold, including how individuals will be arrested and what charges they will face. Such events can be tightly scripted. Other civil disobedience actions take place without prior notice to the authorities, especially if the intent of the event is to shut down the operations of the government or fossil fuel project, at least temporarily. Lawyers need to be lined-up to represent the protestors, particularly when they appear in court. Jail support is usually organized to assist arrestees after they are released, including helping with transportation and food.

Since many civil disobedience arrestees in the United States avoid jail time, with the charge stricken if they stay out of trouble for a set time period, the police can make arrests and time spent in criminal justice facilities an unpleasant experience. Groups have responded to such down time as an opportunity to hold training sessions and sing alongs while waiting to be released.

How-to Resources for Civil Disobedience

There are many books and manuals on the theory and practice of civil disobedience. One of the best known theoreticians is Gene Sharp, who has been called the “dictator slayer,” and the “Machiavelli of nonviolence.” Sharp sought to “correct common misconceptions about nonviolent action: that people have to be pacifists or saints to undertake it, that strategic nonviolence somehow involves avoiding conflict, and that it can only be used in democracies. He set out to show that nonviolent action is “a technique of struggle involving the use of psychological, social, economic, and political power,” and that it can be used even against viciously repressive regimes.”⁸⁶¹ “How to Start a Revolution” is a 2011 documentary about his theories.⁸⁶²

ACT UP, which used civil disobedience to force an adequate public health response to the AIDS crisis, has a manual for civil disobedience, which it developed from the *Handbook for NonViolent Action* by the War Resisters League. “The purpose of training is for participants to form a common understanding of the use of nonviolence,” it says. “It provides a forum to share ideas about nonviolence, oppression, fears, and feelings. It allows people to meet and build solidarity with each other and provides an opportunity to form affinity groups. It helps people to decide whether they will participate in an action. Through role playing, people learn what to expect from police, officials, other people in the action and themselves.”⁸⁶³

The Climate Disobedience Center was organized to provide logistical, legal, and spiritual resources, on the ground assistance, and advice to climate activists engaged in civil disobedience. “Our trainings go well beyond skills and tactics to help your community identify the principles that ground you and help you think through

⁸⁶¹ <https://www.dissentmagazine.org/article/the-machiavelli-of-nonviolence-gene-sharp-and-the-battle-against-corporate-rul>

⁸⁶² https://en.wikipedia.org/wiki/How_to_Start_a_Revolution

⁸⁶³ https://actupny.org/documents/CDdocuments/ACTUP_CivilDisobedience.pdf

how to use those principle to guide your efforts,” they say. “Unlike other direct action trainings that assume an action ends at the point of arrest, our trainings are designed from the beginning to help activists strategize actions that extend into successful courtroom confrontation and long-term campaigns.”⁸⁶⁴

The Center embraces the climate necessity defense, which asserts that protestors are acting in the public interest, which the law protects. Defendants using the climate necessity defense admit their criminal conduct but argue that it was necessary to avoid greater harm. The impacts of climate change are so serious that breaking the law is necessary to avert them. The defense allows activists to call attention to and explain the reasons behind their actions. By presenting a necessity defense — describing the dangers of climate change, the lack of effective legal remedies, and the importance of individual action — activists seek to put the government on trial. The necessity defense also seeks to empower juries.

To date, there have been a few climate cases where a judge has allowed the defense, with a few leading to acquittals (though not directly on the defense). In the past, activists have been found not guilty by reason of necessity for protesting issues like nuclear weapons, CIA recruitment, and Apartheid.⁸⁶⁵

One of the Center’s cofounders is Tim DeCristopher. As Bidder 70, he disrupted a federal Bureau of Land Management oil and gas auction in December of 2008, by outbidding oil companies for parcels around Arches and Canyonlands National Parks in Utah. He received national attention for the action and spent 21 months in prison. Claiming they had been rushed into auction with insufficient environmental and scientific review, the Interior Department canceled many of the leases shortly after the auction and a subsequent court injunction.⁸⁶⁶

⁸⁶⁴ <https://www.climatedisobedience.org/about>

⁸⁶⁵ <https://cldc.org/climate-necessity-defense/>

⁸⁶⁶ https://en.wikipedia.org/wiki/Tim_DeChristopher

The Fierce Vulnerability Network, which describes itself as a “constellation of direct action teams positioned at the intersection of racial healing and climate justice,” also has published an organizing manual which has a large section on civil disobedience and direct action.⁸⁶⁷

The treatment of protestors engaged in civil disobedience in the United States has been relatively restrained in recent decades, especially when compared to the response to the civil rights movements in the 1960s and 1970s, and before that, to labor organizing. In the U.S. people of color and low-income individuals find civil disobedience more threatening than others, with a higher likelihood of negative consequences. The police have long been an instrument of racism and the oppression of those in poverty.⁸⁶⁸

Some Successful (Impactful) Climate Action Campaigns

There have been many inspiring climate action campaigns and protests.⁸⁶⁹ Several campaigns in the United States are outlined below: the successful effort to ban the hydrofracking on natural gas in New York State, led by grassroots activists who challenged the leadership of the big green groups; the Dakota Access Pipeline protests, which highlighted the leadership role of frontline Indigenous communities; and the recent Line 3 pipeline struggle. The Keystone XL Pipeline was one of the most visible and longest campaigns.

The last and longest campaign overview is of the one I played a major role in, to successfully divest the New York City and New York State pension funds from the fossil fuel industry.

⁸⁶⁷ <https://thefvn.org/>

⁸⁶⁸ <https://www.aclu.org/news/criminal-law-reform/how-do-we-end-racism-in-policing>; <https://www.usatoday.com/story/news/nation/2020/06/07/black-lives-matters-police-departments-have-long-history-racism/3128167001/>

⁸⁶⁹ <https://www.panmacmillan.com/blogs/literary/environmental-protests-losing-earth-nathaniel-rich>; <https://www.treehugger.com/historic-climate-change-protests-and-their-impact-5185501>

Although this book primarily covers climate action in the United States, similar protests are happening worldwide. Students in recent years have emerged as major leaders in the climate movement as they realize that adults are failing in their effort to ensure a future for them. The September 2019 Global Climate Strikes, inspired by Swedish youth climate activist Greta Thunberg, attracted an estimate 4 million people, the largest climate protest ever.⁸⁷⁰

In India in 2021, millions of farmers and their allies protested new laws that benefit large agribusiness at the expense of small family farmers. The government responded by cracking down on climate activists who joined the farmer-led protests.⁸⁷¹ In Sydney, Australia, climate activists in June 2022 blocked streets and the critical Sydney Harbor Tunnel.⁸⁷² Extinction Rebellion has repeatedly disrupted life in the UK, though it recently announced it would utilize that tactic less often.

Ban on Fracking in NY

The fight against fracking in New York State was a multiyear campaign that used a diverse mixture of tactics to win a ban on fracking.

Fracking is short for hydraulic fracturing, a method that uses high pressure water and chemical cocktails (often toxic) to break up deep shale formations in order to extract gas. The United States has become a leader in fracking. Many politicians of both parties, including some major environmental groups, have promoted gas as a cheap bridge fuel to a clean energy future. While the burning natural gas does produce carbon dioxide, it produces about 30% less than oil and 45% less than coal. Plus, natural gas does not produce ash particles like coal and oil do, which adds to air pollution.

⁸⁷⁰ <https://www.vox.com/energy-and-environment/2019/9/20/20876143/climate-strike-2019-september-20-crowd-estimate>

⁸⁷¹ <https://theworld.org/stories/2021-03-05/india-cracks-down-climate-activists-supporting-farmer-protests>

⁸⁷² <https://www.bbc.com/news/world-australia-61947201>

However, natural gas is primarily methane, which is more than 80 times more potent in the short-term (20 years) as a greenhouse gas than carbon. The proponents of natural gas have largely ignored or downplayed the problems created by the leakage of methane in the process of producing and distributing gas.

Fracking presents a host of other environmental problems, far too many to detail here. Fracking involves blasting huge volumes of water mixed with toxic chemicals and sand deep into the earth to fracture rock formations. About 25% of fracking chemicals could cause cancer, scientists say. Others harm the skin or reproductive system. The need for wastewater disposal and shrinking water supplies are major problems. Each well consumes a median of 1.5 million gallons of water, according to the EPA, adding up to billions of gallons nationwide every year.

The International Energy Agency estimates that the U.S. oil and gas industry emits 16.9 million metric tons of methane every year, though some scientists believe that is a significant underestimation. Fracking can lead to the rapid industrialization of rural landscapes, with significant increases in noise from the fracking operation and truck levels.⁸⁷³

Grassroot community groups, particularly in Central New York and the state's Southern Tier, where most of the state's fracking would take place, called for a ban on fracking from the start. It was, after all, their communities that were directly threatened. They were joined by the most progressive climate groups, such as the statewide Green Party, which understood that natural gas was just another fossil fuel contributing to global warming and therefore should have no role in a clean energy future.

The larger, more mainstream climate groups with funding and staff initially tended only to support a moratorium on fracking,

⁸⁷³ <https://www.biologicaldiversity.org/campaigns/fracking/index.html>; <https://news.cornell.edu/stories/2019/08/study-fracking-prompts-global-spike-atmospheric-methane>; <https://www.investopedia.com/ask/answers/011915/what-are-effects-fracking-environment.asp>

arguing that the state should take the time to study the issue and evaluate the potential impacts on water and public health. Some of the larger groups, including the Sierra Club, were supportive of gas as a replacement for coal plants they were trying to shut down. Ling Tsou, co-founder of United for Action, a New York City-based grassroots group that fought for a ban, noted, “The mainstream environmental organizations thought the best we could get were good regulations and thought we were crazy.”

In 2008, New York Governor Eliot Spitzer’s lead environmental staff person, Judith Enck (my wife) persuaded him to impose a defacto short-term moratorium on fracking to give the state Department of Environmental Conservation (DEC) complete a generic environmental impact study even though the rest of the Governor’s staff and the DEC opposed a halt. That initial moratorium was extended for several years. In December 2010, Spitzer’s successor David Paterson issued an Executive Order shortly before leaving office that imposed a six-month moratorium instead of signing a moratorium bill that had already passed the state legislature.⁸⁷⁴

The grassroots pressure was sufficient to keep having the moratorium extended until the next Governor, Andrew Cuomo, decided to halt fracking permanently in December 2014, following his re-election.

The grassroots groups employed a wide range of pressure tactics – petitioning, picket lines, phone in, rallies, press conferences. A key decision was to get local governments to pass laws – not just resolutions - that prohibited fracking within their jurisdiction. While many questioned the legality of such an approach, in 2014 New York State’s highest court ruled 5 to 2 upholding the right of municipalities to ban fracking in their jurisdictions.⁸⁷⁵

The legislative strategy, including the push for a moratorium, kept the issue in front of lawmakers while also providing opportunities

⁸⁷⁴ <http://www.cnn.com/2010/US/12/13/new.york.fracking.moratorium/index.html>

⁸⁷⁵ <https://www.nytimes.com/2014/07/01/nyregion/towns-may-ban-fracking-new-york-state-high-court-rules.html>

such as public hearings. Hundreds turned out to speak at public hearings, such as the one the federal Environmental Protection Agency (EPA) held on fracking in Binghamton, N.Y. in later 2010. EPA's Region 2 also submitted strong anti-fracking comments to DEC's environmental review.⁸⁷⁶

Due to the sustained efforts and passion of the grassroots organizers, eventually most of the larger environmental groups came around to support a ban. More than 250 groups eventually joined together to form New Yorkers Against Fracking to support a ban.⁸⁷⁷

New Yorkers Against Fracking (NYAF) was able to put organizers on the ground across the state, from Long Island to Buffalo, who helped mobilize people for actions, such as bus trips to Albany for rallies at the Capitol. The rallies in conjunction with the Governor's annual State of the State address in January were especially massive, with thousands of people participating.⁸⁷⁸ NYAF also organized networks of key fracking opponents - health professionals, businesses, local elected officials, chefs, and faith leaders - that lent additional visibility and credibility to the effort.

The groups heavily focused on doggedly pursuing⁸⁷⁹ the Governor by turning out fracking opponents to picket, chant, and hold signs wherever he showed up. They also targeted the Governor outside of New York State, such as placing an ad during his appearance at the Democratic National Convention⁸⁸⁰ in May 2013 as he tested the water for a possible future presidential run. They showed up when he went to vote.⁸⁸¹ Finding the public schedule of such public

⁸⁷⁶ <https://www.nrdc.org/experts/kate-sinding/lively-crowds-turn-out-epa-fracking-hearing-binghamton>;

<https://www.epa.gov/sites/default/files/documents/hfsummarybinghampton2.pdf>

⁸⁷⁷ <https://www.frackaction.com/coalitions/>

⁸⁷⁸ <https://tworowtimes.com/news/regional/new-yorkers-gather-anti-fracking-protest/>

⁸⁷⁹ <https://indivisible.org/resource/bird-dogging-guide-get-them-record>

⁸⁸⁰ <https://www.democratandchronicle.com/story/news/politics/blogs/vote-up/2012/09/05/fracking-opponent-targets-cuomo-in-charlotte-ad/2187001/>

⁸⁸¹ <https://www.pressconnects.com/story/news/local/new-york/2014/09/09/new-york-fracking-cuomo-protest/15351419/>

officials is generally not an easy task. It requires a considerable monitoring of news media and announcements by politicians or sponsoring groups, and/or tips from friendly media professionals.

Another key factor was “Gasland” by Josh Fox,⁸⁸² a documentary film about the fracking fight. Fox had received an offer of \$100,000, which he rejected, to allow drilling on his property in Pennsylvania just south of the



New York border. This led him to visit residents in two dozen states to discuss their experiences with fracking. One key visual was of homeowners living near fracked wells lighting their water taps aflame as water came out of their faucet due to the presence of methane. The film was a great tool to show at local organizing events.

Electoral politics also played a role. During his 2014 re-election campaign Governor Andrew Cuomo was looking to surpass the vote total his father, Mario Cuomo, had received in his own re-election effort. In addition to fracking, many liberal-leaning voters were not happy with the Governor’s push to expand standardized testing and curriculum in schools as well as his negative comments about public employees, particularly teachers. A relatively unknown law professor and public campaign finance expert, Zephyr Teachout, pulled an unexpectedly high vote total in the Democratic Party primary.

