Georgia State University Law Review

Volume 39
Issue 4 *Summer 2023*

Article 14

2023

The Keynote Address to Georgia State University College of Law's 28th Annual Law Review Symposium

Robert Verchick

THE KEYNOTE ADDRESS TO GEORGIA STATE UNIVERSITY COLLEGE OF LAW'S 28TH ANNUAL LAW REVIEW SYMPOSIUM RENEWABLE ENERGY: 2023 AND BEYOND

Robert Verchick*

This is such an important topic, so, we are going to get to talking about the power grid and, specifically, climate resilience. But the first thing I want to do is answer the question that I know that you are already asking. And that question is: Was the octopus real?[1] And the answer is yes. There really was an octopus in a parking garage. And I'm going to tell you about why there was one, why you should care about that, and why it's related to the power grid.

So, here's the first part: yes, there was an octopus in the parking garage. The setting is a luxury condominium complex that sits on Miami Beach, right on Biscayne Bay, and it's got a nice, elevated parking structure. One morning, right after a supermoon, an extreme tide, and a series of other things—and as you know, there's been about a foot of sea level rise since the Industrial Revolution. We've had some changes. So, a guy named Richard Conlin shows up to get into his car in the garage and he steps in this huge pool of green water shimmering beneath the overhead fluorescent lighting. And he thinks, "Oh, I'm going to have to wade to my car." Then he hears a "gurgle, gurgle, gurgle," and he looks over by his car and he sees a few rubbery limbs flopping up and down. It's an octopus, absolutely alive.

* Gauthier-St. Martin Eminent Scholar and Chair in Environmental Law, Loyola University New Orleans College of Law. I'm grateful to *Georgia State University Law Review* for inviting me to speak. I owe special thanks to the *Law Review*'s editors for transcribing and editing my speech.

1. This presentation was adapted from chapters 1 and 7 of ROB VERCHICK, THE OCTOPUS IN THE PARKING GARAGE: A CALL FOR CLIMATE RESILIENCE (2023).

So, he does what anybody would do, what you would do, what I would do. He pulls out his phone and starts taking pictures. Then he puts them on the internet, the picture goes viral, and of course, I see it. And friends of mine who are law professors and so on see it. And we start sort of digging around. It was a friend of mine, Dan Farber, who's at Berkeley Law, he sent me this picture. I said, "What's this about?" He says, "It's a climate story."

And he was right—it's a climate story because there was a drainage pipe that came out of that garage, and it went right down to Biscayne Bay. When they first built that pipe, it was above the waterline, and now it is almost always below the waterline. So, when things drip through that pipeline, the octopuses congregate around the opening to eat. So, something switched in the tide and boom, the water goes the wrong way and up pops this cephalopod out of there. They eventually did get security guards to come out with little plastic buckets and they retrieved the octopus, and they brought it home. And I am told it lived a complete, normal, happy life.

But what I was wondering—and I was talking to my friend Dan about—was, if we can't keep octopuses out of parking garages, what else can't we do? We thought, well, what we're going to do is write an op-ed. That's what people like us do. So, we wrote an op-ed for the *Miami Times* called *The Octopus in the Parking Garage*. And that's basically what we said. We said, "Look, what can't we do that we're not already thinking about?" We said that "the octopus in the parking garage is an eight-armed alarm bell, an urgent call for recognizing and preparing for climate change."

Now, I had already been, at this time, in the Obama Administration working on climate resilience and trying to adapt fourteen federal agencies to climate change. So, this was already sort of wheeling through my mind. I eventually thought, "Well, I'm going to write a book about the octopus in the parking garage, about climate resilience." Just to cut to the chase and to be sort of extra simple about it: climate resilience, basically, for me, is a way of managing climate impacts in a way that helps societies learn, adapt, and thrive. It's about bouncing back better. You know something already about resilience,

because we talk about it all the time in terms of emotional resilience, in terms of physical resilience. Even if you go through some sort of bad event in your life, what you don't want to do is just power through it and get out on the other side like a car at the end of a demolition derby that is kind of just spinning around in the middle. That's winning, but that's not resilient, right? That's just being tough. What you want to be—if something bad happens to you, God forbid—you want to be able to assess that situation, figure out how you can change some of the things you might do and actually be a stronger person. Right? Learn some lessons and thrive in a better way.

