

Resources

BIG DECISIONS

Time to face the future of US environmental and energy policy

NEW RESEARCH

Navigating the Waters of the United States

A recent report finds flawed methods and assumptions have reduced safeguards for US waters

FOSSIL FUELS

Plugging Orphaned Oil and Gas Wells: What We Know and Need to Know

CLIMATE CHANGE

A Climate Resilience Road Map for the New Administration

An eight-part federal policy agenda to tackle the climate emergency



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Accessible for
Everyone.

Resources Radio

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A Note from RFF's President

Looking Forward

Last year was tough, beyond any stretch of the imagination. In spite of the hardships and setbacks, Resources for the Future (RFF) has stayed the course to help improve environmental, energy, and natural resource decisions through impartial economic research and policy engagement.

Now that a turbulent 2020 is behind us, we have the opportunity to look ahead—with informed optimism and educated guesses about what's to come. In this issue of *Resources*, RFF scholars and others offer some research-based recommendations for how the incoming Biden administration can advance the goal of transitioning to a low-carbon future. We have an article from Arthur G. Fraas and Richard D. Morgenstern that examines benefit-cost analysis, its recent erosion, and whether its integrity can be restored. Brian Prest weighs the options for a new administration to reform oil and gas leasing and permitting. University Fellow Carolyn Kousky provides a road map for climate resilience. A dazzling infographic summarizes recent work from Dallas Burtraw and others about how to decarbonize global industry. Daniel Raimi shares updates from his research about policy options for managing abandoned oil wells.

This issue of *Resources* also gives important updates on a new report from the External Economics Advisory Committee, which evaluates the rules encompassing Waters of the United States, along with follow-ups from our *Climate Insights 2020* survey, which gauges American public opinion on climate change and the environment.

To draw from my conversation with Sue Tierney, the chair of RFF's Board of Directors, in the final episode of the special *Resources Radio* podcast series we co-hosted this past fall: Ultimately, actions have consequences—and if you don't have good data and analysis, you have little idea of what those consequences might be. You need a good baseline picture of reality, and you need a solid understanding of how your actions might change that reality.

Opportunities are wide open, and at RFF, we are eagerly looking forward to working with a new administration, Congress, our supporters—and you—to actively pursue a healthy environment and resilient economy.



All best wishes,

Richard G. Newell
President and CEO, Resources for the Future

Resources

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BIG DECISIONS

The Future of US Environmental and Energy Policy

INTERVIEWS BY

Richard G. Newell
and Susan F. Tierney

WITH INSIGHTS FROM

Jody Freeman
Paula Glover
Amy Harder
Jeffrey Holmstead
and Mary D. Nichols

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Rob Dobi

Resources Radio is a weekly podcast launched in late 2018 and produced by the Resources editorial team and Resources for the Future (RFF).

Guest hosts Richard G. Newell, president and CEO of RFF, and Susan F. Tierney, chair of RFF's Board of Directors, sat in for a month-long spin-off series that we launched last fall. Throughout the series, Newell and Tierney talked with leading decisionmakers, analysts, researchers, and reporters about the big decisions that will impact US environmental and energy policy in the years to come.



Listen to full versions of all the interviews in this article and lots more at resourcesradio.org.





In this podcast episode, **Richard G. Newell** spoke with **Mary D. Nichols**, an environmental lawyer and former chair of the California Air Resources Board. They discussed some policy debates that have animated Nichols's years leading the agency, from early disputes surrounding Governor Arnold Schwarzenegger's push for a cap-and-trade program to contemporary discussions about crafting environmental policies that address systemic injustice.



“
We meet in open sessions, our hearings take as long as they need to, and everybody is invited.
”

BIG DECISIONS IN

Air Quality Regulations

This podcast episode was originally released on October 19, 2020.

The transcript of this conversation has been edited for length and clarity.

Richard G. Newell How did addressing air pollution become your life's calling?

Mary D. Nichols I moved to Los Angeles and found a job with a public interest law firm that was just getting started—because this was 1971, when the whole field just began. They had a grant from the Ford Foundation to work on environmental issues, and they had divvied up the issues. As the youngest—the kid—I got assigned to do air pollution. It was pretty obvious that air pollution was the number one environmental issue in Los Angeles.

At that point, there was essentially no body of law about air pollution at all, but the Clean Air Act had just been signed into law and was ready to be interpreted. It was, at that point, an amazingly concise and powerful piece of legislation. I got to figure out how to bring some of the first cases under that new statute, which is something that I think every young lawyer dreams of.

Newell I had never fully appreciated how your career has really spanned the entire implementation of the Clean Air Act; that's amazing. Let's fast-forward to today, when we're facing a series of enormous problems: the pandemic, the country's racial reckoning, and of course the climate issue. Over the summer, you saw firsthand the devastating effects of wildfires in California. Do you see a clear path out of these predicaments? How related to each other are the solutions for all these major challenges?

Nichols The solutions are related—or, they need to be related.

I worked in the civil rights movement, and I saw that systemic racism (although we didn't call it that, then) clearly affected

the futures and lives of whole segments of the population—and the legal system had something to do with creating those problems. I worked with others to try and create paths to divert people out of the system. When you layer environmental pollution on top of societal challenges, the effects are synergistic, not just additive.

This connection finally has been recognized in a broad way and is now part of the discussion about solutions. It has to be.

Newell You've overseen some key cap-and-trade programs, such as the federal Acid Rain Program and California's own emissions trading programs. I know that California's landmark Global Warming Solutions Act of 2006, known as Assembly Bill 32 (AB 32), had scoping plans that described a major role for regulations and a relatively minor role for carbon pricing. But carbon pricing has grown over time, and I wonder whether you see a larger role for it in the future.

Nichols Governor Schwarzenegger, who signed AB 32 into law, wanted the legislation to be based on a cap-and-trade program. He was taken with the idea of market-based programs, and in fact, one of the reasons why he wanted me to come and run this program at the California Air Resources Board (CARB) was that he found out I'd been at the US Environmental Protection Agency when the Acid Rain Program went into effect. And that was the first—and at that point, the only—cap-and-trade program that had ever actually been fully implemented.

He was very excited about that, but the Democratic-controlled legislature was not at all excited about it. In the end, the legislation sent to his desk said simply that CARB could include a market-based program in the scoping plan if they made certain findings. But the governor was determined from day one to implement a market-based program; my job was to figure out how to get it in there without completely upsetting the legislature

and while integrating it into a program that was based on regulation.

Of course, it's a bit of a misnomer to assume that a cap-and-trade program and regulations are completely opposed to each other—but they were presented as stark opposites. To this day, some groups that fought having a cap-and-trade program in the legislation still are not in favor of it—even though it's been operating successfully for a decade now; has raised revenue that's supported some very progressive programs in environmental justice communities; and has operated as a cap on emissions, as it was intended to.

Newell Does an optimal balance exist for drawing down emissions? Should we seek a balance between carbon pricing and regulations?

Nichols We probably need a market program like cap and trade. We've included industrial sources and fuels, and we have a market-based program that applies to automotive fuel suppliers—the Low Carbon Fuel Standard—which is a separate regulation. We have an emissions standard for motor vehicles—which directly regulates the amount of greenhouse gases that vehicles can emit—and we have a bunch of other regulatory programs, including a requirement for carbon-free energy.

It's a complicated system, but these things interact with each other. I don't know that we've gotten it perfect, but at least we've been able to keep the whole thing together, reduce emissions, and do it in a way that not only has *not* hurt the California economy, but demonstrably has been beneficial.

Newell AB 32 was only 13 pages long. I've even heard it compared to somebody jumping out of an airplane and designing their parachute on the way down. Yet, CARB has successfully enacted so many pathbreaking programs on the basis of that relatively brief legislation, it seems that establishing a careful process has been at least one of the keys to that success. Do you agree? How does CARB design and implement regulations, particularly given the complexities you've just laid out?

Nichols CARB is an interesting example of how you can combine a democratic process with a highly expert bureaucratic process.

The board itself comprises appointees of the governor who have to be confirmed by the legislature. Half of them are elected officials at the local level who serve on their local air pollution boards, and the others are filling special seats with special qualifications such as automotive engineer, physician, or attorney (in my case)—fields that were considered necessary for an effective air pollution control program.