In the general election, the Green Party candidate for Governor, Howie Hawkins, who had been campaigning for both a ban on fracking and a Green New Deal since his 2010 campaign, pulled 5% of the vote, the highest total for a progressive third-party candidate for governor in New York State in a century. Hawkins pulled double digits in the Capital District, which had the largest concentration of

⁸⁸² <https://www.npr.org/2011/02/24/134031183/Gasland-Takes-On-Natural-Gas-Drilling-Industry>

public employees, as well as in parts of Central New York where the opposition to fracking was strongest.⁸⁸³

The disappointing 2014 election, the realization that the strategy of passing local laws banning fracking had already removed most of the best potential fracking sites from development, and the constant pursuit of the Governor and protests, led Andrew Cuomo to have the Department of Health finally release its long-awaited health study on fracking. A month after the election, Cuomo said that the documentation of the health problems required him to ban fracking. *The New York Times* noted that his action was likely a way to help repair his position with the Democrat's left wing, especially after the one-third vote that Teachout received.⁸⁸⁴

Keystone XL Pipeline

The decade long campaign to defeat the Keystone XL (KXL) tar sands pipeline was a not only a monumental climate victory but a turning point in climate movement strategy. It was the first national pipeline fight with high visibility both among activists and the mainstream media. Inspired by the Indigenous-led resistance against the Canadian tar sands and growing opposition along the pipeline route, the national climate movement led by 350.org and Sierra Club in 2011 seized on Keystone XL as the place to up the ante in opposing President Barrack Obama's "all-of-the-above" energy policy.

The campaign had powerful protests nationwide, 1,200 arrests outside the White House, legal battles, tens of thousands rallying in Washington, D.C. shortly after the 2012 election and putting up solar panels and doing tree occupations along the pipeline route. In April 2014, farmers, ranchers, and Indigenous leaders formed the Cowboy

⁸⁸³ <https://nypost.com/2014/11/05/green-party-on-the-map-as-hawkins-grabs-5-of-gov-vote/>

⁸⁸⁴ <https://www.nytimes.com/2014/12/18/nyregion/cuomo-to-ban-fracking-in-new-york-state-citing-health-risks.html>

and Indian Alliance and assembled tepees and a Conestoga wagon on the National Mall for a “Reject and Protect” action.

The ultimately successful struggle against Keystone XL had dramatic sudden twists and turns, with flip-flopping executive orders over three presidential administrations turning victory into defeat and then back again.

Canadian TC Energy abandoned the project in June 2021 following President Joe Biden’s denial of a key permit on his first day in office. The fact that the pipeline crossed international boundaries gave the President more unilateral power to halt it than otherwise would be the case. Expanding an existing pipeline, it planned to transport 830,000 barrels of Alberta tar sands oil per day to refineries on the Gulf Coast of Texas.⁸⁸⁵

The DAPL Fight⁸⁸⁶

The Dakota Access Pipeline (DAPL) fight thrust the role of frontline opposition from Indigenous communities into the leadership of the climate fight and the national limelight.

Grassroots protests began in 2014 to the construction of Texas-based Energy Transfer Partners’ 1,172-mile-long underground oil pipeline. The pipeline runs from the Bakken oil fields in western North Dakota to southern Illinois, crossing beneath the Missouri and Mississippi rivers, as well as under Lake Oahe near the Standing Rock Indian Reservation.

The protests were led by the Indigenous community, which has increasingly become an important factor in fights against pipelines. In North Dakota, the pipeline route was diverted by the Army Corps of Engineers away from the more developed Bismarck area toward

⁸⁸⁵ <https://www.nrdc.org/stories/what-keystone-pipeline>; <https://www.politico.com/story/2013/02/thousands-rally-in-washington-to-protest-keystone-pipeline-087745>; <https://www.politico.com/story/2013/02/thousands-rally-in-washington-to-protest-keystone-pipeline-087745>

⁸⁸⁶ Much of the overview of the DAPL fight is from Wikipedia https://en.wikipedia.org/wiki/Dakota_Access_Pipeline_protests

Standing Rock, partially to track an existing pipeline. Members of the Standing Rock Sioux tribe and other local residents view the pipeline as a serious threat to the region's water, including the Missouri River which is the tribe's main water source. The construction also threatened ancient burial grounds and cultural sites of historic importance.

The struggle led to the largest gathering of Indigenous nations in over a century. It garnered international attention and raised awareness of the dangers of pipelines and the continuing mistreatment of Indigenous people by the U.S. Government. The #NoDAPL movement was one of the most inspiring environmental events of the last few decades and a critical moment for Indigenous sovereignty.⁸⁸⁷

Protests against the pipeline route began in 2014 in Iowa, including by local Native American groups. In April 2016, youth from Standing Rock and surrounding Native American communities began organizing to stop the pipeline. Sacred Stone Camp was founded by the local tribe historian as a center for cultural preservation and spiritual resistance to the pipeline. The water protectors' camp became a center for direct action, with a strong social media presence. By September, members of more than 300 federally recognized Indigenous nations were residing in three main camps, alongside 4,000 additional pipeline resistance demonstrators.

ReZpect Our Water is an Indigenous youth group that formed to oppose the pipeline. In April 2016, ReZpect Our Water organized a 2,000-mile cross-country "spiritual run" from North Dakota to Washington, D.C., to protest the construction of the pipeline. Upon their arrival they delivered a petition with 160,000 signatures to the U.S. Army Corps of Engineers.

As an independent nation, Standing Rock sought support from the United Nations. On September 20, Standing Rock Chairman David Archambault II addressed the UN Human Rights Council in Geneva, Switzerland, urging them to support the protests and support their land

⁸⁸⁷ <https://ccrjustice.org/home/blog/2018/02/21/nodapl-movement-was-powerful-factual-and-indigenous-led-lawsuit-lies-can-t>

rights. The following April, Standing Rock member Brenda White Bull spoke at the UN Permanent Forum on Indigenous Issues.

In September 2016, construction workers bulldozed a section of privately owned land which the tribe claimed as sacred ground. The protestors responded by establishing a winter camp. Joined by many Native Nations, the Standing Rock Sioux asserted the land rightly belonged to them under the 1851 Treaty of Fort Laramie. When protesters moved into the area, security workers used attack dogs. In October 2016, police cleared an encampment which was situated on the proposed path of the pipeline. As of mid-October, there had been over 140 arrests. Some protesters who were arrested for misdemeanors and taken to the Morton County jail reported harsh and unusual treatment.

In late October 2016, police from several agencies, including North Dakota State Troopers, the National Guard, and other law enforcement agencies from nearby states, began to clear out a protest camp and blockades along the state highway. In November 2016, police used water cannons on protesters in freezing weather, generating significant media attention.

Amnesty International spoke out against the use of strip searches of arrestees. Protesters were blasted with high-pitched sound cannons and were held in cages that appeared to be dog kennels. Dakota Access LLC hired the firm TigerSwan to provide security during the protest. In May 2017, internal TigerSwan documents revealed a close collaboration between the pipeline company and local, state, and federal law enforcement as they carried out “military-style counterterrorism measures” to suppress the protests.

Continued conflicts and resulting attention on social media led to increasing national and global support for the protesters. High profile activists, celebrities, and politicians spoke out in support of protest.

As her campaign manager, I helped get Green Party presidential candidate Jill Stein out to DAPL in the fall of 2016 for the encampment and protests. She was charged with a crime after she had left the site. She had spray painted the words “I approve this message”

on the blade of a bulldozer to protest that it “had been used to destroy sacred burial sites of the Standing Rock Sioux. I had to scramble to find a legal team to represent her since there were a lot of arrests from the protests combined with a lack of progressive criminal justice and National Lawyer Guild attorneys in North Dakota.”⁸⁸⁸

Demonstrations were held in numerous cities to show support for the DAPL protests. In November, a group called Veterans Stand for Standing Rock formed to participate in nonviolent intervention to defend the demonstrators from what the group has called “assault and intimidation at the hands of the militarized police force.” On November 15, hundreds of cities held protests against the pipeline in a coordinated protest which organizers called a “National Day of Action.” Thousands joined the protests in North Dakota over Thanksgiving,

One way Energy Transfer Partners fought back against the protests was with a lawsuit against Greenpeace, the Netherlands-based international NGO support group BankTrack, and surprisingly, Earth First! (which was far more active several decades ago.) The company, belittling the leadership of the Indigenous community, made the wild unsubstantiated charge that every group opposed to the pipeline were “terrorists” involved in a “secret underground enterprise” that purposefully misleads the public about the dangers of pipelines and other environmentally dangerous projects in order to profit from the panic that ensues.”⁸⁸⁹

In December 2016, at the end of President Obama’s administration, the Army Corps of Engineers denied an easement for construction of the pipeline under the Missouri River. This decision however was reversed the following month by the administration of President Donald Trump.

⁸⁸⁸ <https://www.theguardian.com/us-news/2017/aug/09/dakota-access-pipeline-jill-stein-arrest-green-party>

⁸⁸⁹ <https://ccrjustice.org/home/blog/2018/02/21/nodapl-movement-was-powerful-factual-and-indigenous-led-lawsuit-lies-can-t>

In March 2017, the Standing Rock Sioux led a four-day protest in Washington D.C., culminating in the Native Nations Rise march on March 10. The protesters marched through the capital, pausing to erect a tipi at Trump International Hotel, and rallied in front of the White House.

The pipeline was completed by April 2017 and operations began shortly afterwards.

In March 2020, a U.S. District Judge ruled that the government had not adequately studied the pipeline's "effects on the quality of the human environment," and ordered the Army Corps of Engineers to conduct a new environmental impact review. In July 2020, a District Court judge ordered the pipeline to be shut down and emptied of oil pending a new environmental review. The temporary shutdown order was overturned on appeal court on August 5, although the environmental review was ordered to continue. In February 2022, the U.S. Supreme Court ruled that the review must continue, which leaves open the possibility that that the pipeline could be forced to close.⁸⁹⁰

Legal fights also continue over the right of the public to see documents related to the security firm hired by Energy Transfer, following a \$175,000 fine paid by TigerSwan to resolve an investigation by state officials as to whether they were illegally operating in the state.⁸⁹¹

Line 3 Pipeline

Sustained, continued protests employing a multitude of tactics are taking place against many other pipelines, building upon lessons from DAPL, Keystone and elsewhere.

The Line 3 replacement project received considerable national attention as the major pipeline fight following DAPL, with

⁸⁹⁰ <https://www.reuters.com/business/energy/us-supreme-court-turns-away-dakota-pipeline-operators-appeal-2022-02-22/>

⁸⁹¹ <https://apnews.com/article/dakota-access-pipeline-north-c7f3935c3cb185bddac45d0ff2ab2e64>

opposition from Indigenous people and climate justice groups. It first began operation in 1968 and has been the source of millions of gallons of oil spills, including a 1991 oil spill in Grand Rapids, Minnesota, that was the worst inland oil spill in United States history.⁸⁹²

The expansion will bring nearly a million barrels of tar sands oil per day from Alberta, Canada to Superior, Wisconsin. Proposed in 2014 by Enbridge, a Canadian pipeline company, it sought to build a new pipeline corridor through untouched wetlands and the treaty territory of Ojibwe and Anishinaabe peoples, through the Mississippi River headwaters to the shore of Lake Superior.

Stop the Line 3 Pipeline coalition reported that “We are holding events in our homes, community centers, churches, schools, and online. We are talking to our politicians, speaking up at hearings, marching in protests, taking nonviolent direct action together, and reporting Enbridge’s activity along the proposed route... Hundreds of water protectors are currently facing criminal charges in Minnesota for standing in defense of the water, the climate, and the treaty rights of the Anishinaabeg people... Police forces - directly funded by Enbridge - have responded to this massive movement with surveillance, harassment, physical torture (“pain compliance”), and trumped-up charges, including felonies.”⁸⁹³

Court challenges continued after its completion.⁸⁹⁴ In October 2022, Enbridge announced that it had reached an agreement to pay \$11 million in penalties to various Minnesota regulators and the Fond du Lac Band of Lake Superior Chippewa, including to fund multiple environmental and resource enhancement projects.⁸⁹⁵

⁸⁹² https://en.wikipedia.org/wiki/Line_3_pipeline

⁸⁹³ <https://www.stopline3.org/#intro>; <https://www.theguardian.com/us-news/2021/jun/20/line-3-pipeline-indigenous-environmental-justice>

⁸⁹⁴ <https://www.mprnews.org/story/2021/03/23/mn-appeals-court-hears-arguments-in-line-3-challenge>

⁸⁹⁵ <https://www.reuters.com/business/energy/enbridge-says-it-agreed-pay-11-mln-line-3-pipeline-penalties-2022-10-17/>

Fossil Fuel Divestment from NYC and NYS Public Pension Funds

The first major public challenge to the financing of the fossil fuel industry came with Bill McKibben and 350.org launched the campaign to get college and church endowments to divest from fossil fuels. McKibben's Do the Math Tour in 2012 showed that to keep global warming at manageable levels we need to leave 80% of the existing fossil fuels in the ground.⁸⁹⁶

Divestment⁸⁹⁷ was a conscious effort both to duplicate the campaign successfully used against Apartheid in South Africa⁸⁹⁸ and to give groups local targets that they could mobilize around (think globally, act locally). It was a tremendous success in launching a grassroots movement.

350NYC took the lead in initiating the largely successful campaigns to divest both the New York City and New York State pension funds from fossil fuels, the second and third largest public pension funds in the country. In 2020, the NYS Fund, with assets of \$210 billion, had approximately \$13 billion invested in fossil fuels.

The initial focus of the campaign was to argue that it was morally wrong for pension funds to seek to profit from investing in fossil fuel companies that threatened life on the planet. As the campaign progressed it also highlighted that fossil fuel companies over the last decade were the worst performing part of Wall Street – a trend that would get worse as the world agreed in the Paris Climate Accords to move away from using fossil fuels.

The fact that the New York divestment effort was part of a large national and international effort was a major contributing factor to our success and our willingness to continue organizing over the years. Stories of the organizing and progress being made elsewhere, starting at college campuses, were inspiring. We were amazed as the value of

⁸⁹⁶ <https://www.rollingstone.com/politics/politics-lists/bill-mckibben-and-350-org-on-the-do-the-math-tour-20240/>

⁸⁹⁷ https://en.wikipedia.org/wiki/Fossil_fuel_divestment

⁸⁹⁸ [https://theworld.org/stories/2021-03-18/climate-divestment-activists-draw-inspiration-south-africa-s-anti-apartheid\](https://theworld.org/stories/2021-03-18/climate-divestment-activists-draw-inspiration-south-africa-s-anti-apartheid/)

the funds being divested grew from the billions into the trillions (and is now more than \$40 trillion⁸⁹⁹).

Since I had spent several decades working with legislators through my work with the Public Interest Research Group and then Hunger Action Network, I volunteered to help coordinate both the New York City and State campaigns.

Even though in both cases the pension funds were largely controlled by a comptroller (initially John Liu in the city and then Scott Stringer, with Tom DiNapoli state comptroller), the New York City pension funds give a major role to other public officials and labor unions, while the state operated on a “sole trustee” model. New York City has five separate public pension funds – general, teachers, fire, police, and the board of education – each with their own board of trustees divided between city and labor representatives. The Mayor and Public Advocate both had representatives on the two largest (general and teachers) along with the Comptroller.