That's what we want for everything in society as we look at climate change. So, in my book, when I started looking at climate resilience, I looked at all kinds of things. I looked at resilience from wildfires, I looked at restoration of coral in the Florida Keys, I looked at flooding in New Orleans in my neck of the woods. And almost throughout, I'm just blown away by the people I'm meeting. Just all kinds of folks who are working in communities, who are working in schools—people like Chief Shirell Parfait-Dardar or Sharon Levigne, who's an international environmental justice hero—all working in different ways to make their communities safer in an era of climate disruption.

I am going to talk today about power outages, which often come as a second disaster in the wake of the first, main disaster. The question I want to ask is: How do we make the grid more resilient?

Here's why resilience is so important. The climate is changing in a way that has no analog in our history; much faster because of what human beings are doing to it. If we keep looking backwards to understand what the threats are going to be, we're going to have a problem. I'm explaining this already in my own state. Entergy is, as you may know, my region's major electricity provider, and they're putting together their own climate impact assessment and submitting it to our public service commission saying, "We figured out what the risks are and here's how we're going to build better." They figure out the risks by looking at the last thirty years or so. That is exactly—ladies and gentlemen—what we will *not* have. What we are going to have is something *different* from that. There's only one jurisdiction that I

know of in the United States that's taking a different approach at this point. I'll tell you a little bit about that. There are a few that are going to be coming on-line with different approaches.

Here's the other reason that we need to know something about climate resilience. If we turned out the lights today all over the world and never consumed another molecule of fossil fuel, we would still be locked into more than one hundred years of heating. It's the same principle as if you boil a pot of water on the stove and turn the flame off. You're not going to stick your hand into it afterwards; it's got to cool down. And we are going to have the same issue. The other thing is, we are *not* cutting our carbon pollution down as fast as we need to, despite all the things that we are trying to do. So, we're going to get more warming than we can safely handle. The whole goal is to be able to manage impacts that we can't avoid and avoid impacts that we can't manage. Incidentally, we can't possibly limit global warming to 2.0 degrees Celsius above pre-industrial levels if we don't cut the demand of fossil fuels, whether it's natural gas, or oil, or any of that. I'm not just saying that; that's the United Nations, that's the National Climate Assessment of the United States, that's climate scientists all over the world. Nobody—*nobody*—thinks we can hit our goals if we don't reduce the demand of natural gas, oil, and other fossil fuels. So, that must be Job One. The *other* Job One is preparing for climate disruption.

Now, here's the reason why: because we know it's going to be expensive and hard, right? We know that. But we know that the other side is going to be even worse if we don't do anything to adapt to climate change. If we don't do anything to reduce our demand of fossil fuels by the end of this century, our economy is going to lose half a trillion dollars every single year. Just to put that in perspective, that is about the same amount of money that our economy expands by every year, which is to say any economic expansion we get in 2100 goes to pay off climate change.

So, we've got to have a different plan. Actually, a study published in *Nature Climate Change* suggests that adaptation is a way to reduce some of that. What do we do? Well, we reduce carbon pollution. We

talked about that. And we must also adapt. And we must do it in a way that's flexible and fair because we don't know how much we're going to have to adapt. We don't know how sensitive the planet is to these sorts of heating arrangements. We don't know how fast things are going to change. We also know that we have to be fair about this, because bouncing back better means getting rid of all of these social inequalities that see to it that the least advantaged among us will suffer the most from climate disruption—people of low-income, people in marginalized groups, and other overburdened and underserved populations.

When I was at the U.S. Environmental Protection Agency, in the first term of the Obama Administration, we were just starting to think about climate resilience on a programmatic, agency-wide level. We often talked about asking climate questions as a way of figuring out what resilience is supposed to look like. Our questions basically were: "How could climate breakdown affect what I'm doing?"—and I guarantee whatever you care about, whatever it is you like to do, if you think hard enough, there's going to be some negative implication—then, "What choices do I have?" and then, "What changes should I make?" Because we're not going to be able to become resilient to everything. There are going to be tradeoffs. And those decisions are sometimes going to be difficult.

When I think of power grid resilience, I always think about my experiences in New Orleans right after Hurricane Katrina and the levee failures. I still have nightmares about those days. There are thousands of people who still do. My nightmares are always the same—it's a million degrees outside and my house is six feet underwater. It's humid. Dragonflies are buzzing everywhere. The place smells like low tide times ten. And here is the image that comes back to me: rows and rows of abandoned refrigerators parked on the sidewalk. During a sustained power outage, people lose their refrigerators because everything inside rots, and you don't dare open that thing up. So, after Hurricane Katrina, there were literally hundreds of thousands of taped refrigerators carted off to the curbs. People took pictures of them and put them on Facebook. It became a meme. It was also a big problem.

