

A Field Guide for Transformation

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I live my life in widening circles
that reach out across the world.

—RAINER MARIA RILKE

I was more than a decade into being an environmental activist when I saw it: energy. It was everywhere. In the fuel for our cars, in the fertilizer for our food, in the plastics at the grocery store, in the electricity lighting our homes. We were relying on fossil fuels for everything. Once I learned to see them, I could find fossil fuels wherever I looked. And it wasn't hard to see their harms either: coal, oil, and gas make people sick, pump pollution into our air and water, and push up carbon concentrations in the atmosphere, driving dangerous weather. It took me a long time to understand that government policy has created this climate crisis. Our politicians subsidize fossil fuels while blocking clean energy. We need to turn this around. If we could just stop digging up fossil fuels, I thought, we might stand a chance.

But this realization did not come easily. My first environmental actions were not about changing our energy policy. Instead, they were small and immediate. After discovering clear-cutting in the Amazon, in fifth grade, I made a T-shirt that featured cattle talking in the rainforest. They said: "Do not eat me." When my friends and I found out that the tiny milk boxes we got at lunch could not be recycled at school, we stopped playing outside. Instead, we spent our lunch hour meticulously cutting up the cartons so we could lay them flat and bring them home to recycle them. We did this for weeks.

In my teens, my actions got bigger and I started to stretch beyond myself. I wrote to the owners of the local grocery store to ask them to stop selling Chilean sea bass—a vulnerable species. I got my family to stop using disposable plates at family gatherings. I would flip the bird at Hummers and other gas-guzzling trucks in a kind of public protest. But when my high school geography teacher introduced the idea of

climate change, he told us it probably wasn't real. It took me years to figure out that fossil fuels are at the center of climate change.

When I went to university, I had my first real chance to learn about the climate crisis. In courses from biology to psychology, it became clear that the energy system was the root of the problem. I tried to figure out ways to get more people to change how they used energy. Working with other students and faculty, we had thousands of students and employees take part in an experiment. They were trained in why saving energy was important and asked to do things like take the stairs rather than the elevator. Some became zealous, switching off bathroom lights while people were still on the toilet. The campaign worked: We helped university residences cut around 10 percent of their energy use. Before I graduated, I helped build on campus a large solar project, whose profits would fund student scholarships. It was clear to me that changing the energy system was the key to tackling the climate crisis. And I vowed to do everything I could to help drive that transformation.

Yet the results were not satisfying enough. I wanted a bigger scale. I saw that changing behaviors was not as powerful as changing institutions. So I spent the next decade trying to understand how people have tried to change energy policy to tackle the climate crisis. I tell you these stories to show you how—to paraphrase Rilke—I've lived my life in widening circles. How I've tried with each passing year to reach a bit further into the energy system and drive greater changes.

I tell you these stories because I know: You can do the same.

The climate crisis is here now. How have we gotten into this mess?

One common answer is that *we are all to blame*, through our everyday choices: whether to drive, bike, or walk, to take a flight, or to buy stuff. It's easy to see why we might think that environmental problems, including climate change, are mostly a question of our own behavior.

When we buy something, we are making decisions that shape the future. It's easy to get lost in the smaller choices, like using a plastic straw. We can forget that the bigger choices, like what car we buy or

whether to buy a car at all, have a much larger impact. It's even easier to miss the choices we can't make, like taking a train to a nearby city when no train service exists.

When we start to see the choices that are *not* available, we can begin to see the role of political power in our daily lives. Who decides what options are available for us to choose in the first place?

Institutions shape the choices we *can* make. Some actors in society have more power than others to decide how our economy is built and fueled.

When it comes to the energy system, fossil fuel companies and electric utilities have limited our choices. Over the last century, these companies resisted innovation. They learned how to do one thing well—dig up, sell, and burn fossil fuels—and they want to keep doing it. When electric lightbulbs were first invented in the late 1800s, the new industry was radically innovative. Thomas Edison, for example, hoped to move away from coal toward wind and solar energy. But by the 1920s, this inventiveness declined as corporate managers took over. They focused on existing technologies, building ever-larger coal plants. And they worked to undermine more efficient technologies, which would have enabled the energy system to produce less waste.