It was helpful that none of the Comptrollers or other key officials were climate deniers. They did not have the sense of urgency that was needed, but we did not have to spend time convincing them that climate change was real.

New York City Divestment Campaign

Much of our work initially focused on getting the City Council to support divestment. This was unproductive. Unfortunately, our initial choice to lead the effort in the Council (Brad Lander, who get elected City Controller in 2021) felt he was too busy with other matters and kept suggesting other council members take the lead, all of whom failed to follow through. Eventually Council member Helen Rosenthal stepped up and worked very hard and effectively for several years to promote divestment. Unfortunately, the powers of the City Council are fairly limited (the city uses a strong mayoral system), and their

⁸⁹⁹ <https://stand.earth/press-releases/fossil-fuel-divestment-movement-hits-40-trillion-in-represented-assets/>

legal authority over the management of the Public Pension was debatable.

350NYC and other groups held numerous public forums, rallies, petition drives, call-ins, letters, and demonstrations over several years to drum up interest and educate people on the issue. Monthly coordinating committee meetings were held at the Society for Ethical Culture next to Central Park to develop strategies and divide up workload. Divestment was one of the first organized climate campaigns in the city and even the forums would draw well over a hundred people.

We also held informational meetings with the staff in the City Comptroller's office. The staff were less than enthusiastic, as they felt that the comptroller's fiduciary responsibility to manage the pensions meant that only financial returns should be considered (ignoring both the long term financial and life challenges posed by fossil fuels.) We did not get meetings with the Comptroller themselves other than when we would approach them in public when they would appear at rallies (usually at labor sponsored events).

In the long run, the support of the Mayor and Public Advocate as well as several of the unions (especially DC37, the largest municipal union) was instrumental. Bill DeBlasio was a progressive City Council member (and later Public Advocate) from Park Slope in Brooklyn (the most progressive neighborhood in the city) who replaced Mike Bloomberg as Mayor. His staff person on pensions, John Adler, was quite helpful. The massive People Climate Movement march in the city in the fall of 2014 (estimated at 400,000), followed by the visit of Pope Francis after his strong encyclical on climate, pushed the mayor to do something in 2015 on climate and divestment was his choice.

When Scott Stringer was first elected to the State Assembly, I worked with him through my role with Hunger Action Network on various corporate accountability issues. I assumed that he would be ready to stand up to the fossil fuel industry once elected Comptroller, which he reinforced when I talked to him several times during his

campaign. But once elected, he resisted divestment, citing his fiduciary responsibilities. (One problem at both the city and state level was that the financial advisors on staff strongly opposed divestment, being unconcerned about climate change.)

Stringer reluctantly agreed to join the mayor in his announcement that the city was moving towards divestment. However, the city decided to show “due diligence” by setting up a study process on how to move divestment forward.

This resulted in a major split within the divestment campaign. One segment felt that we had won the issue and should just step aside and allow the process to unfold. I and others however, pointed out that it was clear that Stringer was a reluctant participant, and the study process gave him enough wiggle room to delay it for a long period of time and the opportunity to derail it at a later date. I reached out to the former Deputy State Comptroller, Tom Sanzillo, who supported divestment to get his input into what a real “study process” should look like. I argued that we should intervene to make sure the long-delayed request for proposals process incorporated his recommendation. The key point was that the study should focus on the mechanics of how to actually divest, rather than spending years studying whether to divest and then subsequently do another study on how it should be done.

Unfortunately, we wasted a year sitting on the sidelines debating this issue. It finally became clear that Stringer was still a strong opponent of divestment and that we had to resume active advocacy efforts. Some key people departed the campaign at this point.

There were a number of key developments that eventually caused Stringer to support divestment. One, 350NYC, its many coalition partners, including NYC Councilmember Helen Rosenthal, resumed their organizing and education efforts. We began to focus more on the trustees of the individual funds. Jon Forster, a former vice president of DC37 and chair of their climate committee, was instrumental in building union support. The Professional Staff Congress, a progressive union representing City University of New York (CUNY)

professors and part of the United Federation of Teachers (UFT), helped push them. (Though the leadership of UFT weakened the resolutions advanced by the locals, which we also saw at the state level.) 350.org also began to provide some staff support to the city and state efforts.

Two, New York Communities for Change (NYCC, formerly ACORN), a multi-racial low-income community group, became active in the divestment campaign. NYCC was part of a broader community and labor coalition that had cachet with elected officials. The coalition was active in calling for the city's response to Hurricane Sandy to target jobs and assistance to the low-income and communities of color most harmed by the storm. NYCC was able to get the divestment issue included as a key demand in several of the coalition's major events and efforts, which increased its visibility and support.

Third, Public Advocate Tish James was a strong advocate for divestment, including in her role as a trustee on the two largest funds. She organized a major hearing in November of 2017 on divestment. With de Blasio limited to two terms as Mayor, Stringer and James were considered the two front runners to replace him.

Fourth, at the state level, in December 2017, Governor Andrew Cuomo came out in favor of divestment. He had been slow to support the need for climate action, but began to change after the long campaign to successfully convince him to ban fracking. After fracking was a major factor in his disappointing 2014 election results, he began to be more supportive of climate action. He said he would divest fossil fuels from the various funds that he controlled, and he got State Comptroller Thomas DiNapoli to agree to set up a panel to study how to "decarbonize" the pension fund.

At this point, Stringer saw the handwriting on the wall and used Cuomo as a cover to announce his support for divestment. He was worried that the boards of at least on some of the funds would vote for divestment. And he didn't want James to own the climate issue in the upcoming mayoral campaign. He called up the divestment staff of

350.org on the day that Cuomo's released his call for divestment and asked what he needed to do get 350 to publicly praise him. They spent the next few hours negotiating the wording of a release supporting divestment.

In January 2018, Stringer, DeBlasio, James and the trustees of three of the funds (not the police or fire funds) formally announced a commitment to divest the city's pension funds from fossil fuels within five years and an intention to sue the industry for climate damages and costs.⁹⁰⁰ In December 2021, they announced that \$3 billion in fossil fuels had been divested.⁹⁰¹

At one point during the campaign, we began to highlight how pension funds could better be invested to help society (create jobs, speed up transition to renewables) while providing a higher rate of return. This led to additional opportunities for lawmakers to debate such investments however, so we dropped that focus in order to simplify the effort.

Campaign to Divest from NYS Pension Fund

At the same time that they it kicked off the New York City campaign, 350NYC and others launched the effort to divest the state pension fund from fossil fuels.⁹⁰² The campaign held its first divestment meeting with the State Comptroller's office in December 2013. In March 2014 held a rally at DiNapoli's New York City office to deliver 3,500 petition signatures. In February 2015, as part of Global divestment day, the group held a press conference at the State Capitol and a rally at the Comptroller's Albany office. The N.Y.S. Nurses Association, one of the first unions to support divestment and overall climate action, spoke.

⁹⁰⁰ <https://www.theguardian.com/us-news/2018/jan/10/new-york-city-plans-to-divest-5bn-from-fossil-fuels-and-sue-oil-companies>

⁹⁰¹ <https://comptroller.nyc.gov/newsroom/comptroller-stringer-and-trustees-announce-successful-3-billion-divestment-from-fossil-fuels/>

⁹⁰² <https://gofossilfree.org/ny/divestnyt看line/>

In the first years of the campaign, the focus was on convincing DiNapoli to divest. As he made his opposition clear, we decided to add legislation to ramp up the pressure. We always doubted that the State Legislature would pass a bill to require DiNapoli to divest. DiNapoli was an Assemblymember when the legislature agreed to appoint him – over the objections of then Governor Spitzer – to replace Alan Hevesi who has been forced to resign as Comptroller. The assumption was that the Assembly would seek to protect him. We felt however, that if we could get 50 legislators to co-sponsor the divestment bill, it would be enough of a signal to DiNapoli that he should divest on his own.

In the end, we were almost at 100 legislative sponsors before DiNapoli finally agreed to divest – with a helping hand from Governor Andrew Cuomo.

Senator Liz Krueger had been a long-time colleague of mine in the anti-hunger movement. When the Democrats finally got a majority in the State Senate, she became chair of the Finance Committee. She agreed to be the lead sponsor (and main legislative strategist) in the Senate. Her staff person, Justin Flagg, was an invaluable participant in the campaign.

On the Assembly side, Felix Ortiz of Sunset Park in Brooklyn was chair of the Assembly Task Force on Food, Farm and Nutrition Policy when I first began working for Hunger Action Network. He readily agreed to become our first legislative sponsor. The first version of the bill was drafted in 2015. (Subsequent versions were amended to address concerns raised by legislators and the Comptroller.)

In addition to the usual argument about fiduciary duty, DiNapoli (as well as Stringer) argued that divesting would undercut their ability to engage in shareholder advocacy, introducing resolutions in fossil fuel companies to force them to be better on climate. While shareholder advocacy has value, it is also very limited in what it can do and has not had much success, especially on climate, over decades of efforts. Security Exchange Commission rules prohibit shareholder

resolutions on the core business of the company. Thus, you can pass resolutions to add more women to the board and to adopt statements against discriminations against gays (something that DiNapoli was unsuccessful in getting Exxon to do) but you can't tell Exxon to stop developing fossil fuels.

DiNapoli did finally get a resolution passed to have Exxon examine the risk posed by climate change but even had to admit the so-called study they produced was not very informative. And some of his shareholder advocacy partners such as the Bank of England finally admitted that it was not working and began to move towards divestment instead.

The state divestment campaign developed fact sheets, sign on letters, and rallies, as well as trying to bird dogging DiNapoli when he made public appearances. It was a slow though steady process of adding additional legislative sponsors. Senator Kruger agreed to organize several well-attended legislative hearings and roundtables on the issue, including getting the Comptroller's staff (but not him) to testify.

At the end of 2016, 350.org's national office made New York divestment a key strategic priority, helping launch the DivestNY coalition. They eventually decided to allocate significant staff time to the effort, particularly Richard Brooks, their North American divestment organizer. 350.org had long provided critical staff support, both with the global campaign effort and with financial analysis. They also helped obtain funding for a part-time organizer in the months before DiNapoli agreed to divest. 350.org also contracted with Corporate Knights, a financial investment firm in Canada, to analyze how well the pension funds in fossil fuels were doing. (Both the city and state campaigns spent considerable time documenting how many billions were invested in the various fossil fuel companies). A second study that Corporate Knights did on their own found that if the state had divested when DiNapoli first became Comptroller, that value of the pension fund would have had more than \$22 billion higher.

For years, DivestNY met semi-monthly to coordinate the campaigns. Ruth Foster and then Jordan Dale stepped up to provide coordination of the effort. Considerable resources were devoted to lining up bill sponsors. Lobby days were organized in Albany several times a year. DivestNY probably held New York's first virtual lobby day ever on March 17, 2020. The state had gone into COVID shutdown a few days before a scheduled DivestNY lobby day with more than 40 legislative visits scheduled; DivestNY was able to turn almost all of them into virtual meetings.

DivestNY maintained a shared legislative spreadsheet online for use by participants. The spreadsheet identified who were already sponsors and the targets for new sponsors. Anyone meeting with a legislator was asked to enter that information into the spreadsheet (date, name, who actually met with, response, what follow-up was needed). That was invaluable in tracking the legislative push. Meetings were held both in Albany as part of organized lobby days and back in local district offices with local constituents. Facts sheets, bill memos, and talking points were provided to participants.

DivestNY solicited organizational endorsements, including asking the groups to provide memos of support that DivestNY collected and distributed to key legislators and staff. For instance, in June 2017, 220 elected officials from 50 counties across New York State released a letter urging DiNapoli to divest.⁹⁰³ It also targeted the faith community.

One disappointment was that many of the groups who were active in the New York City divestment campaign were less active in the statewide effort after Stringer announced his support, though several of the groups moved on to the Stop the Money Pipeline Campaign to focus on banks and others in the city investing in fossil fuels.

One major addition was New York Youth Climate Leaders, a statewide group mainly of high school students. For several years, they made divestment their key focus and had a high energy level.

⁹⁰³ <https://www.timesunion.com/business/article/More-than-200-lawmakers-call-for-state-pension-11197256.php>

They brought a much-needed level of optimism and passion to the effort. Their lobbying efforts helped bring in several dozen new sponsors. Legislators also took the young activists seriously, sometimes more seriously than older activists whom they have gotten used to meeting with and then politely ignoring. The youth leaders were also more willing to confront recalcitrant legislators.

I decided to run for State Comptroller in 2018 as the Green Party candidate to focus on the issue of divestment. I got the endorsement of 350.org and Food & Water Watch. While the media – and public – paid minimal attention to the race, it did bring some additional attention to the divestment issue. Also, a number of reporters, especially those based at the state Capitol, included divestment in their interviews with DiNapoli. I also organized a weekly phone-in to the Comptroller’s office in the last two months of the campaign and also distributed 10,000 postcards with information about divestment.

As noted earlier, DiNapoli had agreed with Governor Cuomo to establish a decarbonization advisory panel. In April 2019, the panel released its recommendations urging overhaul of the fund’s investment strategy and new standards to reduce climate risk. While DiNapoli had stuffed the committee with supporters of shareholder strategy, its recommendations pushed a ten-year decarbonization plan that aligned with many of the principles of divestment, although on a slower timeline. It did call however, for an immediate divestment on coal.⁹⁰⁴

In February 2020, Extinction Rebellion held a sit-in in DiNapoli’s office, with eleven people (including me) arrested. The protest did receive some national attention and reportedly irked DiNapoli.⁹⁰⁵

The decarbonization report along with increased attention to climate at the state and national level did push DiNapoli to look at how to reduce the carbon footprint of the pension fund. In July 2020, he announced that he was divesting from 22 coal companies. This

⁹⁰⁴ <https://350.org/press-release/divest-ny-decarbonization-report/>

⁹⁰⁵ https://www.youtube.com/watch?v=6_a0AkUEHik

opened to the door in the summer of 2020 to DivestNY to start discussions with the Comptroller how about to “make him a climate champion.”

A few months later New York State Senator Liz Krueger took over the negotiations, saying she would withdraw the bill (even though it was now close to having a majority in both houses) if an agreement supporting divestment could be reached. In December 2020, the Comptroller announced a plan to decarbonize the fund by 2040 and divest from the riskiest oil and gas companies.⁹⁰⁶

As a result, the fund has divested from a number of companies, although a decision is still pending related to major oil and gas companies such as Exxon. The Comptroller had more than a billion dollars invested in Exxon when the campaign started.

Despite the large number of sponsors for the state bill, it never moved out of a committee, let alone passed either house. The major problem was the opposition, often behind the scenes, of the statewide public employees’ unions. They were concerned about giving the governor any role overseeing the pensions, since prior governors had on occasion sought to raid the funds to deal with budget emergencies. They were also asked to oppose the bill by DiNapoli, who was the sole trustee, and whose support they courted.