The city couldn't just put them in landfills. The chemical refrigerants had to be drained out, along with all that organic ooze behind the doors. They hired scores of people to clean these things out. The newspaper interviewed one guy who had this job. When the reporter asked, "How terrible is it?" He said, "It doesn't really bug me because I'm a former mortician."

We're seeing bigger power outages, too, like the one in Puerto Rico after Hurricane Maria, where so many U.S. citizens were deprived of power for almost for almost a year. We're going to be seeing more of these because of climate impacts. Our grid is *not* resilient. In fact, we still don't have a standard for what grid resilience even means.

As Commissioner Tricia Pridemore, chair of the Georgia Public Service Commission, told us, we all want our electricity grid to be reliable, affordable, and safe. And that's the holy trinity of grid management. But now we want even more than that. We want our grid to be *clean* and we want our grid to be *resilient* in the long term. I'm here to tell you that all five of those things conflict with one another. Even the first three of those things conflict with one another.

When I'm asked to describe the power grid, I try to make it really simple. It's three circles. The first circle represents electricity generation. The second circle represents the transmission infrastructure—the high voltage lines and neighborhood distribution lines that move the power. The third circle represents the end user, you or me, or maybe an industrial user of some sort. If we want to know how climate breakdown could affect the grid, we have to look at those different circles. Take generators. We've heard a lot at the conference about power plants fired by natural gas. In the United States, nearly all offshore natural gas comes from the Gulf of Mexico. Half of the nation's gas processing infrastructure is there too, which is a bull's eye for hurricanes, which are just becoming more intense on account of climate change.

Nuclear power plants can be vulnerable too. Fort Calhoun Nuclear Plant in Nebraska was shut down for more than a year because of increased flooding. How many more power plants are vulnerable to similar floods? We need to do more assessments.

Sometimes the problem isn't too much water, but too little. I'm from Las Vegas. I'm third-generation Las Vegas. I grew up near Lake Mead. Hoover Dam, on Lake Mead, provides a lot of hydraulic power or hydroelectric power for California. When I was a kid, I remember the water rising so high, they would have to divert water through floodgates. Today, the lake has shrunk to less than one-third of its capacity. If the levels fall low enough, the dam will no longer be able to generate power. More than one million people would lose power.

Water temperature is also a problem. Remember the nuclear power plant I showed you? That plant has a cooling tower. Lots of power plants have cooling towers. Any plant that generates electricity through a thermal process needs a cooling mechanism. Often, that cooling mechanism draws water from a nearby river or bay. Then the water circulates through the facility, it cools the equipment by absorbing heat. That water—now warmer than when if first arrived—is often shot back out into the environment. So, if the water is too warm to begin with, it can't properly cool the system. Or, if the water outside is too warm, it can't take hotter water coming out, because that would hurt the fish or other native species.

Let's look at transmission infrastructure, which includes high-voltage lines, local distribution lines, and the substations that change the voltage of power moving through the system. We have 55,000 substations in the United States today, many of them are in floodplains. Thirty percent of New York City's substations are prone to flooding.

Perhaps you remember Winter Storm Uri, the cold snap that struck Texas in February 2021. State-wide energy disruptions followed, leaving as many as four million people without electricity or heating fuel in icy temperatures. Water mains burst and water treatment plants failed. More than one hundred people died. The main culprit? Failed power production—specifically from natural gas, which fed two-thirds of the state's generators. The pumps that took the natural gas out of the ground, or that pumped it through pipes, all of that froze and failed. Why? Because none of it was weatherized. Why? Because there were no rules requiring it to be weatherized. Why? Because the industry said they didn't need regulation. "We're not stupid," they said, "it's in our

financial interest to protect our assets." But they didn't. Maybe they miscalculated. Maybe they ran the numbers and decided they could take the financial risk. But that shouldn't give them the right to impose dangerous risks on the public they serve.

One of the things that that Maggie Kelly Riggins of the Southeast Energy Efficiency Alliance reminded us is that there's always a social aspect to these trade-offs, an aspect that requires us to think about justice. There's a whole area of social science that goes back at least to the 1950s of studying the idea of the combination between physical vulnerability and social vulnerability.