Stifling innovation wasn't the only way these companies played a leading role in creating the climate crisis. Fossil fuel corporations and electric utilities also organized to deny climate science. The steady drumbeat of this well-funded campaign broke through. When I think back to my first introduction to climate change in high school, I often wonder why my otherwise brilliant teacher thought to present the topic as a debate. Well, at the time, fossil fuel companies and electric utilities were a decade into their campaign to discredit climate scientists. From the 1980s to the present, they have funded organizations that denied the scientific consensus on climate change, spending billions on the effort. And these efforts were wildly successful: The exact language used in denial reports permeated the public discourse, ending up in the media and in presidential speeches.

Throughout the 1990s and the first decade of this century, clean-energy advocates fought back. They managed to get laws on the books

to ramp up renewables in a majority of states. But just as we started making progress on cleaning up our energy system's dirty ways, these corporations launched an assault on climate policies. As I document in my book, *Short Circuiting Policy*, electric utilities and fossil fuel companies have spent the past decade attacking the piecemeal climate policy we have managed to implement so far.

While many states have clean-energy goals, overall the pace of
* change in the electricity system across the country is paltry. In 2018 only 36 percent of the U.S. electricity supply came from clean-energy sources, including wind, solar, hydropower, and nuclear. Between 2009 and 2018, annual growth in renewable energy was a mere 0.7 percentage points. Meanwhile, natural gas expansion has outpaced renewables in recent years. Incremental progress—with one step forward and another back—simply won't get us to 100 percent clean electricity in the coming decades.

Our challenge is only compounded when we realize that we also need to grow the grid to power our homes, businesses, and cars with clean electricity. Of course, if we invest in energy efficiency, we won't have to build as much new energy supply, because efficiency reduces overall demand. That's especially important to do today, when our energy system is still powered by dirty fossil energy: If we use less *now*, we will burn less fossil fuel overall. And if we keep safe nuclear plants open for as long as possible, it will also be easier to make progress—they currently supply more than half of our clean power. Right now, when a nuclear plant retires, it is often replaced with dirty energy. No matter how you slice it, we will need to move a lot faster to change our energy system.

But rather than helping drive the changes we need, electric utilities and fossil fuel companies have blocked clean-energy laws from passing in new places, leaving many states without any target. They have also worked to roll back or weaken clean energy laws on the books. When these strategies failed, electric utilities and other polluting companies made the fight bigger, using the public, political parties, and the courts to short-circuit progress on climate policy. As a result of this deliberate delay, most states are way behind on cleaning up their energy systems.

By bending the political system to their will, fossil fuel companies and electric utilities have created the climate crisis. Big, polluting corporations have severely limited the choices we can make today. We are not all equally to blame.

Once we see that the climate problem is an energy problem, and that our energy problems are institutional, political, and coordinated, we can also see that climate action must take the same form.

Take, for example, “flight shaming”—the movement to use social pressure to discourage people from flying. Likely you know that you “shouldn’t” be flying because it takes a lot of fossil fuels to do it. If you fly, and you’ve ever tried using an online carbon footprint calculator, you’ve probably found out that flying is the biggest slice of your personal carbon emissions by far.

If you live on the East Coast, where there is a train service between major cities, maybe you tried to take the train instead. Other times, you may have decided not to take the trip.

But you may have family in another country or need to take a plane for your job. Maybe you’ve bought some offsets and tried to reduce your emissions elsewhere, to lessen your guilt.

Yet when is the last time someone tried to make you feel bad for paying taxes and contributing to your country’s military budget? I’d bet this hasn’t happened. The U.S. military is an energy guzzler—it is the institution that consumes the most fossil fuels in the world. In fact, its carbon emissions are greater than those of many countries. In recent years, the U.S. military has emitted more greenhouse gases than Denmark.

The military’s annual emissions are similar to those from commercial aviation. Yet those individual footprint calculators don’t consider this part of your personal footprint. There’s no button to click to offset your contribution to the military’s emissions.

Nor can you easily calculate or offset the emissions from the steel that was used to build the office where you work. And it would be tough to offset the fertilizer—made from fossil fuels—that grows the food you eat. The more you look, the more you see how fossil fuels are everywhere.

* On average, each American emits around fifteen metric tons of carbon pollution each year. You could work very hard to try to shrink your own tonnage but then wake up one day to realize that the United States as a whole emits around six billion metric tons every year.

No one can unilaterally choose to live in a low-carbon economy.

The goal is not self-purification but structural change. As Bill McKibben has put it: “Changing the system, not perfecting our own lives, is the point. ‘Hypocrisy’ is the price of admission in this battle.”

A simple thought experiment can help illuminate this point: If you were to die tomorrow, how much less carbon emissions would occur? Not much less. Society would keep churning along, belching out pollution as it went.