The unions opposed it even though their pensions were not at risk. New York is unique in having a constitutional requirement that public pensions are treated as contracts, so even if there was a shortfall, taxpayers would have to make up the difference. The campaign did get the AFL-CIO central labor councils in the Capital District, which represents many state workers, to pass resolutions in favor of divestment.

The DivestNY campaign is now focusing on getting the N.Y.S. Teachers’ Retirement System to divest.

Some additional perspective and insight on the New York divestment effort is provided by Clara Vondrich, who was Director of

⁹⁰⁶ <https://gofossilfree.org/ny/press-release/divest-nys-victory-2020/>

Divest/Invest Philanthropy (and previously a 350NYC steering committee member).⁹⁰⁷ There were many key individuals and organizations that participated throughout the campaign, with quite a few marathon runners along with a strong relay team.

⁹⁰⁷ <https://350nyc.org/history-of-the-350nyc-campaign/>

CHAPTER 15

CLIMATE LITIGATION AND ELECTIONS

I decided well before I graduated from law school that being an attorney was not the career I wanted to pursue. I soon realized that cases that broke new legal ground – like ending segregation in schools or reproductive freedom for women – were few and far between. Courts primarily apply existing laws to particular factual situations, and I learned from my five years with the New York Public Interest Research Group (NYPIRG) that it's those with the largest campaign donations normally write laws.

When asked by a law professor to explain the legal reasoning behind a U.S. Supreme Court decision siding with a railroad company against a little old lady, I observed that the court sided with rich corporation. When the professor remarked that was a rather simplistic explanation, I replied that such an analysis was invariably correct and avoided the need to read through hundreds of pages of convoluted legal reasoning. At least the professor never called on me again.

Despite all that, I have long felt that the courts might end up being what saves the world from climate collapse, since it was clear that the wealth of the fossil fuel companies dominated the legislative and executive processes. Courts in other parts of the world, particularly Europe, have a more extensive record than in the U.S. of being willing to utilize their powers to adapt to an ever-changing world and provide legal solutions that benefit humanity. The hope is that there will be a court somewhere with the courage to intervene to save life on the planet. Once a respected court opens the door to climate action, others will follow.

It was my organizing with the Association of Community Organizations for Reform Now (ACORN) in the late 1970s that first highlighted for me the importance of elections. ACORN always focused on power and innovative ways to obtain it. Since elections are one of the main ways that power is obtained and exercised in the United State, ACORN always integrated an electoral strategy into their organizing efforts right from the beginning.

For example, in Arkansas, where ACORN started, the County Judge leads in adopting the local budget. ACORN recruited scores of its members to become Justices of the Peace – which also gave the members a little income for performing various official services. When the County Judge convened the annual budget meeting, he was stunned to be confronted by a roomful of ACORN members who had a vote in its final adoption.

ACORN decided to launch the People's Party in the late 1970s. The new public campaign finance rules provided that presidential candidates would qualify for matching funds if they raised \$5,000 in each of 20 states. ACORN decided to rapidly expand to 20 states by 1980. I volunteered to start Arizona ACORN in 1978, forgetting how conservative the state was until I crossed the state line and saw that I was on the Barry Goldwater Memorial Highway. Goldwater was the conservative Republican presidential nominee who was handily defeated by Lyndon Johnson in the 1964 election. He paved the way however, for conservatives to win power with Ronald Reagan in 1980, a watershed moment in American politics.

When ACORN was unable to move its two most critical allies – unions and black churches – out of the Democratic Party, they folded back in. I volunteered to return to Des Moines to organize the Iowa caucuses for ACORN to support Senator Ted Kennedy, who was challenging President Carter in the Democratic Party caucus. I left ACORN after Iowa to become the national organizer for the Campaign for Safe Energy, pushing to get the presidential candidates in both major parties to oppose nuclear power and embrace renewable energy.

A number of us in ACORN did not agree with its decision to rejoin the Democrats. Several of us left to help launch the Citizens Party (CiP), which ran well-known environmentalist scientist Barry Commoner for president in 1980. A former ACORN organizer, the late Bert DeLeeuw, became the Executive Director of CiP.⁹⁰⁸

ACORN did, however, continue to support the idea of a third party. After supporting Jesse Jackson and the Rainbow Coalition's effort in 1984 and 1988, in the early 1990s ACORN helped launch the New Party which sought to use fusion as their principal strategy, running candidates on more than one party line.⁹⁰⁹ They sought to replicate the efforts of the Populist Party in the late 1890s.⁹¹⁰ However, the success of the Populist Party had led many states to ban fusion and when the U.S. Supreme Court upheld the legality of state bans on fusion, the New Party folded. ACORN shifted its electoral staff to New York, which still allowed fusion, to launch the Working Families Party (WFP). Both the Greens and WFP first achieved official party status due to their vote totals in the 1998 gubernatorial campaigns.

After the 1980 elections, I moved back to Albany, NY, to engage in community organizing and building the Citizens Party. The city of Albany is the home of arguably the strongest Democratic political machine in the U.S., even surpassing Chicago. The silver lining was that in order to challenge the Albany Democrats, one had to really sharpen your electoral skills. I used many of the organizing techniques from ACORN, starting with how to create door knocking lists of the voters on index cards (something a smartphone can handle these days). Over the next several years, I helped friends win in Democratic Party primaries and then managed campaigns for the Citizens Party in the general election.

⁹⁰⁸ <https://greenpagesnews.org/the-citizens-party/>;

<https://www.commondreams.org/news/1990/11/18/lost-dreams-bert-deleew>

⁹⁰⁹ [https://en.wikipedia.org/wiki/New_Party_\(United_States\)](https://en.wikipedia.org/wiki/New_Party_(United_States))

⁹¹⁰ <http://projects.vassar.edu/1896/populists.html>

When I moved across the Hudson River to Rensselaer County, it was much easier to win elections since the local parties did not have the organizing strength or campaign skills of the Albany Democrats. When the Citizens Party fizzled out after the 1984 presidential election, I began to organize the Green Party in New York in the late 1980s.

In the early 1990s, I was elected to the Poestenkill Town Board as a Green with the backing of the Democrats. Poestenkill is an overwhelmingly Republican community in the Hudson Valley that is a mixture of a rural Appalachia and a suburban development. Gravel mines, taxes, and garbage were the decisive issues. I won the Democratic primary for State Assembly in 1992 while also running as a Green (New York allows fusion, a strategy which the Greens later decided to reject). Over several decades I managed a series of Green Party races for Governor, U.S. Senate, and President, along with numerous campaigns for local offices.

Senator Bernie Sanders 2016 presidential campaign, with its call for a people's revolution and semi-socialist principles, inspired a new generation of young electoral activists. Many of them gravitated to the long-standing but rather moribund Democratic Socialists of America (DSA).⁹¹¹ Young people combined passion and energy with a high level of understanding of electoral mechanics they gained from Sanders' campaign. I will talk more about DSA later in this chapter. Their big breakthrough was with the victory of Alexandria Ocasio-Cortez in a June 2018 Democratic congressional primary in New York City. Ocasio-Cortez, in addition to her life story, intelligence, and hard work, raised the use of social media in elections to a new level. Her decision to join the Sunrise Movement in occupying Speaker Pelosi's office even before taking her seat elevated the Green New Deal to the stratosphere.

⁹¹¹ https://en.wikipedia.org/wiki/Democratic_Socialists_of_America;
<https://inthesetimes.com/article/bringing-socialism-back-how-bernie-sanders-is-reviving-an-american-traditio>

Litigation

With legislative bodies dominated by fossil fuel campaign donations and in gridlock with partisan divisions (especially in Congress), climate advocates are increasingly turning to the courts in the effort to halt the burning of fossil fuels.⁹¹²

Courts are often instrumental in local climate campaigns, such as denying permits for fossil fuel infrastructure such as pipelines. Environmentalists often sue government agencies for failing to comply with the environmental review process. Opponents of local renewable energy projects have also used litigation as a last resort.⁹¹³

There are significant limitations to climate litigation. The court's role is to enforce existing laws and constitutional provisions, not make new laws or policies. There are restrictions on who can bring litigation. Many individuals and groups lack standing, meaning that many individuals and groups are not uniquely harmed by particular actions to allow them to be plaintiffs.⁹¹⁴ Courts are also restrictive in the forms of remedies they are willing to order. Courts are slow and expensive, requiring attorneys and the use of outside experts, especially in a complex case involving climate change.

Broad climate litigation is usually done by larger groups with substantial funding for such efforts. Groups can try to find a free attorney to fight individual projects (for example to challenge permits), but normally will have to raise significant funds to pay an attorney (often at a discounted rate) and associated costs (filing fees, copying).

⁹¹² https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2021/07/Global-trends-in-climate-change-litigation_2021-snapshot.pdf

⁹¹³ <https://www.winston.com/en/thought-leadership/how-environmental-litigation-can-block-renewable-projects.html>

⁹¹⁴ https://www.americanbar.org/groups/public_education/publications/insights-on-law-and-society/volume-19/insights-vol--19---issue-1/standing--who-can-sue-to-protect-the-environment/

Lawsuits that seek damages for harm caused by the defendants (tort actions)⁹¹⁵ may be taken on by attorneys who are willing in exchange for a percentage of any damages won. Some groups pursuing a climate litigation strategy aim to get to the point where victories against fossil fuel polluters are likely enough that they convince deep-pocketed law firms that specialize in tort litigation to take on the case. Such tort law firms have played a critical role in holding chemical companies liable for the damage their products have caused.⁹¹⁶ Tort law was also used to fight tobacco companies.⁹¹⁷

Still, courts have occasionally been willing to tackle issues that legislatures often fail to deal with due to the level of controversy. The U.S. Supreme Court, for instance, ruled against segregation in *Brown vs. Topeka Board of Education*, authorized same sex marriages, and for half a century protected abortion rights (until a shocking reversal by a partisan, conservative court). Courts in other countries have often been more progressive, such as recognizing the rights of animals and nature.⁹¹⁸

Fossil fuel companies are also increasingly using litigation to fight back against policies that seek to restrict their operations, including seeking reimbursement for the decreased value of the fossil fuel infrastructure and reserves. As of 2021, fossil fuel companies were suing various countries for \$18 billion to recover “lost profits.”⁹¹⁹ One reason the Obama Administration and other governments fought against mandatory emission cuts in the Paris Climate Accords was their worry that it would open the U.S. to liability from fossil fuel companies, including under the provisions of the various global trade agreements that give corporations the power

⁹¹⁵ <https://www.tortmuseum.org/what-is-tort-law/>;

<https://scholarship.law.vanderbilt.edu/vlr/vol46/iss1/1/>

⁹¹⁶ <https://www.nytimes.com/2016/01/10/magazine/the-lawyer-who-became-duponts-worst-nightmare.html>; <https://news.bloomberglaw.com/environment-and-energy/dozens-of-chlorpyrifos-lawsuits-coming-over-childrens-health>

⁹¹⁷ <https://www.tortmuseum.org/the-tobacco-cases/>

⁹¹⁸ <https://insideclimatenews.org/news/19092021/rights-of-nature-legal-movement/>

⁹¹⁹ <https://www.business-humanrights.org/en/latest-news/fossil-fuel-firms-sue-governments-across-the-world-for-13bn-as-climate-policies-threaten-profits/>

to challenge regulations by national governments that impede their operations.⁹²⁰

In 2022, the Intergovernmental Panel on Climate Change (IPCC) recognized the role of litigation in affecting “the outcome and ambition of climate governance.”⁹²¹ The number of climate change-related cases is more than two thousand. This has doubled since 2015, with one-quarter filed between 2020 and 2022. Seventy-three are “framework” cases challenging governments’ overall responses to climate change. Many cases, especially outside of the U.S., are challenging fossil fuel companies, with other corporate targets in the food and agriculture, transport, plastics, and finance sectors. The Grantham Research Institute reports that key areas for future litigation will involve “personal responsibility; challenging commitments that over-rely on greenhouse gas removals or ‘negative emissions’ technologies; short-lived climate pollutants; the climate and biodiversity nexus; and strategies exploring legal recourse for the ‘loss and damage’ resulting from climate change.”⁹²²

There have been some recent victories that give hope that the courts are becoming more open to ordering climate action. In 2021, the District Court of The Hague ruled that the energy company Royal Dutch Shell must reduce its carbon emissions by 45% compared with 2019 levels over the next nine years, finding that the current high level of emissions might contribute to imminent environmental harm to Dutch citizens.

The Federal Constitutional Court in Germany, the world’s seventh largest emitter of greenhouse gas, ordered the government to adopt a clearer strategy towards achieving its climate targets after 2030. A ruling in 2020 required the Irish government to detail its climate mitigation plan, including how to meet the goal of cutting

⁹²⁰ <https://www.theguardian.com/environment/2021/nov/03/secretive-court-system-poses-threat-to-climate-deal-says-whistleblower>

⁹²¹ <https://blog.ucsusa.org/delta-merner/how-the-latest-ipcc-reports-can-strengthen-climate-litigation-efforts/>

⁹²² <https://www.lse.ac.uk/granthaminstitute/publication/global-trends-in-climate-change-litigation-2022/>

emissions by 80% by 2050. A 2015 decision ordered the Dutch government to lower domestic greenhouse-gas emissions by at least 25% by the end of 2020.⁹²³

An increasing number of lawsuits are being filed to hold fossil fuel companies liable for the damages caused by burning fossil fuels even though they knew it was contributing to global warming. It is difficult however for science to determine the level of damage caused by any one particular emitter and to assign damages. In the case against Royal Dutch Shell — and in climate suits against governments — plaintiffs chose to focus on getting the defendants to mitigate looming climate risks, rather than seeking compensation for harm already suffered.

A 2021 report from the United Nations Environment Programme (UNEP) and the Sabin Center for Climate Change Law at Columbia University found that recent trends in climate litigation include: “Violations of ‘climate rights’, i.e. cases are increasingly relying on fundamental human rights including the right to life, health, food, and water; Failures of governments to enforce their commitments on climate change mitigation and adaptation; and, Greenwashing and non-disclosures, when corporate messaging contains false or misleading information about climate change impacts.”