After AB 32 passed, the board increased in size. We now have two legislative appointees who need to represent environmental justice communities or have experience dealing with environmental justice issues. We also have two legislators who serve ex officio and are liaisons to the legislature, because the legislature realized how important this program is and how difficult it would be for them to try to create the whole program themselves. They clearly were delegating a lot of power to this unelected body, and they wanted to make sure that they kept an eye on what we were doing and how we were doing it.

We had a history at CARB, going back to the 1970s, of doing things that were controversial in various communities at various times. History, experience, and expectation demand that you listen to the public and not just to the regulated community (although you have to listen to the regulated community, as well). We meet in open sessions, our hearings take as long as they need to, and everybody is invited.

When AB 32 passed, however, an additional layer of advisory committees was set up, including a committee of economists who evaluated the design of the cap-and-trade program, a technical advisory committee, and the environmental justice committee that I mentioned. We set up a website, and thousands of people from all over the state wrote in with ideas and suggestions about how California should address global warming. There was a huge amount of public interest in this program from the beginning. While we don't get quite that level of attention at our monthly meetings

BIG DECISIONS IN

Federal Legislation

Richard Newell spoke with **Amy Harder**—a veteran reporter who's leading a new journalism initiative on the energy transition with Breakthrough Energy, an organization founded by Bill Gates. They discussed the likelihood of bipartisan policies moving forward, “climate hawks” in Congress and the viability of climate policy, implications of changes in the Supreme Court for environmental cases, and more.



Amy Harder on how polarized politics shapes environmental policy:

» “Climate change has become so polarized over the last decade that policies intricately tied with climate change often run into political headwinds so much more than tangential issues like conservation and public lands, which was at the heart of the Great American Outdoors Act.

You still see Congress coming together to do big things in that respect.”

anymore, we get a lot of interest from all kinds of different groups around the state—people with ideas for how we can do things differently or better, and people criticizing the program either for not being strong enough or for being too strong.

We do our work in a very public setting. I think that makes the program more durable and more sustainable.

Newell The word “rollback” perhaps has become the defining word of the Trump administration in relation to environmental policy. The *New York Times* has counted more than 100 environmental rules being reversed; many of those, including the reversal of vehicle emissions standards, are issues at the forefront of your work in California. In the event of a Biden administration, what would you say should be the immediate priorities at the US Environmental Protection Agency?

Nichols The standards currently in effect for conventional air pollutants and greenhouse gases are not good enough to

get us where we need to go. If we assume that we should aim for a goal of carbon neutrality, then we may be able to prevent warming from reaching catastrophic levels. If that’s the goal we’re willing to accept as a country, then we’re going to have to move fast to make some big changes.

The plan that was adopted in the Obama administration—the Clean Power Plan—is not good enough. We’re going to have to find ways to leapfrog over some of our current regulatory problems. I don’t think we can do all or much of this without legislation, although there’s a lot we *can* do. One thing we can do is with cars, trucks, and the transportation system: we can go back to the bargaining table with the automotive industry and come up with a way of coordinating on these regulatory programs going forward.

Just defaulting to where we were before Trump came into office is not going to be the right solution. I think we’re going to have to find a way to continue making progress, which is very much like the framework agreement

that we came up with in California, where five companies are negotiating a whole new set of standards that involve zero-emission vehicles by the middle of this century.

Newell Can you say a little bit more about that and the recent announcement in California?

Nichols The governor recently signed several big executive orders relating to climate, but the one that I was most directly involved with deals with the transportation system. It will require that we move to zero emissions for new vehicles by 2035. The fleet as a whole has to turn over by 2045, and that’s going to include trucks, tractors, and off-road vehicles. It’s an exceedingly ambitious goal, which also will require huge public and private investments in the infrastructure for fueling all these new vehicles.

It’s a goal that fits the size of the problem, but not only that—it also lays out an ambitious agenda that will give industry, city planners, and anybody thinking about transportation a

BIG DECISIONS IN

Administrative Law

Sue Tierney spoke with **Jody Freeman**, a professor who specializes in administrative law and environmental law at Harvard, and **Jeffrey Holmstead**, an attorney and former assistant administrator of the US Environmental Protection Agency who also serves as a member of the President’s Council at RFF.

They discussed past “shenanigans” in presidential transitions; how the next administration might prioritize goals in office, particularly during a troubling pandemic and highly unstable economy; the need for congressional action to make headway on climate change; and more.



Jody Freeman acknowledges that climate change will intensify even after Trump leaves office:

» **“More intense hurricanes, more intense fires, a longer fire season—all the things we’re experiencing are worse because of developments in the world of climate ... Everything looks like it’s on fire for the new president, and I think it’s going to be very challenging to figure out what to do, and in what order.**

And remember: presidents don’t have much time before the midterms, so they’ve got to figure out what their priorities are.”



Jeffrey Holmstead believes Congress should lead on environmental policy:

» **“I don’t think a conservative Supreme Court will be opposed to environmental regulation, and I think they’ll do their best to see that agencies implement the statutes consistent with congressional intent ... but it will be clear that the courts are not the place [to deal] with solutions to climate change ... [the US Environmental Protection Agency] can certainly do some things, but I think, ultimately, we should all be looking to Congress and hoping to come up with the kinds of solutions that can get enough votes to pass and be durable.”**

“
The standards currently in effect for conventional air pollutants and greenhouse gases are not good enough to get us where we need to go.
 ”

path forward. It was greeted with excitement by many, but also with the sense (even by the auto industry) that we were on this path, anyway. The auto industry may not like having deadlines or state mandates for this, but they understand this is the direction the world needs to go, and it’s what’s going to be demanded of them.

Newell How much of the executive order needs to be followed up by additional legislative action? Is it now in the hands of CARB to develop specific regulations? What else has to happen?

Nichols The executive order is aimed at executive agencies, so it directs CARB and our sister agencies to develop the regulations that actually implement the order. In a couple of places, the executive order also specifically invites the legislature to step up, adopt these goals, and add requirements, if they want to do that. This is particularly the case with respect to petroleum fuels in California, where because of existing legislation, the governor can’t require the oil and gas industry to stop using fracking techniques to produce fuel.

In general, these are things that could be done without legislation. But if we want to make it something that’s widely accepted and that the legislature wants to put its own stamp on, then the legislature will want to come and put their hands on it, as well.

Newell We’ve talked about technology in the context of vehicles, but technology developments will be important more broadly in facilitating an energy transition and reducing emissions. What do you believe should be the role of environmental entrepreneurs and venture capital in the coming years? What levers are available to policymakers for supporting that kind of private sector innovation?

Nichols Environmental entrepreneurs have been key to the creation and implementation of our climate program, going back to the beginnings of the vehicle emissions standards and AB 32—both of which had significant support from Silicon Valley venture capitalists and entrepreneurs who care deeply about the problem of global

warming, but who also saw an opportunity for California as a first mover, and for the businesses in which they’re directly involved.

Just to give one example of a well-known individual who participated in the development of this program: Tom Steyer is one of many people who believe the private sector needs to play a role in making sure these programs are created and delivered in a way that benefits the greatest number of people. As it’s turned out, California has attracted venture capital to a greater extent than any other state, in large part because of this program.

Newell You have extraordinary depth and firsthand experience in crafting environmental law and policy. What are some of the big environmental decisions looming on the horizon that you think we aren’t paying sufficient attention to right now, in either the public or private sector?

Nichols Gosh, there’s so many. I suppose I’d say the issue of global air pollution. In Los Angeles, pollution levels today are a tiny fraction of what they were 40 years ago. Meanwhile, other cities in China, India, Indonesia, and elsewhere are almost unlivable. The World Health Organization has declared air pollution as the biggest threat to people’s lives.

We’ve got to get to some kind of global consensus about addressing these problems, and we need a sense of shared responsibility. The thing that’s made this so painful for me, as a person who has worked so long in this area, is watching how Donald Trump, his administration, and other leaders have turned things backward in terms of their willingness to address these issues that affect the health and well-being of their own people and the planet. And we’ve seen their response to the COVID-19 pandemic. We’ve seen these same things playing out, but in a much starker fashion, with people demonstrating for the right to not wear a mask or violently protesting against measures that protect not just their own health, but public health. The lack of a consensus around protecting public health, and the lack of trust in science, need to be addressed seriously. That’s probably the biggest challenge I see.