In Louisiana, where I live, we are, of course, concerned about the geophysical risks faced by our communities—the heavy rains, the hurricanes, and so on. But we are also very interested in the economic and social risks our communities face, which is to say, the high levels of poverty, racial inequality, and political marginalization. If you measured both types of risks and compared them to the levels in other states, you would find, not surprisingly, that the Pelican State is somewhat of an outlier in terms of geophysical vulnerability. That comes with living on the Gulf Coast. What you would also find is that, in terms of social vulnerability, we are even *more* of an outlier. But, unlike geophysical risk to storm weather, social injustice is *not* a necessary part of living on the Gulf Coast. It is something our leaders have just chosen to tolerate. What is more, there are many places in the United States where social unfairness is layered on top of geophysical risk. If you are interested in learning more about the geography of social vulnerability, the U.S. Department of Health and Human Services maintains an excellent website and mapping tool designed to help policymakers learn more about their communities for the purposes of reducing disaster risk.[2]

Memorial Hospital during Hurricane Katrina housed dozens of elderly people marooned in a hospital that had no power, and several people died. Around the country, there are all kinds of other problems

2. *CDC/ASTDR Social Vulnerability Index*, AGENCY FOR TOXIC SUBSTANCES & DISEASE REGISTRY, U.S. DEP'T HEALTH & HUMAN SERVS., https://www.atsdr.cdc.gov/placeandhealth/svi/index.html [https://perma.cc/A7EY-KG9X] (Nov. 16, 2022).

with power outages, as you could probably imagine. When you look at the literature of social vulnerability and disaster, so much of it is about power outages. People whose medicine is spoiling in their refrigerators. People who need ventilators and they don't have power to feed them. People in wheelchairs with dead batteries. The literature is huge on this. Heat waves are part of the story too. More than 700 people die every year from heat stress in the United States. That's seven times the number of people who die in floods. And the people who die in heat waves are disproportionately African American and Latino. Experts say you can draw a straight line from racially discriminatory lending practices to increased heat risk in minority neighborhoods.

Well, what can we do about it? There are three main strategies for building a more resilient grid: hardening, smartening, and greening. You harden, or armor, the grid to protect against physical threats, you make the network nimbler and more responsive by taking advantage of computerized communications systems, and finally, you replace carbon-based power generators with renewable sources like wind and solar, both of which have proved more resilient to many kinds of storms and other stressors.

During Hurricane Sandy, so many of the natural gas plants failed, so many of the coal plants failed, but no wind turbine failed. They turned them off during the during the worst of the winds, and they just turned them back on and they go.

Just north of Fort Meyers, Florida, there's a community called Babcock Ranch that is powered by more than 700,000 solar panels, specifically designed to stand up to strong winds. Last year when a Category 4 hurricane hovered over the town for more than eight hours, the lights stayed on. The whole town was operating normally a day after the storm passed. There is a real story here about making this more resilient.

We're talking a lot about microgrids in the United States, and there are a lot of problems in rebuilding the grids in Puerto Rico, political and otherwise. But one keen idea that they have is maybe having a series of eight microgrids where they're all linked together and

running, just like you'd expect a grid to work. But then in times of disaster, you can separate them, so a failure in one place is not a failure in another place.

Another thing that's going to be really important about renewables is making renewables work for high-heat industries. This is something that we were hearing about from Commissioner Pridemore. I know this problem very well. In Louisiana, sixty percent of our carbon footprint is related to heavy industry. We cannot get to net zero if we don't find a way to electrify heavy industry. There's no way. Because certain processes now used in oil refining and ammonia production, to name two examples, require high levels of heat. Today, that's generated by burning natural gas. Luckily, there are technologies either available now or in development that will allow us to operate our industries without such reliance on fossil fuel.

Industrial heat processes of over 400 degrees Fahrenheit can be produced with certain technologies like concentrated solar energy. It's now possible to make ammonia without high heat, using electricity generated from renewable sources. It turns out the places that are working the hardest on trying to electrify heavy industry tend to be in Europe. Why? Because natural gas is more expensive in European countries and, thus, the incentive for innovation is stronger. So, it's not just about having the technology. There has to be an incentive to *use* it.