UNEP expects climate litigation to increase with respect to companies misreporting climate risks, governments failing to adapt to extreme weather events, and cases seeking to enforce previous court decisions. A rise is also expected in cases concerning persons displaced by climate change impacts.⁹²⁴

In March 2023, the UN General Assembly passed a resolution requesting the International Court of Justice to issue an advisory opinion on the legal obligations of nations with respect to climate change. It asked the Court to clarify governments’ obligations to protect the “climate system” for “present and future generations,” and

⁹²³ <https://www.nature.com/articles/d41586-021-02424-7>

⁹²⁴ <https://www.unep.org/news-and-stories/press-release/surge-court-cases-over-climate-change-shows-increasing-role>

what governments' responsibilities are for "acts and omissions" that have caused harm to the climate, especially for harm to "particularly vulnerable" small island developing countries such as the Pacific Island nation Vanuatu which initiated the resolution.⁹²⁵

In August 2022, a U.S. federal appeals court ruled that a pair of lawsuits by Hoboken, New Jersey, and the State of Delaware to hold oil companies accountable for climate change should be heard in state courts, striking down efforts by the fossil fuel industry to move the cases to federal judges. More than 20 similar lawsuits seeking damages have been filed in the last five years, mainly using state level tort laws. In addition to fighting lawsuits on jurisdictional grounds, the fossil fuel industry is pushing for states to pass laws that would block municipalities from suing companies for damages related to climate change.⁹²⁶

In November 2022, more than 60 Puerto Rican municipalities, which were decimated by Hurricanes Irma and Maria in 2017, filed suit against Shell and other fossil fuel producers in a first-of-its-kind, class action climate liability lawsuit under RICO, the criminal racketeering act. Desmog reported that the lawsuit "alleges that the fossil fuel defendants engaged in a coordinated, multi-front effort to promote climate denial and defraud consumers by concealing the climate consequences of fossil fuel products in order to inflate profits." RICO has been successfully used to hold tobacco companies liable for lying about the health hazards of smoking.⁹²⁷

In February 2023, ClientEarth filed a lawsuit in England against the 11 directors of Shell Oil Company. According to *The Guardian*, it was the first case where the plaintiffs "are seeking to hold corporate

⁹²⁵ <https://insideclimatenews.org/news/29032023/climate-change-international-court-rulings/>

⁹²⁶ <https://www.npr.org/2022/08/18/1118188330/federal-judges-deal-the-oil-industry-another-setback-in-climate-litigation;>
<https://www.acslaw.org/expertforum/the-essential-role-of-state-courts-in-addressing-climate-harms;>

⁹²⁷ <https://www.desmog.com/2022/12/02/puerto-rico-climate-liability-lawsuit-racketeering-fraud-shell-bp-chevron-exxon/>

directors liable for failing to properly prepare their company for the net zero transition. A global transition to low-carbon energy is inevitable as world governments act to end the climate crisis and Shell's failure to move fast enough threatens the company's success and would waste its investors' money on unneeded fossil fuel projects."⁹²⁸

One recent development is that non-fossil fuel companies are increasingly worried about facing litigation over their potential failure to adequately respond to the climate crisis. This is partially a result of the Securities and Exchange Commission and regulators in other countries developing rules to require large companies to disclose their climate-related risks.⁹²⁹

Children's Climate Litigation

In 2015, several dozen youth working with Our Children's Trust filed a climate lawsuit, *Juliana v. United States*, asserting that since the federal government's actions in permitting fossil fuels are a cause of climate change, it has violated the youngest generation's constitutional rights to life, liberty, and property, as well as failed to protect essential public trust resources. That lawsuit is still seeking to be heard, having survived various court rulings.⁹³⁰

Our Children's Trust has launched youth-led climate legal actions in all 50 states over the past decade, with legal actions pending in seven states.⁹³¹ In August 2023, in a groundbreaking decision, a state judge ruled that Montana had violated the children's state constitutional right to "a clean and healthful environment" by

⁹²⁸ <https://www.theguardian.com/environment/2023/feb/09/shell-directors-personally-sued-over-flawed-climate-strategy>

⁹²⁹ <https://www.eenews.net/articles/fear-of-climate-lawsuits-spread-beyond-fossil-fuel-industry>

⁹³⁰ https://en.wikipedia.org/wiki/Juliana_v._United_States

⁹³¹ <https://www.ourchildrenstrust.org/state-legal-action>

promoting fossil fuel development without considering how those projects contribute to climate change.⁹³²

These lawsuits were inspired by a successful class-action suit in the 1990s by 43 students against the Philippine government to protect a forest surrounding their village. It was based on the Public Trust Doctrine, which is based on common law arising out of the Romans in the sixth century. It holds that air, water, and beaches are common property which is not owned by anyone and instead belongs to people as a whole, requiring states to manage certain natural resources for the benefit of the public. While the concept has traditionally been used to manage water resources, recent lawsuits have sought to expand the doctrine to include natural resources that have been impacted by climate change.⁹³³

Fossil Fuel Companies Sue Opponents

Fossil fuel companies have used the legal system in both the United States and abroad to suppress the rights of those who speak out against what such companies have done and are doing.

In the U.S., Earth Rights has identified more than 150 cases in the last decade where the fossil fuel industry filed strategic lawsuits against public participation (SLAPPs) and other judicial harassment tactics such as subpoenas in attempts to intimidate its critics in the U.S. This is part of a broader global trend of trying to restrict public debate, retaliating against those who seek to publicly speak in favor of the public interest, like Steven Donziger who was subjected to nearly 1,000 days of house arrest as part of a years-long legal ordeal that began after he successfully sued Chevron on behalf of 30,000 Ecuadorian Amazonian Indigenous people.⁹³⁴

⁹³² <https://insideclimatenews.org/news/15082023/montana-youth-climate-lawsuit-ruling-big-deal/>; <https://www.ourchildrenstrust.org/montana>

⁹³³ <https://nationalaglawcenter.org/the-public-domain-basics-of-the-public-trust-doctrine/>

⁹³⁴ Democracy Now, <https://www.youtube.com/watch?v=OZ2CC25AG1k>

One case involved Energy Transfer Partners who were seeking to build the Dakota Access pipeline (DAPL) in North Dakota. They sued Greenpeace, various other climate groups, and Indigenous water protectors for the Standing Rock protests. Contending the defendants were part of a “network of putative not-for-profits and rogue eco-terrorist groups,” the company sought \$900 million in damages under the RICO Act, a law created to fight the mafia.

In 2016, Exxon retaliated against investigations into its alleged fraudulent climate change practices by the attorneys general of New York, Massachusetts, and the U.S. Virgin Islands by suing their attorney generals, slapping various nonprofit organizations and climate change experts with broad subpoenas, and threatening to depose 17 other state attorney generals. The industry hopes to use such harassment to force groups to divert their limited resources into responding while making groups fearful of working together.⁹³⁵

The Role of Elections

Elections are how democracies are supposed to decide who gets to make decisions for the rest of us.

Globally, elections have been critical to climate action. The U.S. pulled out of the Paris Climate Accords after Donald Trump was elected President. In Australia in May 2022, following massive wildfires, voters ousted the conservative coalition that had championed coal and gas and made Australia one of the climate laggards of the world. Within weeks, a new government updated the country’s international climate targets under the Paris Accord. The fate of the Amazon – and democracy - hung in the balance in the November 2022 elections in Brazil, as progressive challenger and former Brazilian president Luiz Inácio Lula da Silva defeated conservative incumbent Jair Bolsonaro.⁹³⁶

⁹³⁵ <https://earthrights.org/publication/the-fossil-fuel-industrys-use-of-slapps-and-judicial-harassment-in-the-united-states/>

⁹³⁶ <https://www.nytimes.com/2022/10/11/climate/elections-climate-change.html>

Climate has been a key factor in a number of recent European countries such as Switzerland⁹³⁷ and Sweden⁹³⁸ (the latter in the 2018 elections facing the smoke from fires in the arctic). Globally, the Green Party has been able to use their presence in a number of coalition governments to advance climate matters. Support for the Greens has surged as many voters make climate more of a priority.⁹³⁹

While there are numerous problems with America's electoral systems, elections are still the generally agreed upon way to decide how we will be governed. A change in a few seats in Congress, a state legislature, or local government can be critical in determining which party is in control and willing to advance climate initiatives. Electing a few more committed climate activists can also be instrumental in prodding the Democratic Party to be bolder.

One study found that the Democrats' endorsement of the Green New Deal provided a two-percentage point increase in their vote share in the 2020 Congressional elections.⁹⁴⁰

Limits on U.S. Democracy

Election districts in many states and communities are heavily gerrymandered, drawn so that in most cases you know which of the major parties will win. One exception is for races that cover the entire jurisdiction, such as statewide races for the U.S. Senate. Thus, for climate activists, running climate activists in Democratic primaries can be an effective way to prod the Democratic Party leadership to be stronger on climate action. Many climate activists also focus on the limited number of seats nationwide that will determine which party controls the Senate and House.

⁹³⁷ <https://onlinelibrary.wiley.com/doi/full/10.1111/spsr.12520>

⁹³⁸ <https://www.bnnbloomberg.ca/hottest-summer-bumps-up-climate-fight-in-swedish-election-race-1.1121800>

⁹³⁹ <https://www.cfr.org/background/under/how-green-party-success-reshaping-global-politics>; <https://www.zmescience.com/science/climate-change-driving-green-voting-across-europe-07022022/>

⁹⁴⁰ <https://journals.plos.org/climate/article?id=10.1371/journal.pclm.0000043>

The U.S. is one of only three democracies in the world which use a winner-take-all system (the one with the most votes win), rather than the more standard system of proportional representation, where legislative bodies are determined by the percentage of votes each party gets. Proportional representation creates legislative bodies that are more reflective of the ideological makeup of the citizenry.

The U.S. is unique in that it shoehorns all political positions into two main parties, the Democrats and Republicans. The United States also enables an outsized role for campaign donations which enables the wealthy and corporate interests to dominate the electoral process.⁹⁴¹

The problem is even worse at the federal level, as the wealthy male landowners who devised the constitution sought to balance the interests of small states and large states, which included protecting the powers of the slave states. This led to the Electoral College, which in recent decades has resulted in Republicans who won the White House with a minority of votes nationwide. The founding fathers – who excluded women, slaves, nonlandowners and Indigenous people – were also worried about the power of the “common man” to rapidly change political leaders, so they created the U.S. Senate, which is not only inherently undemocratic (two members per state regardless of the number of residents) but has six-year terms to guard against the more mercurial House of Representatives, which is elected every two years.

In recent decades Congress has been so dominated by partisan gridlock that it seems unable to function, particularly when the Democrats are in charge, since they are both more politically diverse than Republicans and more restrained in exercising power when they have slim majorities.

The design of America’s electoral system promotes the creation of two centrist parties and then the role of the money shifts it further to the right. The lack of third parties in the U.S. means that there are

⁹⁴¹ <https://www.brennancenter.org/issues/reform-money-politics/influence-big-money>

less avenues for innovative ideas and alternatives to be raised, a major problem for any democracy but particularly on climate action.⁹⁴²

Still, throughout American history it has often been third parties that raised issues that proved popular enough with voters that eventually the mainstream parties came to accept them. This includes issues such as abolishing slavery, giving women the right to vote, social security, establishing a minimum wage, authorizing same sex marriage, and creating unemployment compensation.⁹⁴³

What is Going on with the Republicans?

While the GOP has long been dominated by climate deniers, in the 2022 midterm elections they sought to project a more even-handed approach. Few bought their spin. *Politico* responded to a climate plan released by Congressional Republicans by noting that they “continue to resist setting a specific emissions reduction target. They oppose policies to reduce fossil fuel use, including regulations, taxes, or mandates. And Graves said House Republicans, unlike at least some GOP counterparts in the Senate, are skeptical of the government extending and expanding clean energy tax credits that the renewable industry says are critical to helping them deploy zero-carbon power at the scale needed to address climate change.” The *Washington Post* added, “It is unclear whether the GOP plans would, in fact, reduce carbon emissions, or if they instead largely amount to an attempt to deflect political blame over Republicans’ long-standing opposition to addressing catastrophic global warming.”⁹⁴⁴

However, a February 2023 report found that so-called red states had done a better job at adding electricity from solar and wind than

⁹⁴² <https://www.washingtonpost.com/business/2021/03/01/break-up-two-party-system/>

⁹⁴³ https://www.pbs.org/newshour/politics/politics-july-dec04-third_parties

⁹⁴⁴ <https://democrats.org/news/fact-check-the-gop-is-still-the-party-of-climate-deniers/>

the blue states, with Iowa, Oklahoma, Florida, and Texas leading the way.⁹⁴⁵

Roger Karapin, a political scientist at Hunter College and the Graduate Center at CUNY, provided some interesting insights into the Republican Party growing opposition to climate action.⁹⁴⁶ One hopeful point he made is that the parties will shift their positions if enough voters have moved in a particular direction. He noted that majorities of Republican voters support various climate proposals, including tougher carbon emissions limits and a carbon tax to be paid by fossil fuel companies. More than 70% of voters support expanding wind and solar energy, and only 10-35% favor using more coal or natural gas.

Karapin notes that at the turn of the century, Republican leaders were willing to take up the climate issue: “President George W. Bush initially favored carbon dioxide regulation, and moderate Republican leaders supported a national emissions trading system. But the national GOP turned hard against climate policy once Barack Obama was elected President, committing to the fossil fuel industries, and promoting an economy based on low-cost, fossil fuel energy. On this and other issues (same-sex marriage, guns, abortion bans), Republicans committed to a base mobilization strategy even though its positions were unpopular with a majority of the public. They combined this base mobilization strategy for winning elections with the pursuit of a minority-rule strategy within constitutional rules (e.g., electoral college, voting rules in U.S. Senate). And under Donald Trump’s leadership, they began overturning traditional rules for deciding elections in order to take power.”

While the Democrats now publicly acknowledge the realities of climate change and the reasons for it, they have remained reluctant to

⁹⁴⁵ <https://www.theguardian.com/environment/2023/feb/26/red-states-lead-usa-renewable-energy-wind-solar-power>

⁹⁴⁶ <https://yaleclimateconnections.org/2022/07/the-nexus-between-the-climate-change-and-democracy-crises/>

directly confront the fossil fuel industry.⁹⁴⁷ They have failed to call for a halt to new fossil fuel infrastructure and their leaders have continued to promote an “all-of-the-above” energy strategy even while ramping up support for renewable energy. They have been quick to embrace speculative solutions supported by the fossil fuel industry, such as carbon capture and sequestration.

How to Influence Elections

There are various handbooks showing how groups can impact elections.⁹⁴⁸

One electoral activity that climate groups can do, even those which must be nonpartisan, is voter registration. One strategy is to target constituencies more likely to support climate action.

Groups can also use elections to raise the visibility of climate issues (for example, asking a climate question at a candidate debate or campaign event.) In 1980, I helped coordinate the national Campaign for Safe Energy to get the presidential primary candidates in both parties to address the issue of nuclear power and renewable energy, often handing out a list of possible questions to attendees at campaign events. We got the Democratic Party to put our positions into their national platform, the only platform issue President Jimmy Carter lost before the convention itself. In hindsight, a platform fight at the convention would have generated more publicity.⁹⁴⁹

Most climate groups that engage in electoral politics do so by endorsing candidates. The Sierra Club and the League of Conservation Voters are among the best known for their electoral

⁹⁴⁷ <https://www.currentaffairs.org/2022/04/do-democratic-politicians-understand-that-fossil-fuels-have-to-go>; <https://www.energyindepth.org/democratic-group-calls-for-party-to-reject-keep-it-in-the-ground-agenda-and-embrace-fracking/>

⁹⁴⁸ <https://commonslibrary.org/engaging-in-elections-and-building-community-power/>; <http://wellstoneclub.org/wp-content/uploads/2020/11/Politics-the-Wellstone-Way.pdf>

⁹⁴⁹ <https://www.washingtonpost.com/archive/politics/1980/06/24/democrats-adopt-plank-opposing-nuclear-power/212ac403-67d5-41f6-964c-d7759b5aafel/>

work, but others such as the Sunrise Movement, Food & Water Watch, and 350.org have also increasingly become active in elections. While IRS rules seek to prohibit 501c3 tax exempt nonprofits from directly impacting elections,⁹⁵⁰ the big groups have resources that enable them to easily set up additional organizational structures that enable electoral work.