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We’ve got to get to some kind of global consensus about addressing these problems, and we need a sense of shared responsibility.
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The “Big Decisions” podcast series culminated in a fifth and final episode in which guest hosts **Richard G. Newell** and **Susan F. Tierney** discussed the difference it makes when policymakers have access to sound economic and policy analysis and the best ways of deploying resources to achieve ambitious policy outcomes.



“**RFF will focus on two major areas where we think we can help improve environmental, energy, and natural resource decisions: The first is in designing smart emissions reduction strategies. The second is in confronting risk and building resilience.**”

BIG DECISIONS IN

Data-Driven Policymaking

This podcast episode was originally released on October 30, 2020.

The transcript of this conversation has been edited for length and clarity.

Susan F. Tierney We’ve asked this of all our guests while hosting this special series on *Resources Radio*, and I’d like to turn the question around on you: How did you end up building a career in energy and the environment?

Richard G. Newell In 1987, I was finishing my undergraduate work. At the time, I was doing a dual degree in materials engineering and philosophy, and I recognized that it wasn’t where I wanted to spend the rest of my life; I was looking at different things and exploring.

That was around the time of something called the “Gar-barge,” which was a vessel full of garbage: the *Mobro 4000*. Some may remember that the barge sailed from Long Island and headed to North Carolina, where its garbage was supposed to be disposed of, but it was turned away. So, it headed down the East Coast of the United States and was denied entry into Mexican waters. It went as far as Belize before it came back, and its trash was eventually incinerated in a Brooklyn landfill.

I looked at this and other issues at the time—like acid rain and the ozone hole—and I thought, “This isn’t just a technology issue. There’s something else going on here.” There’s the cost of the different options, politics, business, and policy that makes change happen. And I said, “That’s for me.” It’s analytical, it’s broad thinking, and it’s really important to society. After that, I became more focused specifically on the economics of climate and energy policy, technology, and markets.

Sue, you’ve been involved on transition teams for a couple of presidential administrations and have held various roles within the federal government. Can you tell us something about those experiences?

Tierney I was fortunate to co-lead, with Elgie Holstein, the Obama-Biden transition team at the Department of Energy. Based on that experience, I want to celebrate the peaceful and constructive transition of democratically elected leaders.

The transition from the George W. Bush administration to the Barack Obama–Joe Biden administration was, of course, a change in party, and I cannot say enough good words about the transition. It was a very complicated time; the economic crisis was real and deep. The Department of Energy staff did a great job of handing things off; it was extremely cooperative. I can’t point to anything that seemed like angling, caginess, withholding of information, strategic sharing—nothing like that. It was great. That’s what we deserve, and I got the privilege of operating in that kind of environment.

Now a question for you, Richard: I know that Resources for the Future (RFF), as a nonprofit organization, is very careful to not take positions in electoral races or legislative politics around specific proposed bills. Regardless of the outcome of this election, important research questions may be relevant for what’s ahead in the next administration. Could you share some thoughts about what kinds of research questions RFF scholars will be exploring in the future?

Newell Regardless of the election outcome, RFF will focus on two major areas where we think we can help improve environmental, energy, and natural resource decisions: The first is in designing smart emissions reduction strategies. The second is in confronting risk and building resilience.

Sue, you have experience in academia, in state and federal government, and in consulting with a wide variety of clients. I also know you’re keenly aware of the value of including evidence-based information as part of the decisionmaking process by officials in legislative settings and administrative agencies.



BIG DECISIONS IN Equitable Energy Policy

Sue Tierney spoke with **Paula Glover**—president of the Alliance to Save Energy and former president and CEO of the American Association of Blacks in Energy—about policy priorities for Black professionals in the energy industry, creating coalitions to make progress with good policy, professional pipelines that help diversify the energy field, and energy justice.



Paula Glover on how the coronavirus pandemic underscores the importance of affordable energy:

» “Certainly in this post-COVID world, so many of us are at home. Imagine that person who doesn’t have access to electricity, or who already has an energy burden who’s now at home, or who doesn’t have access to the internet and has children who are trying to do remote learning.

I think the resource that [the American Association of Blacks in Energy] provides in terms of energy is more important to people day to day now than it ever has been, and ... I’m incredibly concerned about what happens to those customers who have not been able to pay the bills for the last year.”

Can you comment on the difference it makes for federal and state decisionmakers to have access to sound economic and policy analysis?

Tierney It’s indispensable. I’m very familiar with the Regional Greenhouse Gas Initiative work that Dallas Burtraw, Karen Palmer, and other RFF colleagues have done for many years—from the beginning of its planning and design. I’m also very familiar with the analyses that Karen Palmer and Dan Shawhan have done on the carbon pricing mechanism in regional transmission organization markets. Matthew Wibbenmeyer’s work on wildfires is going to be really important, as states like California consider what policies they’ll implement to address that increasingly awful climate impact.

Let me ask you the same question: Richard, you served as head of the Energy Information Administration (EIA), and even though it’s not a policymaking agency, its work is important for providing data analysis and other information in the energy domain. What difference do you think it makes to have that kind of high-quality data and analysis?

Newell It probably won’t come as a surprise to you or anybody that I think having high-quality data and analysis is really important. EIA was created out of the energy crisis of the 1970s. At the time, the government realized it did not have the data and information it needed about the energy sector to make good decisions in response to the energy crisis. So, it created the EIA, vastly expanding the investment in data collection around the energy system so that good decisions could be made.

And RFF was created in 1952 for a quite similar reason. During the Truman-Eisenhower era, the country was heading into a period of rapid post-war economic expansion and was concerned about the availability of resources to support that growth, along with conservation and the environmental implications of resource use. If you look at RFF’s early years, a lot of the work was just about data collection. Vast tomes were created at that time—actually predating the existence of the EIA—to provide good information and analysis.

I think all this is absolutely essential to inform good decisions by policymakers and the private sector. Ultimately, actions have consequences—and if you don’t have good data and analysis, you have little idea of what those consequences might be. You need a good baseline picture of reality, and you need a solid understanding of how your actions might change that reality.

Tierney Can you comment on any initiatives or policies from the federal government that you’re looking forward to hearing about or advancing in the next couple of years?

Newell The big ones are about climate change and clean energy. My hope is for economy-wide action to address climate change. Ideally, that’s through a broad-based price on carbon; and if not, it’s through well-designed, flexible policies at the sector level that embrace a wide range of technological options and, I hope, harness the power of the marketplace.

We need to design public policies—for economic stimulus, infrastructure investment, and technology research and development—to advance *both* our economic well-being and environmental well-being. I think we can do that, but it’ll take information and analysis to help steer what could be historically massive investments.

Another area, which we touched on earlier, is what I’d call “data for decisions.” We need much better information for the financial sector, communities, government, and businesses to confront climate risk and build resilience.

And I have to mention the importance of addressing the distributional impacts of energy and environmental policies on workers and communities. Equitable access to the benefits of environmental protection, the impacts of policies, and the effect of market and technology transitions on workers and communities are all important to understand. We need to do a better job of looking ahead as a country, foreseeing where these transitions are headed, and helping workers and communities prepare for that future.

Tierney I’m pretty focused on that set of economic stimulus issues you’ve just described. Of course, I hope policies will

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RFF scholars will continue to apply our nonpartisan economic research to help inform good decisions related to energy, the environment, and natural resources.

”

address and accelerate action to mitigate the emissions related to climate change. But in the near term, given where we are in the economic crisis, I really hope that a clean energy and environmental economic stimulus package comes forward.

I’m also focused, like everybody else, on jobs, economic development, and positioning the economy for a low-carbon energy transition. We know there’s a great multiplier effect for energy efficiency investments, and that’s a great job creator. Electrification of buildings, smart grid work, a conservation corps associated with tree planting, incentives for solar and wind, and electric vehicle charging are all good options to look forward to. Half the customers in the United States do not have advanced meters; we’re going to need that in the energy transition. And I also would note the importance of economic assistance for

communities that are going to be, or already are, affected by this energy transition.

Newell Where things head, in terms of future stimulus response and investment, is going to depend on election outcomes, at least in part. Personally, I hope that we learn lessons—both positive and not so positive—from past experiences in which major investments are made in short periods of time. One of the things we’re focused on at RFF is taking advantage of evidence and what we know from past experience about the best ways to deploy resources and help advance our decarbonization goals.