Since, I have a little bit more to say about incentives, I should give you a trigger warning: *there is economic theory ahead*. If you stay with me, you will soon understand why, as a general matter, the U.S. power grid—not to put too fine a point on it—just sucks. We have some great technology. Lord knows, we have some great people involved in managing our utilities. But the grid is still not up to snuff. And it's because of the way or management system is *designed*.

Let's start with the observation that the power grid is infrastructure, what economists call a public good. That means the benefits are shared and often hard to internalize. What's the problem? We like infrastructure. We like streets that are free to use. We like electricity that's affordable and accessible, even though it might be expensive to

make. Why? Because we all rely on it so much. We couldn't live a full life without electricity or roads. The other thing is that if society provides those things to all in an affordable way, we actually get more total economic benefit. That's why roads are free, generally speaking. That's why the internet is basically free. And with that, you get things like Amazon—an amazing service provider and revenue generator.

So, all of that is what you can call infrastructure, a shared good. Another way of thinking about infrastructure is it's the thing we always underinvest in and over rely on. That's because it's the reversal of the tragedy of the commons. You already know what a tragedy of the commons is because if you've ever shared a kitchen in an apartment with three or four flat mates, you've lived it. Everybody underinvests in cleaning the dishes and over relies on dumping the dishes in the sink.

So now we understand economic theory. Once we know that, we can understand why our grid right now probably has a funding gap of $117 billion because we're not putting enough in it. What does that mean? Based on a 2016 study, we could lose $4 trillion in our GDP by 2025, which brings a lot of lost jobs, a lot of unfairness, and all of these other kinds of things.[3]

Because power generation is a public good—something that everyone must have access to but that no one wants to pay enough for—we need special incentives to encourage adequate investment in upkeep and expansion. For the most part, these incentives were created a very long time ago and are out-of-date. You might not know this, but in most places in the country, utilities do not sell their electricity for a profit. They sell it at cost because, as a regulated monopoly, they're not allowed to do anything different. So, how do utilities make money? They make money by raising their rates when they build new stuff. Then they are allowed to raise the rates. What is that new stuff? That's more power lines, more power generation, big, heavy things, nuclear power plants, all of that. They build it and then they get to raise their

3. AMERICAN SOCIETY OF CIVIL ENGINEERS, FAILURE TO ACT: CLOSING THE INFRASTRUCTURE INVESTMENT GAP FOR AMERICA'S ECONOMIC FUTURE 4 (2016), https://www.infrastructurereportcard.org/wp-content/uploads/2016/10/ASCE-Failure-to-Act-2016-FINAL.pdf [https://perma.cc/STZ5-4527].

rates, which is completely how it's intended to be. Then the public utility commission, the body that regulates in-state utilities, decides how much they can raise their rates. This arrangement is called "cost-of-service regulation."

When you build new stuff, you make a lot of money. And the more expensive your new stuff is, the more you make and the more electricity you can sell. That used to be a good thing because in the past we needed the grid to expand in order to make electricity accessible in far-flung, rural areas. Now, it's almost everywhere. Electricity is still not as accessible as it should be in many tribal regions. One of the things that did not happen during Franklin Roosevelt's push for rural electrification was the expansion of power on Indian land, and that's still a problem.

So, you get lots of money from building stuff. What you don't get a lot of money from is investing in ways for people *not* to consume more electricity. Smart meters are an example of this. Now, some places have a lot of smart meters, often, they're required to have smart meters, but you don't make money if you're a utility installing smart meters that allow people to consume electricity. First of all, smart meters are not that expensive, so you're not getting a lot of money from that. Second, people are buying less electricity, which means you don't have to expand the grid as much. It's just a way that the thing is arranged.

There are lots of economists and legal experts who have all kinds of workarounds. People who want to change the way utilities get revenue. Maybe a utility could get more revenue if it showed that it was becoming more efficient. That would be different than building new stuff. But you would have to change the rules for that to happen. And in some cases, that would have to happen with the legislature. In some cases, it would have to happen with the commission.

So, how do you make power utilities *not* suck? One way is you have more regulation—smart regulation, not just any old regulation, but you attempt to create the reasons for people to do things. Some legal experts say that utilities should have more legal liability for when things fail. I'm all for liability when things fail, but I don't think it's a

very efficient way of getting the results you want. You need to create incentives for people to do the right thing. So, sticks are regulation, if you will, and carrots are incentives.