Most political analysts would advise climate groups to maximize their impact by focusing on races that are likely to be close and where the groups' involvement can make a major difference. Especially critical would be races where the results could determine which party controls a legislative body.

Spirited challenges to incumbents can also have an impact. Politicians can become stronger on climate after a strong protest vote, to foreclose similar challenges in the future. While it was the intense organizing by grassroots groups that moved the New York Governor to ban fracking, the higher-than-expected election results by relatively unknown law professor Zephyr Teachout in the Democratic primary, followed by the 5% vote in the general election by the Green Party's Howie Hawkins (the best result in the state by a progressive third party in a century), were contributing factors.

In recent years, with the Republican Party's growing opposition to climate action, most climate groups almost exclusively endorse Democrats. Some environmental groups, especially the more moderate ones worry that with so many environmental groups being seen as appendages to the Democrats that it undercuts any potential of winning support for environmental measures from Republicans. The League of Conservation Voters, a more corporate-oriented group, has pursued a strategy of trying to move moderate Democrats and Republicans to support environmental causes for many years.⁹⁵¹

⁹⁵⁰ <https://www.irs.gov/charities-non-profits/charitable-organizations/the-restriction-of-political-campaign-intervention-by-section-501c3-tax-exempt-organizations>

⁹⁵¹ <https://www.csmonitor.com/Environment/Energy-Voices/2014/1025/Midterm-elections-Why-environmental-groups-are-backing-Republicans>

Other groups put out voting guides which rank candidates on their environmental performances.⁹⁵² Such rankings are a way to signal to voters who to support, and many candidates will publicize a positive ranking from well-known groups in their campaign materials. The media also pay attention to such rankings. One challenge in compiling an accurate scorecard is that in many legislatures almost all votes are done along party lines, so it is more of a ranking of the party than individual legislators.

While money remains the main fuel of elections, the second most important aspect is get-out-the-vote efforts such as door knocking, voter identification, phone banking, and organizing election day turnout. With the grassroots infrastructure of the national political parties largely eroding away in recent decades, even a minimal amount of such efforts by a climate group is greatly appreciated by politicians, and often rewarded by them being willing to embrace the group's legislative agenda.

Groups that endorse candidates for office usually have some form of questionnaire and interview process where they ask candidates where they stand on issues. Climate groups can ask their allies (including unions and other environmental groups) to include some specific questions related to climate. This also helps educate the candidates about the issue. Climate groups can also do their own survey of candidates on various climate issues and release the results to the public. However, groups that are not supposed to endorse candidates according to IRS rules need to be careful not to design the survey in such a way that it sends a clear message to support particular candidates. One way to do this is to include questions about other issues.

Groups can also share their policy positions with candidates, urging them to adopt them as their own (groups, especially 501c3 organizations, should probably send them to all candidates). Groups

⁹⁵² <https://insideclimatenews.org/news/21042022/voting-climate-change/>

can also hold a forum on climate and invite candidates to speak on climate (unless you are endorsing specific candidates, invite them all).

Climate Groups' Electoral Activities

While a number of climate groups endorse candidates, in recent elections Democratic Socialists of America (DSA) has focused on running their own candidates in Democratic primaries to provide leadership on their agenda rather than endorsing incumbents or other traditional challengers. They do intensive analysis of the candidates and the demographics of the districts before selecting only a few campaigns to devote all their resources to with the hope of winning.⁹⁵³ DSA is a long-standing organization that was revitalized by an influx of young organizers following the presidential campaigns of Bernie Sanders.

Their impact has been most noticeable in NYC, where they helped elect Congressman Alexandria Ocasio-Cortez, who defeated a powerful and generally well-liked incumbent in the primary. They have a passionate, committed volunteer base and a high level of mastery of electoral campaign techniques. They have elected a number of federal and state officials in New York, but their number of candidates remains relatively low. DSA has an ecosocialist working group⁹⁵⁴ to help build local power for climate and environmental justice, including the Green New Deal and public power.⁹⁵⁵

The Sunrise Movement has made a major commitment to electoral politics. While they devote considerable resources nationally to getting out the vote in support of Democrats in key close elections, they have also been willing to publicly confront and push Democratic Party leaders on climate change. In 2020, Sunrise contacted over 6.5 million voters in the primaries and general election, contributing to

⁹⁵³ <https://www.politico.com/states/new-york/albany/story/2021/11/24/climate-crisis-spurs-dsa-endorsements-in-2022-legislative-contests-1394892>

⁹⁵⁴ <https://www.dsasusa.org/working-groups/ecosocialist-working-group/>

⁹⁵⁵ <https://www.nysfocus.com/2020/10/12/nyc-dsa-electoral-powerhouse/>

what it says was the largest youth turnout in history. The group has played a critical role in a string of recent progressive primary victories, leading texting and phone banking operations for candidates like Jamaal Bowman, the middle school principal who defeated 31-year incumbent Eliot Engel in New York, and Cori Bush, who knocked off 10-term incumbent Lacy Clay in Missouri.

Sunrise also does considerable organizing campaigns outside of electoral politics and has shown an ability to mobilize a substantial number of young activists and to do creative direct actions, including against elected officials. Case in point: when newly elected Alexandria Ocasio-Cortez joined Sunrise activists sitting in Speaker Pelosi's office to demand action for a Green New Deal.⁹⁵⁶

For the 2022 midterm federal elections, a half dozen climate groups formed the Climate Votes project to invest \$100 million for multiple ad campaigns, as well as in-person field organizing in battleground states including Arizona, Nevada, Pennsylvania, Georgia, and others. The groups included Climate Power Action PAC, Climate Reality Action Fund, EDF Action Votes, League of Conservation Voters Victory Fund, NRDC Action Votes, and NextGen PAC.⁹⁵⁷ (A PAC, a political action committee, is organized for the purpose of raising and spending money to elect and defeat candidates.)

The Next Generation PAC has registered 1.3 million voters since its founding in 2013. Its founder, billionaire Tom Steyer, spent more money in the 2014 and 2016 elections than any other donor, supporting candidates with strong climate agendas. Besides running for President in the 2020 democratic primary, Steyer donated more than \$55 million to Democratic candidates and liberal causes in the 2020 campaign cycle — more than any other donor. NextGen Climate

⁹⁵⁶ <https://theintercept.com/2020/09/08/sunrise-movement-ed-markey-election/>; <https://thehill.com/policy/energy-environment/416411-youth-protectors-fill-nancy-pelosis-office-demanding-climate-change/>; <https://www.sunrisemovement.org/our-election-impact/>; <https://www.sunrisemovement.org/our-election-impact/>; see also <https://msmagazine.com/2022/09/20/youth-vote-gen-z-voters-midterms/>

⁹⁵⁷ <https://www.cnn.com/2022/06/06/politics/climate-groups-midterms-spending>

Action Committee spent \$40 million in the 2020 cycle, including more than \$8.5 million to support Democratic presidential nominee Joe Biden and oppose Donald Trump.⁹⁵⁸ Many climate activists, however, question how effective Steyer's spending has been, particularly the more than \$70 million he spent in 2014.⁹⁵⁹

Climate Hawks Vote, founded in 2013, is another political operation (a Super PAC) which supports candidates and elected officials that make climate action a top priority. It was co-founded by blogger and activist R.L. Miller, who as California Democratic Party's environmental caucus leader was frustrated that significant parts of the Democratic Party support fossil fuel. It also gives scores to elected officials based on their climate positions. It has a relatively small budget, however.⁹⁶⁰

As discussed earlier, fossil fuel companies invest heavily in campaign contributions. In the 2018 midterm elections, they made more than \$350 million in campaign contributions and lobbying expenditures – 13 times greater than renewable energy companies.⁹⁶¹ The U.S. Chamber of Commerce is the largest dark money, pro-fossil fuel trade association in the United States with an extensive history of supporting climate deniers and spreading misinformation about climate change. It spent nearly \$160 million on congressional lobbying in 2019-20.⁹⁶²

⁹⁵⁸ <https://www.factcheck.org/2020/07/nextgen-climate-action-nextgen-america/>

⁹⁵⁹ <https://www.latimes.com/nation/politics/la-na-steyer-environment-20141106-story.html>

⁹⁶⁰ https://en.wikipedia.org/wiki/Climate_Hawks_Vote

⁹⁶¹ <https://yaleclimateconnections.org/2020/01/fossil-fuel-political-giving-outdistances-renewables-13-to-one/>

⁹⁶² <https://climate-xchange.org/2021/07/30/fossil-fuel-industrys-influence-in-the-2020-congressional-elections/>

CHAPTER 16

CLIMATE AND THE MEDIA

This chapter first examines the role of the media in covering the climate issue. While mainstream media coverage of climate issues in the United States has somewhat improved in recent years, it has a long-term record of giving far too much coverage of climate denial. This chapter explores the various reasons for the media's poor coverage of climate issues, starting with the still increasing concentration of corporate ownership.

The second part explores ways that climate groups can increase media coverage of their work. *Be the Media*.

As the head of various non-profit organizations and community groups, I always developed a plan on how to increase media coverage, similar to the attention I paid to fundraising, staff supervision, advocacy efforts, and more. Like the first rule for fundraising, media coverage starts with asking, and then asking again

Many colleagues expressed surprise about the amount of media coverage groups I've been associated with have received. I always advised them to not to wait for the media to come to them. I also recommended they work on becoming a reliable asset for reporters. Reporters work on deadlines. They appreciate people who are either able to quickly provide the type of quote they need for their story or have the contact information for the person who can. Responding in a quick and timely fashion is often critical to generating media coverage.

Most media savvy groups generate most of their media coverage not through press conferences or media releases but by pitching stories to individual reporters and media outlets.

Climate groups need to create their own media, starting with mastering the various social media platforms. Understand which demographics pay attention to which platforms.

In order to generate more media coverage of the issues and groups I believe are important, for more than two decades I have produced a weekly public affairs program on various radio stations, often as part of the Pacifica Radio Network. I am a news producer and co-host for a nightly local news program on a community radio station in New York's Capital District. I am also a co-founder of the Hudson-Mohawk Independent Media Center, the local component of a worldwide movement that grew out of the Battle in Seattle, the 1999 global justice protest against the World Trade Organization (WTO).⁹⁶³

How the Media has Covered Climate

The American media has been widely criticized by giving far too much time to climate deniers and the false information campaigns of the fossil fuel industry, even when there was a scientific consensus that climate change was happening and it was caused by human activities, mainly burning fossil fuels.

Many in the media defend their performance on the grounds that they are supposed to provide balance, or equal coverage to both sides of the debate.⁹⁶⁴ Critics point to more revenue-focused business calculations, both as media companies have increasingly consolidated into a few massive corporate behemoths and since fossil fuel companies and other affiliated businesses are a major source of advertising dollars.⁹⁶⁵ Prestigious news outlets such as *The New York Times* and *Washington Post* for years sold ads in the form of paid statements by fossil fuel companies on their opinion pages.⁹⁶⁶ There

⁹⁶³ <https://en.wikipedia.org/wiki/Indymedia>

⁹⁶⁴ <https://ethics.journalists.org/topics/balance-and-fairness/>

⁹⁶⁵ <https://www.theguardian.com/environment/2019/apr/22/why-is-the-us-news-media-so-bad-at-covering-climate-change>

⁹⁶⁶ <https://www.teenvogue.com/story/fossil-fuel-branded-content>

has also been a decline in the number of journalists covering science issues.⁹⁶⁷

One study of over one hundred thousand articles documented that the American media gave too much weight to people who dismiss climate change, giving them an unearned legitimacy and posing serious danger to efforts aimed at raising public awareness and motivating rapid action. Most of the climate change skeptics covered by the media are not scientists, and the ones who are, have very thin credentials; often they are politicians. The problem is even worse with the rise of social media and blogs.⁹⁶⁸

Another study focused on three of the country's most influential news outlets – *The New York Times*, *Wall Street Journal*, and *USA Today* - over 30 years came to a similar conclusion. The study found the least-covered press releases came from groups with the most expertise on science and technology. “Rather than marginalize self-interested voices and give prominence to expert voices, these papers did just the opposite,” the study concluded.

As climate denial has fallen out of fashion, the media has shifted to coverage of climate delay, which seeks to put off large-scale efforts to address it, sometimes redirecting responsibility to consumers and emphasizing the downsides of urgent action. This includes the television and other media ads by fossil fuel companies touting their (minimal) investments in renewable energy, arguing that they're on top of the problem, they care, so that they can avoid the type of public pressure and ultimately political regulation that would force them to change at the pace that is needed.⁹⁶⁹

Chris Hayes, one of MSNBC's prime time cable television talk show hosts, claims that “every single time we've covered [climate change] it's been a palpable ratings killer. So, the incentives are not

⁹⁶⁷ <https://www.asc.asn.au/blog/2015/11/05/the-demise-of-science-journalism-and-rise-of-science-communication-2/>

⁹⁶⁸ <https://www.universityofcalifornia.edu/news/media-creates-false-balance-climate-science-study-shows>

⁹⁶⁹ <https://grist.org/climate/the-curse-of-both-sidesism-how-climate-denial-skewed-media-coverage-for-30-years/>

great.” Especially on television, where most Americans still get their news, the demands of ratings and money work against adequate coverage of the climate crisis, arguably the biggest story of our time.⁹⁷⁰

Recent Improvement in Climate Media Coverage

United States (and global) media coverage of climate has improved recently, prodded by climate activists who are increasingly willing to protest at media offices. One study found that news coverage of climate change in the U.S. reached an all-time high in 2021 and more intense language such as “climate catastrophe” and “climate emergency” is being used.⁹⁷¹ Climate groups have been urging metrologists, the “scientists” with the greatest public respect, to highlight the link between climate change and extreme weather events.⁹⁷²

Major national newspapers are starting to pay more attention to the climate – but local publications and local news are not. The four major broadcast networks spent just 142 minutes on climate change in 2019. And about half of Americans hear about global warming in the media once a month or less.⁹⁷³

The “both sides” approach to climate is now impacting on the issue of meat vs. plant-based diets on climate change. Research, as well as the Intergovernmental Panel on Climate Change (IPCC), is clear that to combat climate change and use the planet’s resources more sustainably, the world needs to produce less meat. The livestock industry is a major source of pollution, deforestation, and greenhouse

⁹⁷⁰ <https://www.theguardian.com/environment/2019/apr/22/why-is-the-us-news-media-so-bad-at-covering-climate-change>

⁹⁷¹ <https://allianceforscience.cornell.edu/blog/2021/12/us-media-coverage-of-climate-crisis-hits-all-time-high/>

⁹⁷² <https://www.theatlantic.com/science/archive/2022/02/weatherman-climate-change/621630/>

⁹⁷³ <https://www.theguardian.com/environment/2019/apr/30/what-will-it-take-for-the-media-to-focus-on-climate-change-in-the-2020-elections>

gas emissions. Yet newspaper coverage is still framing this issue as an open debate, including expert opinions alongside representatives of industry-friendly trade groups.⁹⁷⁴

The IPCC and the United Nations have addressed the issue of media coverage globally.⁹⁷⁵ Global media coverage of climate, across a study of 59 countries, has been growing: from about 47,000 articles in 2016-17 to about 87,000 in 2020-21. While the coverage of climate science has increased and become more accurate, “on occasion, the propagation of scientifically misleading information by organized counter-movements has fueled polarization, with negative implications for climate policy,” they conclude.