Regardless of what happens with all the big decisions that we’ll see in the coming months and years, RFF scholars will continue to apply our nonpartisan economic research to help inform good decisions related to energy, the environment, and natural resources. ■



ON THE BLOG

The Next Four Years

In a series of blog articles released weekly in the lead-up to Inauguration Day, RFF scholars weighed in on key challenges facing the new administration and explored the outlook for climate policy in the coming years.

Three of the articles from the series appear in some form here in the magazine. The following excerpts come from the other four articles—read them all at resources.org.

PHOTOS Clockwise from top left:

Mario Tama / Getty Images
Stefani Reynolds / Getty Images
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Alexander Tsang / Unsplash



Biden’s Regulatory Agenda Will Go through the Clean Air Act

by Alan Krupnick

“I would expect the new administration to reaffirm the Obama-era fuel-economy standards and return to working cooperatively with California and its partner states.”



Is Regulation or Legislation More Durable?

by Dallas Burtraw

“The opportunities and benefits of implementing new rules within existing laws merit close consideration by the incoming administration.”



Legal Risk Hangs over Biden’s Climate Plans

by Nathan Richardson

“The Biden administration can make real and important progress on climate and other environmental issues, despite the Supreme Court’s 6–3 majority.”



Considerations for Benefit-Cost Analysis under the Biden Administration

by Alan Krupnick

“I am hopeful a Biden administration can be trusted to make non-ideological decisions and take a science-based approach to the benefit-cost analysis process.”

Decarbonizing Global Industry

The industrial sector—comprising all manufacturing activities, petroleum refining, and construction across the globe—is vast. From cement to ceramics, chemicals to construction, the sector is also incredibly diverse. Industry is responsible for one-third of global greenhouse gas emissions, so reducing its carbon footprint is essential for mitigating climate change; however, the sheer complexity of global industry makes decarbonization efforts particularly vexing.

Solutions to reduce emissions for iron production and steelmaking might not translate for paper manufacturing, for example. And a far-reaching clean energy agenda in the United States will not be enough, if China or Europe fails to adopt similar reforms.

Recently, Dallas Burtraw, the Darius Gaskins Senior Fellow at RFF, coauthored a related journal article alongside some 29 other researchers that assesses how the world can achieve net-zero industrial emissions by 2070. Despite the heterogeneity of the sector, the authors point out that the top three industries—iron and steel, chemicals and plastics, and cement—account

for over 55 percent of global industry emissions. Homing in on the biggest polluters within these industries could have sizable impacts on the entire industrial sector's emissions and the emissions trajectory of the world.

Burtraw and coauthors offer solutions that are relevant to a range of industries. Across the board, industry should design longer-lasting, lower-carbon materials and make their processes more efficient. But these industries cannot act alone; policymakers across the world should support research and development to discover new innovations, implement carbon pricing, and incentivize a transition to zero-carbon energy.

Most importantly, there will be no one-size-fits-all approach to decarbonizing industry. A variety of reforms, across countries and industries, will be crucial. Achieving net-zero emissions by 2070 will be a challenge, but a clear—if narrow—path forward is available. Necessary investments primarily will come from the private sector, but business cannot act until the policy landscape is more certain. Policymakers and businesses just need to commit.

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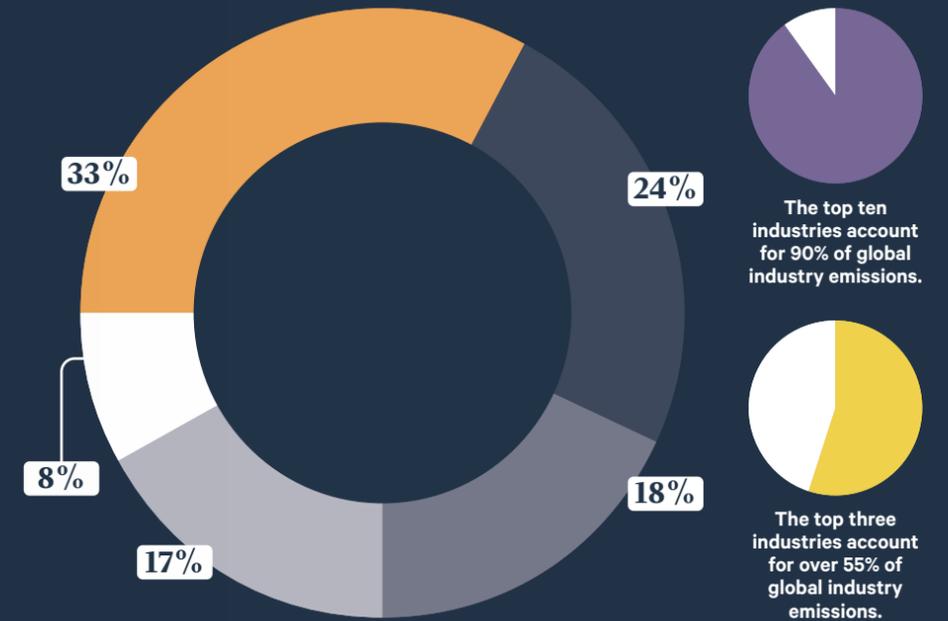
James Round

“Achieving net-zero emissions by 2070 will be a challenge, but a clear path forward is available.”

Industry is Responsible for One-Third of Global Greenhouse Gas Emissions

- Industry
- Buildings
- Transport
- Agriculture and Land
- Other

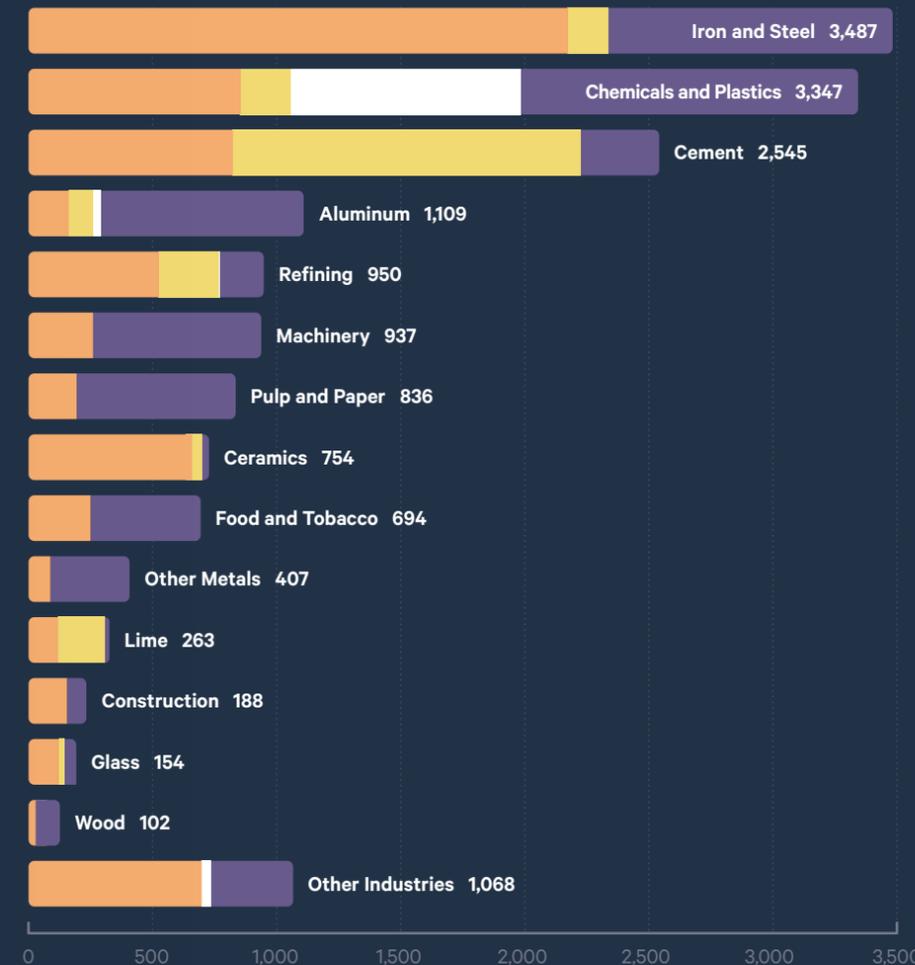
Each sector's wedge includes emissions associated with electricity and heat purchased by that sector.