And this isn’t even hypothetical: We ran the experiment in 2020, during the coronavirus pandemic. For months few were flying or * driving or even leaving their homes. Yet emissions barely budged—falling an estimated 8 percent. We need emissions to fall that amount every year until 2030 to limit warming to 1.5 degrees Celsius. Individual action alone won’t get us there.

But what if you build or contribute to something bigger than yourself, something that breaks the relationship between energy and pollution in the longer term? That would keep going beyond your lifetime.

• Put simply: We cannot make enough headway on the climate problem by working at the individual level. We need to organize our efforts. And that is one essential function of a modern, healthy democracy: cooperation and coordination.

When Greta Thunberg was asked to name the top thing that people could do, she answered: “Try to push for a political movement that doesn’t exist. Because the politics needed to fix this doesn’t exist today. So I think what we should do as individuals is to use the power of democracy to make our voices heard and to make sure that the people in power cannot continue to ignore this.”

And we won’t move fast enough if we don’t draw in everyone. We need celebrities with private jets and people who have never taken a flight. We need meat-eaters and vegans. We need people living in West Virginia—the state with the second-dirtiest electricity mix—and people living in California. The pace and scale of the changes we

must make in our energy system are unprecedented. We need everyone in the fight.

When you decide to become part of changing our energy system, you can start small. In this first circle, you're training yourself to see the energy system and how to change it.

It's great to turn off the lights when you leave a room, and better still to stick up a sign to remind others to do the same. Or announce out loud before you leave a room, "Could the last one out hit the lights?" This kind of action can help conserve energy at the margins.

The challenge with relying on ongoing behavior change is that people must make the choice. Sometimes people simply forget. Hence, it's even more effective to aim for changes that are structural and hard to reverse.

The building you live in is likely fueled by natural gas. We use it to cook our food, heat our water, and warm our rooms. This fossil gas is methane, which creates massive amounts of radioactive waste when it is dug up from the earth. When you use it in your home, it can leak and make you sick. In rare cases, it can even cause an explosion. Leaking fossil gas is not just bad for your family; it also heats the planet far more powerfully—roughly thirty times more over a hundred-year period—than carbon dioxide.

But it doesn't have to be this way. We can use clean electricity to power induction stovetops, electric water heaters, and electric furnaces and heat pumps.

So if you want to change something in your daily life, make your home all electric. Start planning for that change now: Save up, look for a contractor, see if your city offers any incentives. If you don't own your home, you can talk to your landlord, friends, parents, or grandparents about making this change.

And if you do manage to rid your home of fossil gas, consider sticking a sign on your lawn that says: "Ask me about my all-electric home!" Talk to your friends and neighbors about what you did and why you did it. And try lobbying your city, county, or state to offer financial programs to support more people in making the same choice you did.

Changing the energy system can start in your own life. But it's im-

portant to remember that it cannot end there. You have to keep looking for the wider circle.

The next circle is found in community. Each one of us is connected to others. These relationships give us more power than we believe. We can and do shift our communities when we act.

We can begin by talking about the climate crisis with others. This may feel small, but in truth, it's big. So many Americans barely hear about the weather systems shifting perilously around them, much less solutions to address the problem. As Katharine Hayhoe has said, "The number one thing we can do is the exact thing that we're not doing: talk about it."

I try to talk about climate change once a day, with someone other than my cat. Often I'll begin a conversation about the weather—commenting on a drought or heat waves—and before you know it, we're talking climate crisis.

There are a range of reactions to my raising the topic.

One man, whom I talked to in a cab, had heard of the problem but thought that volcanoes were the cause. I explained to him that fossil fuels were the culprit, and by the time I left, he understood our predicament better.

Another man, who was older and didn't have kids, commented that he never does well in the heat. I told him it would likely keep getting worse from here on out. He said that was true. But he wasn't worried about it—because before things got too bad, he would be dead. This kind of reaction is a privilege. To divorce yourself from the ongoing struggles of humankind. To not worry about what will befall whom, and when, because you will be long gone.

It's also a sign that someone is trying to protect themselves psychologically. Many people want to hold the climate crisis at a distance so they don't have to feel sadness or fear. They don't want to reckon with it.

As Wendell Berry once put it: "It is the destruction of the world in our own lives that drives us half insane, and more than half."

Given the emotions that this conversation can raise in people, it's important that you talk about solutions as well. Remind people

that our governments—city, state, and federal—can make different choices. That this story is not yet finished.