The IPCC says “explicit” attention to equity and justice by the media is important for both social acceptance and fair and effective legislation. It suggests by analyzing local contexts and social factors, journalists can create stories related to climate justice. For instance, the 2022 Durban floods and landslides in South Africa left nearly 450 dead and displaced some 40,000. Journalists’ coverage should incorporate the vulnerability created by racial and poverty drivers.

Efforts to Improve Coverage of Climate

Covering Climate Now is a global journalism collaboration started by *Columbia Journalism Review* and *The Nation*, in partnership with *The Guardian*, to improve media coverage of climate. With more than 460 partners in 57 countries, their mission statement says: “CCNow collaborates with journalists and newsrooms to produce more informed and urgent climate stories, to make climate a part of every beat in the newsroom — from politics and weather to business and culture — and to drive a public conversation that creates an engaged public. Mindful of the media’s responsibility to inform the public and

⁹⁷⁴ <https://insideclimatenews.org/news/15102022/the-both-siderism-that-once-dominated-climate-coverage-has-now-become-a-staple-of-stories-about-eating-less-meat/>

⁹⁷⁵ <https://news.un.org/en/story/2022/10/1129162>

hold power to account, we advise newsrooms, share best practices, and provide reporting resources that help journalists ground their coverage in science while producing stories that resonate with audiences.”⁹⁷⁶

Fossil Free Media, a project founded by Jamie Henn, a co-founder and former communications director of 350.org, helps the climate movement to get its message out in the media. According to *The Guardian*, Fossil Free Media’s Clean Creatives Campaign is pressuring public relations and advertising agencies to “break their ties with the fossil fuel industry, seeking to dismantle the fossil fuel industry’s ability to spread disinformation by going after the wordsmiths and creatives that greenwash the industry.”⁹⁷⁷

Disinformation by the Fossil Fuel Industry

The faulty media coverage of climate has been driven for decades by the disinformation campaign of the fossil fuel industry.

The U.S. House of Representatives Oversight Committee held a hearing into such efforts in September 2022, following a yearlong investigation. The committee found that the industry was still “gaslighting” the public, continuing with business as usual while publicly claiming they are changing. Internal emails and messaging guidance show that Big Oil’s climate pledges rely on unproven technology, accounting gimmicks, and misleading language. “Contrary to their pledges, fossil fuel companies have not organized their businesses around becoming low-emissions, renewable energy companies. They are devoted to a long-term fossil fuel future,” the committee concluded.⁹⁷⁸

⁹⁷⁶ <https://coveringclimatenow.org/about/>

⁹⁷⁷ <https://www.theguardian.com/environment/2021/sep/11/greenwash-fossil-fuels-ad-agencies>

⁹⁷⁸ <https://oversight.house.gov/news/press-releases/ahead-of-hearing-committee-releases-memo-showing-fossil-fuel-industry-is>

The committee chair accused ExxonMobil's CEO Darren Woods of lying to Congress after he denied that the company covered up its own research about oil's contribution to the climate crisis as far back as the 1970s. A video was shown at the hearing of an Exxon lobbyist describing the oil giant's backing for a carbon tax as a public relations ploy intended to block more serious measures to combat the climate crisis.⁹⁷⁹

Corporate Media Ownership Concentration

The increasing consolidation and corporatization of the media industry has contributed to both less news coverage and a reduction in the diversity of voices covered. It also “creates a potential for the suppression of information that is at odds with the interests of the parent corporation.”⁹⁸⁰

In 1983, 50 companies owned 90% of U.S. media. Since the Telecommunications Act of 1996, which reduced the Federal Communications Commission (FCC) regulations on cross ownership, 90% of U.S. media is owned by six companies: Viacom, News Corporation, Comcast, CBS, Time Warner, and Disney. The act was “essentially bought and paid for by corporate media lobbies,” as Fairness and Accuracy in Reporting described it, and radically “opened the floodgates on mergers.”⁹⁸¹

Radio has undergone a similar consolidation. Before the Telecommunications Act, companies were not allowed to own more than 40 radio stations. Since then, Clear Channel (now called

⁹⁷⁹ <https://www.theguardian.com/environment/2021/oct/28/exxon-ceo-accused-lying-climate-science-congressional-panel>

⁹⁸⁰ <https://berkeleyhighjacket.com/2021/entertainment/the-dangers-of-the-concentration-of-media-ownership/>

⁹⁸¹ <https://billmoyers.com/story/twenty-years-of-media-consolidation-has-not-been-good-for-our-democracy/>; <https://fair.org/take-action/action-alerts/speak-out-for-media-democracy/>

iHeartMedia) has grown from 40 stations to 1,240 stations — 30 times more than previously allowed.⁹⁸²

Local newspapers have also seen such consolidations, including many closures. Gannett, for instance, owns more than 1,000 newspapers and 600 print periodicals.⁹⁸³

Fifteen billionaires essentially own the media: Jeff Bezos, Michael Bloomberg, Rupert Murdoch, Donald & Samuel Newhouse, Cox Family, John Henry, Sheldon Adelson, Joe Mansueto, Mortimer Zuckerman, Barbey Family, Stanley Hubbard, Patrick Soon-Shiong, Carlos Slim Helu, Warren Buffett, Viktor Vekselberg.⁹⁸⁴

Access to the media is crucial to ensuring that diverse viewpoints are presented. In a 2016 Gallup poll, only about 20% of Americans said they had confidence in television news and newspapers. By 2022, the percentage saying they had no trust at all had risen to 38%. Research indicates that media bias may influence voter choices. The Pew Research Center has shown that the current media landscape contributes to political polarization.⁹⁸⁵

How Climate Groups Can get Media Coverage

Climate groups need to make a media plan on how to generate coverage; don't wait for the media to call you. Getting your event or issue covered in the media means that tens of thousands might hear about it rather than the few dozen or hundreds who attend in person. It also amplifies the importance of the issue for elected officials you are trying to have an impact upon.

⁹⁸² <https://futureofmusic.org/article/research/radio-deregulation-has-it-served-musicians-and-citizens>

⁹⁸³ https://en.wikipedia.org/wiki/List_of_assets_owned_by_Gannett

⁹⁸⁴ <https://feelthebern.org/bernie-sanders-on-media-ownership-and-telecommunications/>

⁹⁸⁵ <https://feelthebern.org/bernie-sanders-on-media-ownership-and-telecommunications/>; <https://news.gallup.com/poll/403166/americans-trust-media-remains-near-record-low.aspx>

Develop a written media plan and recruit volunteers to coordinate the effort. Attend a media training for social activists – or organize a training for your group.

The larger the media outlet is, the more difficult it is to get them to cover your story. Your main coverage will come from local television and newspapers. Unfortunately, few radio stations these days have local reporting, though they may have local talk shows that you can get on. Learn about your local media outlets. For newspapers, determine who is the reporter assigned to cover the environment and climate. Develop a list of contacts. You can follow many reporters on social media.

Bigger organizations often have a communications director whose job is to outreach to and connect with reporters. If the reporter is interested, the communications person may have them contact another individual for quotes or interviews.

For events, if media coverage is important (it usually is) be mindful of reporters' schedules. The best time for media events is usually late morning. That of course is not the best time for those who work during the day and so is a reason why rallies are often held on weekends. If you want television coverage, it's best to avoid doing the event at the same time as their broadcast, as they will have less camera crews available.

At major events like a rally, have someone (or a team) be the media liaison on site. Track down media (the ones with cameras, recording devices, and reporter notebooks), hand them a copy of the press release, get their contact info, and ask them if they need any help, like someone to interview. Especially at local events, local television stations increasingly send camera people who record but who are not reporters and so have limited ability to ask questions. Avoid situations where the moderator of the rally is also the main spokesperson, as the person cannot be two places at once.

At really large events, there is usually a table for the media to sign in at and receive a packet of information (press release, fact sheets, list of speakers and contact info). At large events, it is helpful to have

a multi box with where reporters can plug in their audio devices. The sound quality of amplified speeches (especially without a multi box) is generally not good enough for broadcast. Media videographers instead film for background (B-roll) shots and seek short one on one interviews with speakers for broadcast.

Be your own media – especially in light of the increasing corporate ownership and concentration. This means creating and publicizing your media content with photos, articles, videos, via livestream and on social media.

Learn how to use social media,⁹⁸⁶ including the role of influencers, hashtags, and links. As of 2019, more the half of Americans now get their news from social media (especially Facebook) and that number is increasing.⁹⁸⁷ Get your members to follow and retweet or share your social media, helping to build the number of your followers. Have a plan to increase the number of people following you.

Social media works best with visuals, so recruit graphic artists to help with content. Facebook and Twitter tend to be used by older people. Instagram, Reddit and Snapchat are followed by younger people, along with YouTube and TikTok. Learn how to record short video statements (a few seconds to a few minutes) that can be uploaded to social media. Livestream your events on social media. Upload recorded videos to your own YouTube channel.

For the more adventurous, look at podcasts and shows on public access cable television. Recruit people to take and post photos – and videos – from all your events. Coordinate with your art team on the visuals.

On social media, ignore – do not feed – the trolls. They are just looking for attention.⁹⁸⁸

⁹⁸⁶ <https://takeclimateaction.uk/resources/beginners-guide-social-media>;

<https://accept.aseanenergy.org/the-power-of-social-media-to-fight-climate-change/>

⁹⁸⁷ <https://www.forbes.com/sites/petersuciu/2019/10/11/more-americans-are-getting-their-news-from-social-media/?sh=2d50524f3e17>

⁹⁸⁸ <https://medium.com/the-brave-writer/ignore-the-trolls-ead15f82e7a>

You may want to invest in paid social media. Facebook requires groups that want to post “issue” ads get pre-approval to be able to post, so allow for a few weeks that first time you do it. Experiment with a small budget at first to see how valuable it is. Learn how to target your paid audience.

Be timely. Be quick. Be quotable. You can react to a breaking major climate news story by giving a national story a local angle – or vice versa. When reporting on a larger news story, the media is likely to give you one paragraph at best – so focus on writing just that one paragraph. Write a quotable quote. Add on a perspective that they might otherwise not hear but is still relevant. Help them go deeper of the story. Adding some humor, a punchy “political bite,” helps. You have to react quickly to a breaking news story since the reporter has to quickly put their piece together – and others are pitching their angle. React within minutes or an hour, not many hours or a day after the story has already appeared in the media.

The news media covers the news, so figure out how to make your efforts newsworthy. What is the media hook that will make the media want to cover your efforts – that timely and interesting news information that is interesting to both the media and their audience? Being creatively colorful in your approach will attract attention.

Media Releases

News releases are a key way to communicate your message to the media. Read a few how-to guides to learn how to write an effective news release.⁹⁸⁹

News releases are short, they are not white papers. Most professionals recommend one-page releases; most activists try to stay to two pages. They are written like a story in a newspaper and typically use the Associated Press (AP) style, so read some to grasp their structure. They are written in pyramid style, with the first

⁹⁸⁹ <https://fitsmallbusiness.com/how-to-get-local-press-coverage/>;
<https://fitsmallbusiness.com/how-to-write-a-press-release-template/>

paragraph or sentence containing the major point, then the second and third key issues in the next two paragraphs. The rest of the release then goes into a little more detail about the initial points. You want to include a few quotes, including one near the beginning (but don't start with it). For many reporters the most critical thing is the correct spelling and titles of any speakers at the event. Include a phone number, email, and webpage so the reporter can contact you for more information.

As always, you start with the news hook.⁹⁹⁰ What makes the release newsworthy? You may want to include a photo or a link to a short video.

For coalition events, there is often a release with a few paragraphs explaining the issue, and then each group can provide a one paragraph quote.

Make sure to send the release (usually via email) to the right people, including the specific reporters who cover the climate issue. You can follow it up with a phone call to pitch the story, explaining to the reporter why it is newsworthy. If the release is for an event, distribute copies at the event or news conference (keep track of the names of reporters and their contact info and affiliation) and then email it to other reporters (you can usually set a time for your email service to send).

Have a section on your webpage where you post all your news releases. Also post photos, videos, and any audio there. You can then link to the release on your social media.

A media advisory is different from a news release. It is a brief one page that answers the questions of who, what, when, why and where of an upcoming event. Include a link if you will livestream the event. The advisory is sent out a few days before the event and then again on the morning of the event. Make sure it includes who, what, when, why and where, clearly stated.

⁹⁹⁰ http://guide.saferoutesinfo.org/media/identify_hook.cfm;
<https://www.welchpr.co.uk/2022/09/26/legal-pr-whats-a-news-hook-and-why-does-it-matter/>

Call media contacts ahead of the event to make sure they saw the advisory and to quickly pitch the story to them. Television news departments meet each weekday usually around 9 a.m. to discuss what events they will cover that day, so call then and ask to speak to the assignment editor. They may have a second news team that comes on at 4 p.m. for the evening news, so you may need to call them for an evening event. Newspapers may also have a separate photo department, so contact them if there will be interesting visuals.

Letters to the Editor

Letters to the editor⁹⁹¹ are one of the most widely read parts of a newspaper. Learn the publication's rules for letters, such as how often can a writer be published, the length, and whether your letter has to be unique to the paper. Make sure it doesn't look like a form letter. Longer opinion pieces may be accepted for an opinion page although you should usually talk to the publication beforehand to determine their interest.

Be concise. Be clear about the problem you are addressing and the solutions you are calling for. Facts and statistics are important, but the human story is what moves people. Explain why the issue is important to you personally. Letters that respond to a previous article in the paper have more chance of getting published (state the article you are responding to at the start of the letter). Don't overlook weekly newspapers.