Global Greenhouse Gas Emissions by Industry in 2014

- Direct Energy-Related Emissions
- CO₂ Process Emissions
- Indirect Energy-Related Emissions
- Non-CO₂ Process Emissions

"Industry" includes all manufacturing activities, petroleum refining, and construction. It does not include extraction of raw materials (e.g., mining, drilling, forestry), agriculture, waste management (e.g., water treatment, landfills), nor fugitive emissions. Nor does it include emissions from transporting input materials or output products (as those are part of the "transportation" sector).



This infographic summarizes "Technologies and Policies to Decarbonize Global Industry: Review and Assessment of Mitigation Drivers Through 2070" by Rissman et al., published in *Applied Energy* (2020).

Scan the QR code to read the full article.

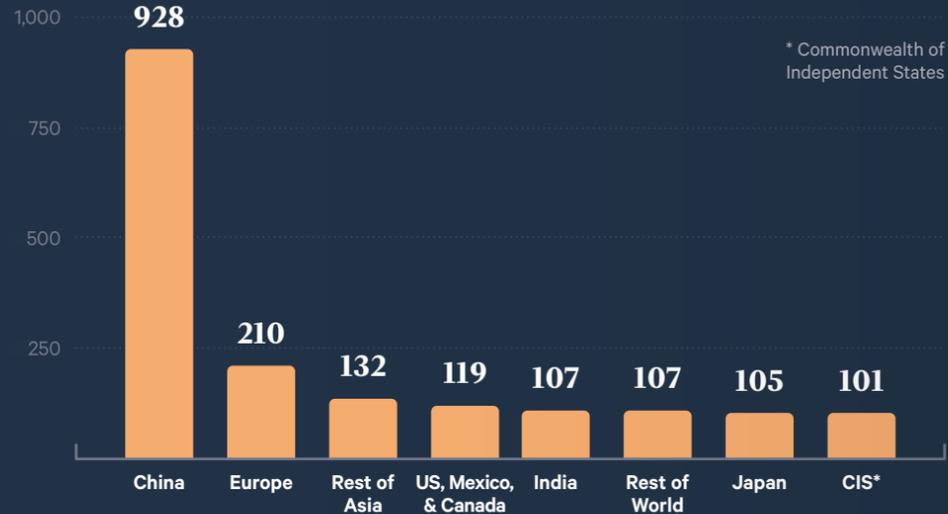
Where Does Production Occur?



World Steel Production in 2018

Million metric tons

SOURCE
World Steel Association (2019)



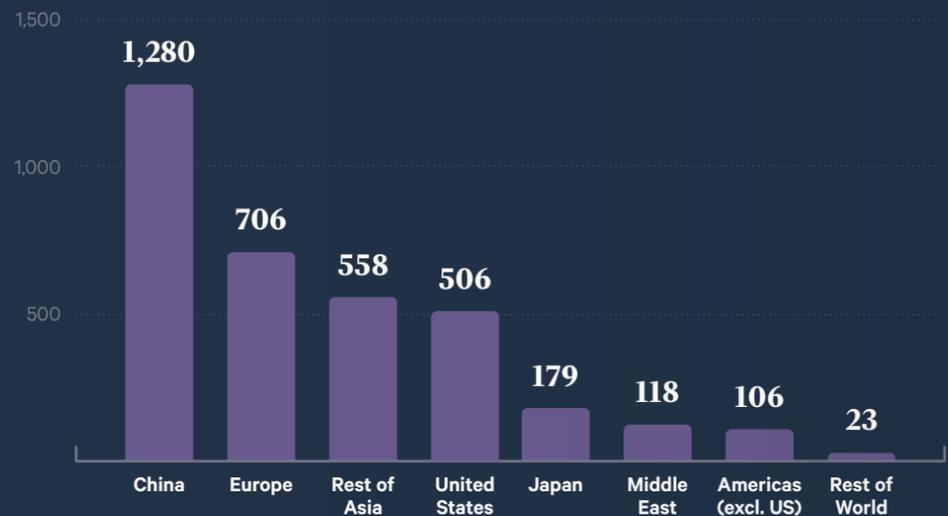
* Commonwealth of Independent States



World Chemical Production in 2017

€ billions

SOURCE
European Chemical Industry Council (2018)



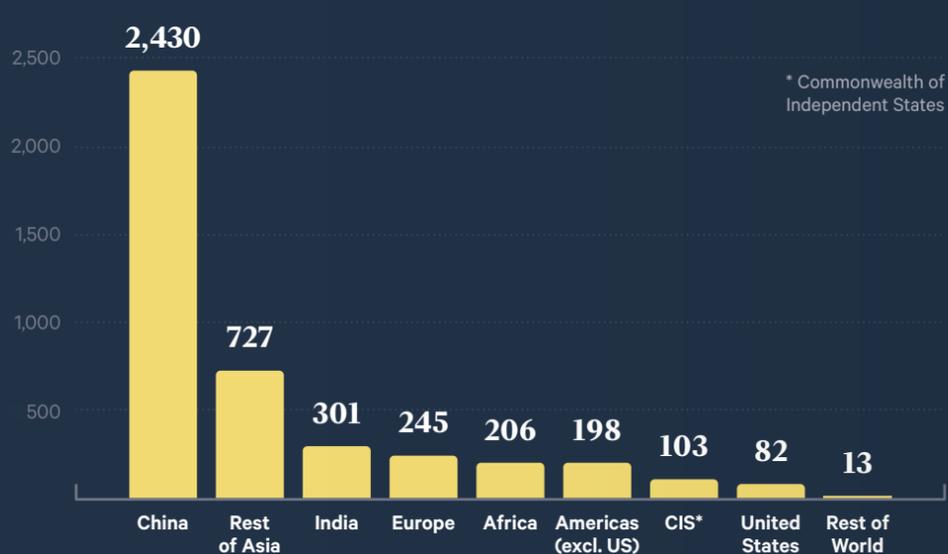
* Commonwealth of Independent States



World Cement Production in 2014

Million metric tons

SOURCE
Jongsung and Lee (2015)



* Commonwealth of Independent States

Three Main Strategies Can Reduce Industry Emissions

1 Reduce Material Consumption



Use Materials Efficiently

Computer-aided design and precision application creates products that work at least as well as traditional products while consuming less material. For example, 3D printers can apply materials in exactly the places needed, while traditional manufacturing methods remove materials to shape parts, wasting those materials in the process.



Design for Longevity and Quality

When products and buildings need to be replaced less often, less new material needs to be created. For example, concrete buildings in China typically have lifetimes under 40 years. High-quality concrete buildings can last for 100 year or more. The Pantheon in Rome is a concrete building built in about 120 CE that still stands today.



Make Better Use of Existing Products

When we maximize the use of existing products, more people get the services they demand, and fewer products are needed overall. For example, the average car in the United States is used for six hours per week to carry 1.4 people. Car sharing, facilitated by new technologies, allows existing cars to be used more efficiently.



Replace with Low-Carbon Materials

Some sustainable industrial materials currently exist, and even more are in development. For example, new technologies, such as cross-laminated timber, allow for tall (20+ story), fire-resistant wood buildings.

2 Reduce Industry Energy Consumption and Shift to Clean Energy



Consume Energy Efficiently

Design industrial systems as an integrated whole by optimizing materials and energy flows between components and right-sizing equipment to suit the loads.



Decarbonize Electricity

Transition to zero-carbon electricity by deploying renewables, such as wind and solar, and increasing grid flexibility via demand response, transmission lines, and batteries.



Use Decarbonized Hydrogen

Use hydrogen produced from zero-carbon electricity for difficult-to-electrify processes, such as producing high-temperature heat and chemical feedstocks.

3 Make Improvements to the Top-Emitting Industries



Iron and Steel

Electric arc furnaces can recycle scrap steel into new steel. Carbon capture and storage (CCS) and hydrogen fuel can be used to reduce emissions.



Chemicals

Novel catalysts can reduce input energy requirements for chemical reactions. Chemical additives and hydrogen fuel also can be used to reduce emissions.



Cement

Efficient equipment with heat recovery and mineral additives can reduce the temperatures required for making cement. CCS and chemical additives also can be used to reduce emissions.

Policies to Help Accelerate the Transition to Zero-Carbon Energy



Carbon Pricing

Should be applied to all industries and all greenhouse gas emissions.