These days I don't just talk to people one on one about how our energy system is driving the climate crisis. I talk to journalists, go on podcasts, give talks in churches, at universities, to politicians. I do as many talks as I can, to whoever wants to hear from me. Because every conversation is a chance to wake our democracy up.

As you continue to work in the community, it can be helpful to join an organization. These groups can help you understand what next steps you can take to advocate for climate action. There are lots of great groups to consider joining, including 350.org, Citizens' Climate Lobby, Greenpeace, Sierra Club, Sunrise Movement, and Surfrider Foundation. Try to find one with a local chapter in your community. In some places, there are also regional groups that focus on environmental justice, like WE ACT in New York, Dogwood Alliance in the southern states, and the California Environmental Justice Alliance. You can also give money to these groups, or others, to help them fund their work.

Linking up with organizations can help you extend your reach. As Jane Fonda, who started Fire Drill Fridays, has said, "People who are organized can change policy. People who are together, unified, and organized around a strategic goal can change anything."

We are working toward the widest circle, which is policy change. It's not easy, and you can't do it alone. But each one of us can chip away at the laws that keep us stuck in our current energy system. Slowly, working together, we can shape it into a new form.

As part of my academic research career, I've had the privilege of interviewing more than 150 leaders who have worked to change energy policy. The people I admire the most are the ones who have used their ideas to try to change the energy system. One woman, Nancy Rader, wrote a master's thesis in the early 1990s on an idea she called a "renewables portfolio standard." With effort from a lot of other brilliant activists across the country, that policy now exists in most states. Mary Anne Hitt and her team at the Sierra Club had an idea to stop new coal-fired plants and shut down existing sites in the United States.

The program she directs has stopped more than two hundred plants from being built and helped retire more than three hundred others. After being harassed by fossil fuel companies, [Naomi Oreskes](#) began investigating them. Her research has resulted in lawsuits against major oil companies to try to hold them accountable for climate denial. Alexandria Ocasio-Cortez wasn't yet sworn in when she joined young activists, including Varshini Prakash of Sunrise Movement, for a sit-in on Capitol Hill and demanded a Green New Deal. Less than a year later, all the major Democratic candidates running for president had backed the policy idea.

Of course, none of these women are changing policy alone. They have coauthors and colleagues, funders and friends. But each one of them has become a linchpin in the effort to transform our energy system—they are people doing what matters. And because they are working in a wide circle, their actions can change our energy system, not just their own lives.

• What policies could you try to work on? You could try to stop new fossil fuel developments in your state or work to shut down coal and natural gas plants that already exist. You could try to support more renewable energy projects by backing policies that pay people and companies to build them. You could support state and federal policies that speed up electric-vehicle adoption by buying back old clunkers, giving funding for new cars, or investing in charging infrastructure. On the local scale, you could work to support public transit or protected bike lanes. You could pressure your city to ban natural gas in new buildings, as cities across the country are starting to do. And you could work to get your state government to provide financial incentives for people who electrify their homes or increase their energy efficiency. To hold electric utilities accountable, you could try to get your state to pass an “intervenor compensation program,” which pays advocates to show up at regulatory proceedings to speak in the public interest. And you could call your federal representative to say you want more funding for research and development, including the Advanced Research Projects Agency–Energy (ARPA-E) program.

To figure out what policy you'd like to work on, lean on the organizations you've joined. See if they have campaigns you can plug into or if there are ways you can start your own and get others to join you.

Until policies are in place that effectively challenge fossil fuel companies' and electric utilities' political dominance, the lives of billions of people, communities, species, and ecosystems are in grave danger.

The twentieth century will be remembered as an age of destruction and delusion. It will be remembered as a time when we filled our oceans with plastic, our lungs with poison, and our minds with climate denial.

With effort from all of us, the twenty-first century can be an era of healing. We can spend this century reducing carbon pollution, bending the emissions curve downward. We can put policies in place that make it easier for our friends and neighbors—and people across the oceans and in future generations—to live without pollution.

This will not be easy. It will require us to get up every day and chip away at the problem. To remind myself, I keep these words from Mary Oliver running through my head: “May I be the tiniest nail in the house of the universe, tiny but useful.” Each one of us can be that nail, chipping away at the fossil energy system.

Do not demand that your smallest, personal circle be pure before you start working on the broader circles of community and policy. Because that day will never come. Let's dig in today to shift the system—and tomorrow and the day after.

When I come to the end of my life, I want the scales to show that I prevented more carbon emissions than I caused. And there is no way to make that happen if I work only on myself.

My offset plan is activism.