Making an opening personal statement can help establish the writer's credibility as someone with firsthand experience with the issue and grab the reader's attention. Avoid too many details or tangents to the point you are making. Address why the reader should care about the issue. Conclude with a bold, clear statement and a call to action that the reader can take.

⁹⁹¹ <https://www.aclu.org/other/tips-writing-letter-editor>;
<https://www.nrdc.org/stories/how-write-successful-letter-editor>;

Talking to the Media⁹⁹²

Decide ahead of time what are the key points that you want to make and focus on that. Keep to your talking points, not the reporter's. Bring the reporter's questions back to your points. Once you have done a good job of making your points, avoid continuing to talk. The longer you speak, the more likely you are to stray off topic or even make a mistake. Invariably whatever point you make that you later regret will be what the reporter highlights. Avoid speaking too fast or loudly. Remember that you are speaking to a general audience, not experts, so avoid going too deep into technical issues or using jargon.

It is helpful to get training in dealing with the media. You can also role play at meetings about how to talk to the media. Have someone play the role of the media asking questions.

Never yell at reporters, even if they write a bad story. Remember that reporters are generalists, filing stories on multiple issues every day. They often only have a few hours to learn and write their story before moving onto the next assignment. Mistakes are inevitable. Correct the major points if essential but avoid nitpicking.

Try to develop a long-term relationship with reporters, which means building on respect and trust. Don't exaggerate points or make statements that you are not sure are correct. If they ask a question you don't know the answer to, admit that and offer to research the question and get back to them.

Many of the activists most frequently quoted in the media are ones who the reporters call when they are working on a story and want to talk to someone who they have a long-term relationship with, whom they trust, and who they know are accurate with their info. They often need to quickly get additional information on a topic that they are not experts on and possibly a quote. Reporters work on deadlines and will

⁹⁹² <https://www.bu.edu/prsocial/best-practices/public-relations/10-tips-on-speaking-with-the-media>; <https://www.apa.org/monitor/2022/04/career-talking-media>; <https://innovationlabs.harvard.edu/talking-media-guidelines/>

reach out to people they know can help them complete their story in a timely fashion.

You can also pitch stories to reporters. Many of the activists most often quoted by the media generate most of their news stories this way. Explain to them why it is newsworthy. For instance, outline why what may seem like a minor decision by a government agency will have a major impact on your community. Or bring them up to speed as to some important action by the legislature that has not made the news yet. It is not unusual to lay out an entire story for a reporter, who then only gives you one quote in the piece (and quite possibly not a quote you made).

Assume that everything you say to the media is on the record. That is one reason why you should avoid making statements that you are not sure are accurate or which are overly inflammatory. Activists very experienced with the media will go off the record if they have heard something that seems likely, but they need the reporter to confirm it before printing it. Or if they want to provide a deeper background (e.g., this agency is way over their head; confidentially, I hear the legislature is about to agree to this deal) for context without being quoted as having said it. Going off the record is a tricky process and should generally be avoided. It must be declared before making such a statement, and agreed to by the reporter.⁹⁹³

Press conferences.

A press conference is held to give a group an opportunity to talk to the media and answer questions. A climate group can hold a press conference to announce a major development such as filing a lawsuit, releasing a study or report, or announcing a new development (e.g., the legislative leader has agreed to bring our bill to a vote), responding to something (e.g., the state just awarded a permit to a fossil fuel

⁹⁹³ https://www.linkedin.com/pulse/media-relations-off-record-background-explained-ami?trk=articles_directory;
<https://www.nytimes.com/2018/08/02/reader-center/off-the-record-meaning.html>

company), or otherwise discuss something newsworthy. You might hold a press conference if a well-known individual or organization has decided to support your effort.

A press conference provides an opportunity for some give and take with journalists, which can be useful when discussing an issue that has some complexity.

A press conference is not a rally (although many groups often treat it as such). A press conference is for the media, not the public or the group's members (though some members can be invited to listen, be in the audience, hold signs). Try not to have more than three speakers (and certainly not more than five). The total speaking time at a press conference should be relatively short (about 20 minutes), leaving adequate time for the often busy reporters to ask questions.

Be mindful of good lighting and audio for television, photographers, and radio. Visuals are important. You can have people with signs and banners stand behind the speakers. Think about how the media will be able to arrange placement of their microphones. Check to make sure you are not conflicting with another major news event.

A press conference is held at a location and time that is convenient for the press, such as late morning. It involves both a news release and advisory as discussed above. Make sure to have the media sign into the event.

You may also want to attend a press conference held by climate opponents such as the fossil fuel industry. Some climate groups may want to organize a protest outside - or even inside - at such a news conference. Others may want to attend and listen, and then talk to reporters afterwards to provide a rebuttal or deeper context. Reporters often appreciate it since it makes their job easier.

RESOURCES FOR PUTTING OUT THE PLANETARY FIRE

Climate Organizations

Other Resources

Books on Climate Change and Advocacy

Organizing Guides

Climate Organizations

350.org <https://www.facebook.com/350.org>

Food & Water Watch - www.foodandwaterwatch.org -
<https://www.facebook.com/FoodandWaterWatch>

Friends of the Earth – www.foe.org -
<https://www.facebook.com/friendsoftheearth>

Sunrise Movement – www.sunrisemovement.org,
<https://www.facebook.com/sunrisemvmt>

Climate Justice Alliance <https://climatejusticealliance.org/>
<https://www.facebook.com/CJAOurPower>

Center for Biological Diversity www.biologicaldiversity.org -
<https://www.facebook.com/CenterforBioDiv>

Indigenous Environmental

Network www.ienearth.org <https://www.facebook.com/ienearth>

Women's Earth and Climate Action

Network <https://www.wecaninternational.org/> <https://www.facebook.com/WECAN.Intl>

Green Education and Legal Fund – gelfny.org –
www.facebook.com/nygreenelf
Project Drawdown <https://drawdown.org/>

Climate Reality Project -
<https://www.climateRealityProject.org/> <https://www.facebook.com/climateReality>

Citizens Climate Lobby - <https://citizensclimatelobby.org/>
<https://www.facebook.com/CitizensClimateLobby>

Beyond Extreme Energy -
<https://beyondextremeenergy.org/> <https://www.facebook.com/BeyondExtremeEnergy>

Extinction Rebellion -
<https://rebellion.global/> <https://www.facebook.com/xrnyc>

African Climate Change Alliance -
<https://africanclimatealliance.org/>;
<https://www.facebook.com/africanclimatealliance>

Asian Pacific Environmental Network - <https://apen4ej.org/>;
<https://www.facebook.com/APEN4EJ>

Beyond Plastics, <https://www.beyondplastics.org/>,
<https://www.facebook.com/beyondplasticsaction>

Renewable Heat Now, <https://renewableheatnow.org/>

Beyond Extreme Energy - <https://beyondextremeenergy.org/>

Greenpeace - <https://www.greenpeace.org/usa/campaigns/climate/>

Union of Concerned Scientists -
<https://www.greenpeace.org/usa/campaigns/climate/>

Evergreen Action - <https://www.evergreenaction.com/>

Fridays for Future - <https://fridaysforfuture.org/>

USCAN – US Climate Action Network has 190 climate groups - <https://www.usclimatenetwork.org/member-organizations>

Citizens Climate Lobby - <https://fridaysforfuture.org/>

EcoAction Committee of the Green Party of the U.S. - https://www.gp.org/ecoaction_committee - <https://www.facebook.com/GPEcoAction>

Global Greens - <https://globalgreens.org/>

Global Alliance for a Green New deal - <https://www.globalgreennewdeal.org/the-declaration>

People vs. Fossil Fuels - <https://peoplevsfossilfuels.org/>

Stop the Money Pipeline - <https://peoplevsfossilfuels.org/>

Third Act - <https://thirdact.org/>

Stand Earth - <https://stand.earth/our-work/moving-beyond-fossil-fuels/>

Climate Safe Pensions - <https://climatesafepensions.org/>

IEEFA – Institute for Energy Economics and Financial Analysis - <https://ieefa.org/>

CIEL - Center for International Environmental Law - <https://ieefa.org/>

Our Children’s Trust - <https://www.ourchildrenstrust.org/>

Intergovernmental Panel on Climate Change – <https://www.ipcc.ch>

Other Resources

Media – End Climate Science <https://www.endclimatesilence.org/>

Covering Climate Now - <https://coveringclimatenow.org/>

5 short videos on how climate change works -
<https://www.howglobalwarmingworks.org/>

Climate Change Resources, <https://climatechangeresources.org/>

Books on Climate Change and advocacy

Fight the Fire: Green New Deal and Global Climate Jobs by Jonathan Neale (Resistance Books 2021), free download,
https://theecologist.org/sites/default/files/2021-02/Fight_the_Fire_0.pdf

No Miracles Needed: How Today's Technology Can Save Our Climate and Clean our Air, by Mark Z. Jacobson (Cambridge University Press, 2023)

Soil Not Oil: Environmental Justice In An Age Of Climate Crisis by Vandana Shiva (North Atlantic Books, 2015)

Capitalism: A Ghost Story by Arundhati Roy (Haymarket Books, 2014)

Shut it Down: Stories from a Fierce, Loving Resistance by Lisa Fithian (Chelsea Green Publishing, 2019)

The New Climate War: The Fight to Take Back Our Planet by Michael E. Mann (PublicAffairs, 2022)

Falter: Has The Human Game Begun To Play Itself Out? by Bill McKibben, (Henry Holt and Co., 2019)

On Fire: The (Burning) Case for a New Deal by Naomi Klein (Simon & Schuster, 2019)

This Changes Everything: Capitalism vs. the Climate by Naomi Klein (Simon & Schuster, 2014)

A Planet to Win: Why We Need a Green New Deal, by Kate Aronoff, Alyssa Battistoni, Daniel Aldana Cohen, and Thea Riofrancos (Verso Books, 2019)

Revolutionary Power: An Activist's Guide to the Energy Transformation, by Shalanda Baker (Island Press, 2021)

Farming While Black: Soul Fire Farm's Practical Guide to Liberation on the Land, by Leah Penniman (Chelsea Green Publishing, 2018)

How to Blow up a Pipeline, by Andreas Malm (Verso Books, 2021)

The Nutmeg's Curse: Parables for a Planet in Peril by Amitav Ghosh (University of Chicago Press, 2022)

This is An Uprising: How Nonviolent Revolt is Shaping the Twenty-First Century by Mark and Paul Engler (Bold Type Books, 2017)

The Story of More: How We Got to Climate Change and Where to Go from Here by Hope Jahren (Vintage, 2020)

The Future Earth: A Radical Vision for What's Possible in the Age of Global Warming, by Eric Holthaus (Harper One, 2020)

Laudato Si': On Care For Our Common Home, by Pope Francis, <https://www.tektonministries.org/catholic-media-tekton-ministries-vatican-releases-popes-long-expected-encyclical-on-the-environment-and-the-care-for-our-common-home-laudato-si>

Victory Plan, Ezra Silk, The Climate Mobilization, <https://www.theclimatemobilization.org/wp-content/uploads/2020/07/Victory-Plan-July-2020-Update.pdf>

Ministry for the Future by Kim Staley Robinson (Orbit, 2021)

The End of Ice: Bearing Witness and Finding Meaning in the Path of Climate Disruption, by Dahr Jamail (The New Press, 2020)

A People's Green New Deal, by Max Ajl (Pluto Press, 2020);
free: <https://www.jstor.org/stable/j.ctv1p3xjwp>

The Robbery of Nature: Capitalism and the Ecological Rift, by Brett Clark and John Bellamy Foster (Monthly Review Press, 2020)

The Earth Is Not for Sale: A Path Out of Fossil Capitalism to the Other World That is Still Possible, by Peter and David Schwartzman (World Scientific Publishing Co Pte Ltd, 2018) see also
<http://theearthisnotforsale.org/>

Ecosocialism: A Radical Alternative to Capitalist Catastrophe, by Michael Löwy (Haymarket Books, 2015)

Creating an Ecological Society, Toward a Revolutionary Transformation, by Fred Magdoff and Chris Williams (Monthly Review Press, 2017)

Hothouse Earth: An Inhabitant's Guide, by Bill McGuire (Icon Books, 2022)

Karl Marx's Ecosocialism: Capital, Nature, and the Unfinished Critique of Political Economy, by Kohei Saito (Monthly Review Press, 2017)

Stopping Oil: Climate Justice and Hope, by Sophie Bond, Amanda Thomas and Gradon Diprose (Pluto Books, 2022)

Burnt: Fighting for Climate Justice, by Chris Saltmarsh (Pluto Press, 2021)

Breaking Through Power, Ralph Nader (City Lights, 2016)

Compilation of books, articles and research websites by covering climate news collaborative

<https://coveringclimatenow.org/resource/essential-reading/>

Organizing Guides

Rules for Radicals A Practical Primer for Realistic Radicals, by Saul Alinsky (Vintage, 1989)

Organizing: A Guide for Grassroots Leaders by Si Kahn, (NASW Press, 1992)

350 Climate Resistance handbook,
https://trainings.350.org/?super_pages=climate-resistance-handbook

Sierra Club Movement Organizing Manual,
<https://www.sierraclub.org/ready-for-100-toolkit/sierra-club-movement-organizing-manual>

Hegemony How-To: A Roadmap for Radicals, Jonathan Matthew Smucker, <https://hegemonyhowto.org/>

Action Network Organizing Guide, downloadable,
<https://actionnetwork.org/forms/download-the-action-builder-organizing-guide-2>

People's Climate Movement organizing toolkit,
<https://peoplesclimate.org/ittakeseveryone/>

League of Women Voters' Toolkit for climate organizing,
http://participate.lwv.org/c/9217/p/salsa/web/common/public/content?content_item_KEY=3804

Climate Justice Alliance advocacy toolkit,
<https://climatejusticealliance.org/cja-advocacy-tool-kit/>

The Art of Campaign Planning; How to Design a Successful Campaign and Win, RE-AMP Organizing Hub,
<https://reamp.org/files/the-art-of-campaign-planning/?bp-attachment=The-Art-of-Campaign-Planning.pdf>

Campaign Planning: A guide for Neighborhood Groups organizing to Clean Up and Prevent Pollution in their Communities, Toxics

Action Center, <https://communityactionworks.org/wp-content/uploads/Workbook1-CampaignPlanning-1.pdf>

Why Civil Resistance Works: The Strategic Logic of Nonviolent Conflict, Maria J. Stephan and Erica Chenoweth,
https://www.belfercenter.org/sites/default/files/legacy/files/IS3301_pp007-044_Stephan_Chenoweth.pdf

Activist Handbook: How to Organize a Protest,
<https://www.activisthandbook.org/en/organising/protest>

An Organizer's Guide to Protest and Political Change, Dan Jasper,
<https://streetcivics.com/an-organizers-guide-to-protests-and-political-change/>

Act Up: Civil Disobedience Training,
https://actupny.org/documents/CDdocuments/ACTUP_CivilDisobedience.pdf