R&D

Implement in national labs and public-private partnerships. Apply financial incentives in corporate settings.



Standards

Guarantee reductions from top industrial emitters when applied to energy efficiency and emissions.



Construction

Material-efficient building codes reduce material demand without compromising building performance.



Analysis

Emissions data collection and disclosure requirements help identify opportunities.



Awareness

Labeling low-carbon materials can facilitate sales for businesses that are decarbonizing their supply chains.



Procurement

Government can be an early adopter of low-carbon materials via green procurement programs.



Navigating the Waters of the United States

A recent report finds that the Trump administration's Navigable Waters Protection Rule revised crucial distinctions that define protected waters, effectively reducing safeguards for US waters based on flawed methods and unsubstantiated assumptions.

TEXT Cole Martin ILLUSTRATION James Round

The Clean Water Act, introduced nearly 50 years ago in the wake of the infamous fire on the Cuyahoga River, set out to develop national water quality standards and regulate water pollution. But for as long as the law has been around, uncertainty has persisted over what bodies of water the law actually protects.

While the Clean Water Act applies specifically to "waters of the United States" (WOTUS), that phrase has brought a flood of complications. An expansive lake or an interconnected tributary might obviously qualify for protection, but what about a remote wetland, seemingly detached from the rest of a river system? Is a

“According to EPA’s own data, one in three Americans drink water that comes from ephemeral or intermittent streams—bodies of water that are *not* protected under the new rule.”

stream that flows just a few months per year technically subject to federal jurisdiction?

“The Clean Water Act itself leaves this definition open, which has been the reason why there’s been so much controversy,” says David Keiser, an environmental economist and associate professor at the University of Massachusetts Amherst.

The Obama-era Clean Water Rule sought to end the complicated and costly legal debates over which bodies of water qualify for federal protection. But the US Environmental Protection Agency (EPA) and the Army Corps of Engineers under the Trump administration reversed that prior guidance and promulgated a new rule—the Navigable Waters Protection Rule—that removes protections from isolated wetlands and intermittent or ephemeral streams.

This “ping-pong game” between administrations only muddies the waters, says RFF University Fellow Sheila Olmstead. These definitions have serious implications, and not just for environmental regulators who need to navigate the complex law or industries hoping to set up mining operations near bodies of water. According to EPA’s own data, one in three Americans drink water that comes from ephemeral or intermittent streams—bodies of water that are *not* protected under the new rule.

Olmstead and Keiser are co-chairs of a recent report that assesses the economic rationale underpinning the former administration’s Navigable Waters Protection Rule. Their inquiry into rules regarding WOTUS, released in December 2020 after nearly a year of research and collaboration with other environmental economists and legal scholars, offers some stark conclusions about the Trump administration’s decisionmaking.

“If the science isn’t right, the economics aren’t going to be right,” Olmstead says. “We’d hate for people to point to the economic analyses underlying the repeal and replacement of the Clean Water Rule as good precedents.”

Federal Protections, Local Benefits

Ironically, the new report—which critiques the former administration’s

economic rationale for revising its definition of WOTUS—came to fruition only because the federal government had worked to curtail economic reviews of environmental regulations. The Environmental Economics Advisory Committee was a long-standing body within EPA’s Science Advisory Board that had provided evidence-based counsel on proposed rules for over 25 years before the Trump administration disbanded it in 2018. In response, a team of economists formed an independent group with the same mission: the External Environmental Economics Advisory Committee (E-EEAC).

“Having an advisory committee within EPA served a very important purpose,” Keiser says. “E-EEAC is an admirable effort to fill this gap.”

A previous E-EEAC report found that the Trump administration’s revised Mercury and Air Toxics Standards “fail to account for the latest science and economics” by underestimating public health benefits and neglecting to incorporate observed changes to the power sector in the past decade. The committee’s new report takes a similarly probing look at the effort to repeal and replace the Clean Water Rule.

Throughout its 70-plus-page review, the new report identifies ways in which the Trump administration’s economic analysis has overlooked sound science and agency-recommended best practices. Olmstead and Keiser take issue with many of the administration’s arguments, but they find especially puzzling the claim that authority over water resources is best granted to state officials.

The Trump administration’s analysis asserts that states would be more adept managers than the federal government because water quality is a “local public good.” According to this logic, state regulators would have a better sense of which bodies of water are regulatory priorities and thus could allocate resources more efficiently than the federal government could. But such an argument doesn’t account for the reality that waterways are not neatly divided among US states; a polluted river in one state obviously—and empirically—has downstream impacts that cross state lines.

“If you’re going to argue that water quality is a local public good, what you’re saying is that essentially all the benefits and costs of activities that affect those water bodies can be contained within state boundaries,” Olmstead says. “But that doesn’t jive very well with the science.”

In fact, the Obama administration’s analysis that justified the Clean Water Rule came to the opposite conclusion about interstate water connections. “The 2015 rule had an extensive, peer-reviewed scientific report. And in that report, the best available science argues that a lot of these so-called ‘isolated’ wetlands or ephemeral and intermittent streams are connected to downstream waters,” Olmstead says.

“Even though we might not be able to visually see the connections, they are often hydrologically connected,” Keiser adds.

State of Play

The Trump administration’s economic analysis also assumes that many states will strengthen local regulation of water bodies affected by the new rule. In several scenarios in the analysis, those states that EPA and the Army Corps expect to fill the gap left by less stringent federal jurisdiction have been excluded entirely; the potential costs and benefits of lax federal standards in these states are thus not considered at all, which has a sizable impact on national benefit estimates. And while it might seem reasonable to expect states to move quickly to protect priority waterways, regardless of federal guidance, the E-EEAC report authors point out that this type of speculative reasoning violates EPA’s own guidelines for conducting economic analysis. In fact, they cannot find any precedent for such an assumption, instead writing that “we cannot find another example in contemporary regulatory impact analysis.”

The former administration’s prediction that various states—as many as 31 in its most optimistic scenario—would move to protect isolated wetlands and intermittent streams is hardly supported by recent history, either. The report points to the aftermath of a 2001

Supreme Court case, which stripped federal protections from many isolated wetlands. Even though many states were impacted, only a few states over the following two decades felt compelled to strengthen their regulations to protect bodies of water that were no longer covered.

“To assume that 31 states are going to fully subsume the federal role doesn’t align very well with precedent,” Olmstead says.

Swimming Upstream with Revised Analysis

Olmstead and Keiser note that the Trump administration did respond to initial criticism of its proposed rule and made changes accordingly. After initially excluding any estimates of the benefits forgone from weakening wetland protections, the former administration’s final economic analysis calculates the national benefits of wetland protection by compiling findings from a variety of smaller studies, which explore the benefits of wetlands in specific locations. That meta-analysis alone was well done, according to Keiser; however, the Trump administration applied these careful findings in imprecise ways when estimating the benefits of wetland protection in parts of the country where local studies had not been conducted.

“To estimate national benefits, EPA made the assumption that baseline acreage is exactly the same in every single state,” Keiser says. “They’re assuming that the number of acres of wetlands in Florida is the same as in Arizona. The economic analyses then provide little information as to how this and other important assumptions impact the overall benefit estimates.”

The federal government has not divulged the full specifics of its methodology here, so it’s unclear the extent to which such assumptions skew the final results. But the E-EEAC report authors note that “many of the decisions [by EPA] appear to bias downward the estimates of losses.” In other words, the analysis of wetland protection benefits—while otherwise scientifically sound—could have been applied using methods that understate the costs of the Trump administration’s rule.



PHOTO A tidal estuary and wetlands ecosystem in Virginia Beach.

Sky Noir Photography / Getty Images

“**Even though we might not be able to visually see the connections, they are often hydrologically connected.**”

”

The Downstream Consequences of Regulatory Uncertainty

Both Olmstead and Keiser think the conclusions of their report have implications far beyond this specific rule. Similar arguments against stringent federal protections have been leveraged to justify other recent rollbacks and could be deployed again in future administrations.

“These arguments about devolving regulatory authority from the federal to the state governments are familiar arguments that one could make about many other environmental statutes,” Olmstead says about the Trump administration’s record of loosening federal environmental standards. “We could have really meaningful debates as a country about regulatory decentralization. But in this particular case, we felt the

arguments were poorly applied, and we want to make sure that they’re not used as precedent in other cases.”