Here is a little story that is interesting to me. Sometimes these are called portfolio standards, but you can have renewable energy standards that essentially require that a certain percentage of energy that's sold on the grid come from renewables. Most states have these, but some don't. Right now, some of them are up in the in the Intermountain area, but there's a big window in the Southeast that happens also to be an area where there's almost no terrestrial wind power. Part of it is there's not as much wind, that's true, but the other part of it is there's not as much incentive.

One of the things we're dealing with in Louisiana is that we don't have an incentive to get heavy industry to electrify. To do that, we would either have to have some kind of regulations insisting that they create ammonia using electricity, which is possible, but it's not the easiest thing to do right now. So, we could either require that, or we could put more money in the development, like they do in some European countries. Or we could put a price on carbon. Make natural gas more expensive, and then they would look for ways to do something without expensive natural gas. All of those, as you know, are politically hard to do, but I'm just sort of putting it out there.

One of the things that I'm really pushing is for renewable energy standards for Louisiana. It's the public utility commission that could make that happen. Five elected people could make that happen. So, I tell my students that if you're interested, if you want one of these standards, you need to look at the people you vote to put on the public utility commission. It's the transparency part that I think is really hard. People don't know how you get the things that they want.

Here's just another quick example that I think is interesting. I mentioned that there was one state that I think is ahead of the game on resilience, and it's New York. After Hurricane Sandy, Consolidated Edison (Con Ed), the main energy provider, the main utility said, "We need a billion dollars to rebuild this grid." And everybody wanted it built now. So, they went to the equivalent of the public utility

commission in New York, and they said, "May we raise rates so we can fund one billion dollars of improvement?" Often, when there is a request like this, the commission says something like, "Sure. Okay." That's what happens in my state too. The utility comes in with all of the paperwork, all of the studies. And the commission has resources, but not unlimited resources. So, they look at it and they go, "Okay, looks good to me. Raise your rates and build the one billion dollars' worth of improvements."

What happened in New York was a little different. There were several community groups, not unlike the community group that Maggie Kelly Riggins is associated with, that started wondering what Con Ed was actually going to do with that money. Then, it being New York, they got folks at Columbia University involved and they got the law clinic at Columbia involved, they got a law clinic at Pace University involved, and they got some of the best climate scientists from Columbia University involved. They made a case in one of these rate hearings that said, "Look, if they're going to spend one billion dollars and raise our rates, we want to make sure they put in world class climate projections to make sure that what they build is going to last." And there was a whole thing about, oh, we don't know enough about how to do it, nobody knows how to do it. Well, these scientists at Columbia University and elsewhere are going to help you. And these experts, over the span of two years or so created a set of projected scenarios for the state of New York. They forecasted future sea level rise, the increase in ambient temperature, the changes in rainfall, and they put all of this together and built the country's first real climate resilience plan for a power grid.

What happened in the time being, because they wanted to build fast, was that the utility was allowed to move forward by adding three feet to its one-percent storm elevation standard (that is, a storm that has a one percent chance of happening in a year). Just throw another three feet of elevation on whatever you want to build, and we'll call it good. But after we get the projected scenarios, then you've got to do something better. What they found out after they got the scenarios is

that three feet wasn't enough. So, they're going to have to go back and either retrofit some of those rebuilt facilities or abandon them.

Now, that is a big news story, and it happened because of political engagement from community groups who knew what a public utility commission was. And it's a super technical field. But in the state of Maine—I just talked to a legislator up in the state of Maine—they just passed one of the first laws in the United States that requires their public utility commission to make sure that any plan for their grid comports with the state's plans for cutting carbon. They're connected. So, when the utility comes and says, "Here's our plan to build more stuff," the utility also has to say, "And here's how that plan will help or hurt the state's carbon reduction goals." The second thing it requires is utilities also have to include an environmental justice assessment. Effectively, they have to say, "Here's our plan to build more stuff. And here's how that plan will help or hurt historically marginalized communities in the state of Maine."

This kind of forward-looking design can be done. We have the technology and the skills. But, for the most part, utilities aren't going to do this on their own. There has to be either an incentive or a mandate. In New York, the mandate for scenario planning was developed from existing law. There's this phrase, for the law students out there, called prudent capital investment. What that means is that when you go to your rate maker and you say, "I want to build stuff," the commissioners have to say, "Well, is it a prudent capital investment?" What climate advocates did in New York was make the case, the legal case, that if a utility didn't plan for climate change, it couldn't claim to be making a prudent capital investment. That was the legal hook.

"Prudent capital investment" is a mandated standard. A common example of an incentive can be found in tort law. Private utilities, and sometimes government-owned utilities, can be held liable when their mistakes are reckless or negligent and cause harm. It's a good thing to hold institutions liable for mistakes like this. But I'm not sure that you want to wait for a catastrophic event and the resulting lawsuits before sending the right incentive. There are carrots too. Recall that we had

$117 billion gap, by at least one estimate. The Biden legislation, particularly the Infrastructure Investment and Jobs Act, is making available nearly a trillion dollars for improvements on energy. That's not just the energy grid. That includes electric vehicles (EVs) and the infrastructure that supports them. But the legislation is a huge shot in the arm. Within that budget, there is almost $30 billion earmarked for resilience.

What I'm afraid of is that we don't know what we're talking about when we say "resilience." We haven't agreed on the standards yet. So, the Federal Energy Regulatory Commission (FERC), the federal body that regulates the interstate energy market, for the first time now has a rule that's requiring the development of a climate resilience standard for power grids, at least as it relates to certain kinds of climate impacts. That's brand new. We really need it because we don't have a good working definition of long-term durability.

To return just to something very general. In my book, there is one chapter called "Lights Out," which is about the grid.[4] Then I have a chapter about wildfires, which also involves the power grid. A lot of these things get connected. Flooding. There's a whole chapter on flooding, and it's connected to the power grid too.

There's a chapter on people migrating, on displacement and restoration. In Louisiana, we've already marked areas where we as a state are encouraging people to move because we cannot protect this area in southern Louisiana anymore. In the future, we'll be having discussions about, not when, but *whether* some power grid infrastructure should be rebuilt. That's how serious it's getting. We're going to start getting lawsuits at some point because people in communities are going to say, "You're supposed to build back my road. You're supposed to build back my power grid." The state of Louisiana is basically saying, "Look, there are some places that are just not worth it," which is a value judgment with a lot of complicated cultural issues wrapped inside.

4. VERCHICK, *supra* note 1, at 104.

I would encourage you to look at Tybee Island as just one example of a place in Georgia that's going to have to have these conversations at some point. How many times are they going to rebuild that road that goes to Tybee Island? How committed is the state going to be to providing electricity in areas like that?

So, all these things connect. Throughout my book, I try to emphasize the theme of hope. For me, hope is different from optimism. An optimist believes that success is likely. Where climate change is concerned, I don't know if that's true. But I do know that if we all join together and work hard that success is *possible*. And as long as success is possible, it's our moral duty to make it so. We can persist as individuals working in community groups like they did in Texas, or as people working as regulators on utility commissions, or as lawyers, or stewards of industry. We can persist.

In one chapter of my book, I write about hiking in the Cascade Mountains with my son in Washington. I live in the Pacific Northwest during the summertime, and about twenty-five years ago, I climbed Mount Rainer with my wife. The mountain is known for its many sprawling glaciers. Since then, I have hiked the base of Mount Rainer every year and visited a particular glacier, called Nisqually. I hike to a ridge where you can pull out your binoculars and see a cavernous hole at the base of the glacier from which tumbles a waterfall of milky fluid, ice, and rocks. There's nothing unusual, in itself, about a glacier spitting out ice water. That's what they do. Over millions of years, an ice sheet grows; the glacier's enormous weight creates pressure and heat inside. Internal layers of ice melt, escape as water, and eventually fill downstream rivers and lakes. In a sustainable glacial system, the ice growth outpaces the water loss. But today, in Mount Rainier National Park, the situation is reversed: less ice is piling up and more water is flowing out. That excess flow contributes in various ways to downstream flood problems in communities within the park that are located along the rivers that the glacier feeds.

My son was in elementary school when I first took him to see Nisqually Glacier. Now he's a big guy about to graduate from college. He studies climate and earth science. I ask him a lot about how we can

get people interested in these things. And one of the things that we came up with, and I talk about it in the book, is that we need to learn more about what our vulnerabilities are. We need to talk about them. Sixty percent of the people in the country are concerned or alarmed about climate change. That's good news, right? But most of those people don't talk to anybody about it. We know that too. They don't even talk to other people who care about it. They just don't talk about it. They clam up because they think there's nothing we can do. They are filled with anxiety. Some say things like, "I don't want to have kids." But what you need to do is talk about those things and then pick anything that's small and doable and do it. Just keep going in that direction. Because the opposite of despair, I have come to learn in my life, is action.