The Biden administration is poised to review many of the previous administration’s environmental rules, and it seems likely that the Navigable Waters Protection Rule will undergo particular scrutiny. But the flaws in the Trump administration’s economic analysis reflect broader limitations within the existing Clean Water Act framework, which cannot easily be resolved through the executive branch alone. Keiser notes that the federal government struggles to monitor water quality nationwide, making it hard to get a sense of where intermittent streams or isolated wetlands are even located. Olmstead suggests that debates over protected waters will inevitably recur unless the text of the Clean Water Act is revamped.

“We’ve had controversial Supreme Court cases, the Clean Water Rule was in litigation before Trump even came into office, the Navigable Waters Protection rule is in litigation—all over this question of what waters count,” Olmstead says. “If the lack of clarity comes from the fact that the law is unclear, then shouldn’t Congress consider changing the law?”

But both houses of Congress remain closely divided along partisan lines. Unless legislators reach some unexpected agreement, these costly lawsuits over federal jurisdiction will continue. Questions will persist over which waterways are truly “waters of the United States.” And that “ping-pong game” between administrations won’t have a winner anytime soon. ■

Cole Martin is a staff writer and reporter at Resources for the Future.

Plugging Orphaned Oil and Gas Wells: What We Know and Need to Know

Our current best estimates for the number of abandoned and orphaned gas wells fall far below the true inventory, yet the stakes for the public are high: an improved understanding of these wells could help create jobs, reduce methane emissions, and improve public health.

New research from RFF Fellow Daniel Raimi and Columbia University coauthors describes how a federal well plugging effort can help achieve these goals, particularly if policymakers have access to the information they need.

TEXT
Daniel Raimi

PHOTO

Silhouette of an oil well under the Milky Way in Dallas, Texas.

Buena Vista Images / Getty Images

In many ways, the modern oil and gas industry is built on precision. Engineers design, build, and operate mind-bogglingly complex structures that can survive harsh temperature extremes or sit stably atop swelling seas, seeking out a needle of oil in a haystack of earth.

But it wasn't always thus.

In the early days of the oil industry—starting around 1860—wells were drilled by brute force through pounding a steel rod into the ground over and over, creeping slowly into the unknown subsurface. And although many think of Texas as the birthplace of the US oil industry, most of those steel rods were pounding out earth in the hilly forests of Pennsylvania, New York, Ohio, and West Virginia. Around the turn of the twentieth century—as California, Texas, and Oklahoma began to emerge as oil powerhouses in the United States—thousands of wells were still being drilled across the lesser-known oil regions of Arkansas, Kansas, Wyoming, and elsewhere.

And who was keeping track of all those holes? The owners, yes, but rarely anyone else, including the government. In most cases, public oversight and regulation of these wells ranged somewhere between minimal to nonexistent.

Eventually, all oil wells stop producing, and some—the dry holes—never yield any black gold in the first place. When the owners walk away, as they often would without consequence in the early days of the industry, those wells become “orphaned” and are wards of the state. (I like to think of them as Little Oily Orphan Annie's.) Because no one has been keeping track of these wells, hundreds of thousands—perhaps more than a million—have become orphaned over the years.

State governments—the primary regulators of oil and gas development in the United States—reported an inventory of roughly 57,000 orphaned wells as of 2018. This number represents the orphans that states have identified, catalogued, and evaluated for public health and environmental risks. But that number leaves out the hundreds of thousands of additional undocumented orphaned wells that remain.

These orphaned wells aren't as benign as their freckled, red-headed counterpart. Many emit methane, a powerful greenhouse gas; some contribute to groundwater contamination; and some can pose trip or fall hazards for hikers or hunters in the hills of Pennsylvania and elsewhere. Perhaps the most important thing to know about orphaned wells is that we know very little about them. Because most remain undocumented, we simply don't know how much methane they're emitting, how many drinking water sources they might be contaminating, and what other hazards they may pose. The famed statement from Socrates—“I know that I know nothing”—encapsulates the problem confronted by researchers and policymakers who focus their attention on orphaned wells.

An Undocumented Opportunity?

The oil and gas industry—and, let's be honest, pretty much everyone else—had a rough 2020. Producers were facing challenges prior to the onset of COVID-19, but the oil bust of 2020 greatly exacerbated those challenges, leading 30 oil and gas companies to declare bankruptcy in the first three quarters of the year. Roughly 100,000 jobs have been lost just in the “upstream” part of the industry (Figure 1), which encompasses the commercial exploration for and production of hydrocarbons.

As policymakers look for options that can provide economic relief to struggling families, several proposals have emerged to put these oil and gas workers back on the job. But instead of drilling new wells, these proposals have focused mostly on plugging orphaned wells, sealing them with cement to eliminate methane emissions and other hazards, and restoring the well site by cleaning up any polluted soil and remaining equipment. Broadly speaking, the skills required to plug wells are similar to those of the existing oil and gas workforce, making this option an appealing match.

In the US Congress, the 2020 Moving Forward Act, which passed the House but was not put to a vote in the Senate, earmarked \$400 million for plugging wells. Colorado Senator Michael Bennet (D-CO) proposed a bill to update financial assurance requirements for oil and gas

development on federal lands and allocate \$1.25 billion for plugging and reclaiming well sites across the United States. President Joe Biden, in his “Build Back Better” effort, has proposed creating “250,000 jobs plugging abandoned oil and natural gas wells and reclaiming abandoned coal, hardrock, and uranium mines.”

Some governments already have been using stimulus funding to plug wells and employ oil and gas workers. North Dakota devoted roughly \$50 million from the Coronavirus Aid, Relief, and Economic Security Act to this purpose in 2020. In Canada, the federal government has allocated \$1.3 billion (C\$1.7 billion) to clean up orphaned and abandoned wells, primarily in the province of Alberta.

In a recently published report, I estimate with Columbia University coauthors Jason Bordoff and Neelesh Nerurkar that a federal program to address the known inventory of 57,000 orphaned wells could plausibly cost between \$1.4 billion and \$2.7 billion and create roughly 13,000 job-years. Intuitively, scaling the program to plug larger numbers of wells would employ more people, reduce more pollution, and cost more money. We estimate that plugging 500,000 wells could create more than 120,000 job-years, though practical challenges likely apply at this scale of effort, particularly the capacity for state regulators to oversee such a large effort.

Getting the Hole Job Done

If public dollars will be spent on plugging orphaned oil and gas wells, how can the government get the best bang for its buck? The policymaking process would be greatly enhanced by a better understanding of the benefits and costs of cleaning up these sites. First, we need to develop a better understanding of the environmental and health benefits of plugging wells. Very little work has been done on this topic, particularly for the undocumented examples that make up the bulk of orphaned wells. Several recent studies have measured methane emissions from these sites, but more extensive measurement would help paint a better picture of which wells are most likely to be most leaky. Even less is known about the extent of groundwater contamination, health risks, and other hazards of orphaned wells.

Second, we need to know how much it will cost to plug these wells. While some can be plugged for just a few thousand dollars, others are far more expensive—in some cases costing hundreds of thousands of dollars. Work currently underway at Resources for the Future (RFF) by me, Alan Krupnick, Jih-Shyang Shih, and Alexandra Thompson seeks to answer this question by analyzing data on the costs of plugging thousands of wells across five US states. Our early analysis shows that—unsurprisingly—deeper wells are more expensive to plug. But we’d also like to quantify how other factors shape plugging costs, such as the proximity to population centers, water bodies, and coal seams, along with other location-specific information.

Figure 2 highlights the wide variation in costs associated with plugging wells. To simply plug a well, the median cost in our data set is about \$14,000, but costs increase with well depth, and a few wells cost more than \$1 million each to plug. (Note that all axes in Figure 2 are logarithmic in scale.) To plug a well and remediate the surface, the median cost is \$48,000—but again, some wells can be much more costly.

With these two key pieces of information—benefits and costs—policymakers can reach informed decisions about how much to spend while working down the backlog of undocumented orphaned wells. The benefits of plugging certain wells (e.g., where methane emissions or risks to groundwater are high) likely will outweigh the costs, especially if those costs are in the five-figure range. But what about a well where methane emissions are low or zero? It may not make sense to spend \$1 million to plug that well, but it might be sensible if the cost were closer to \$10,000. Would it be wise to spend public dollars on helicopter- or drone-based surveys to map the full inventory of the hundreds of thousands of currently undocumented wells?

Until researchers at RFF and elsewhere can gain a better understanding of these variables, policymakers will likely focus on the most valuable currency in the political arena: jobs. And one thing that’s clear is that unemployed oil and gas workers are a good fit for plugging and restoration jobs. As a result, expect to see more proposals on this topic in the months ahead. ■

Daniel Raimi is a fellow at Resources for the Future.

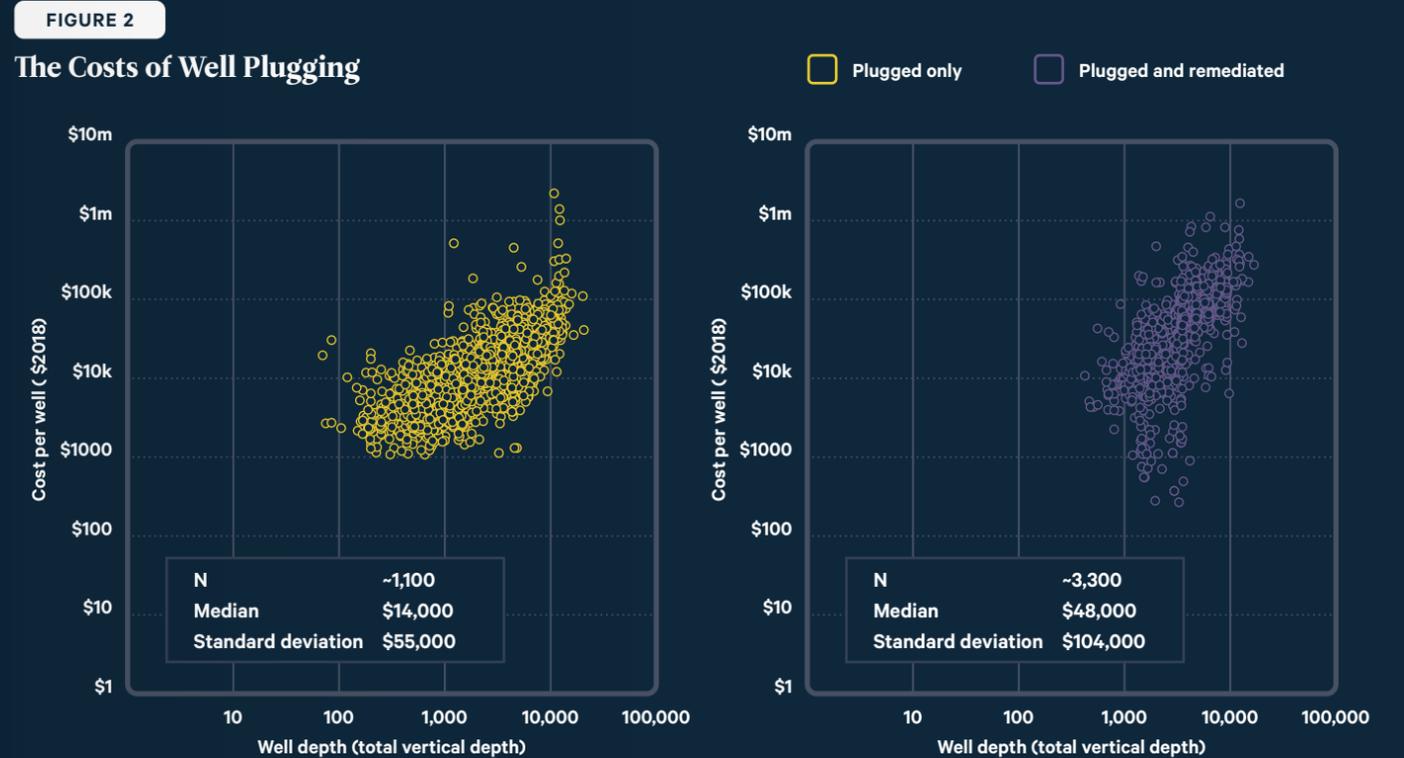
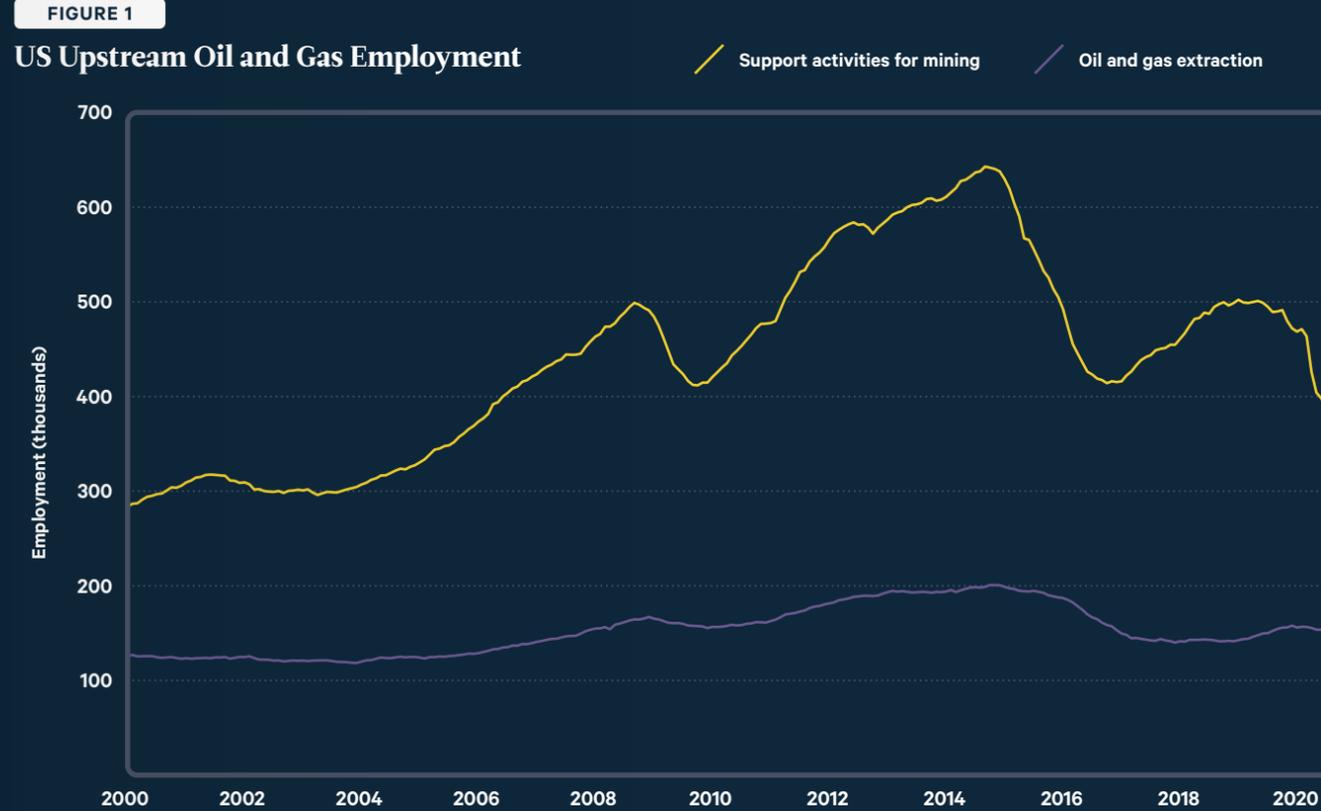
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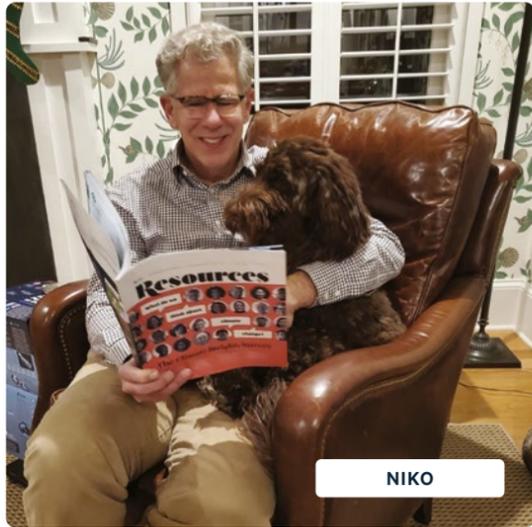
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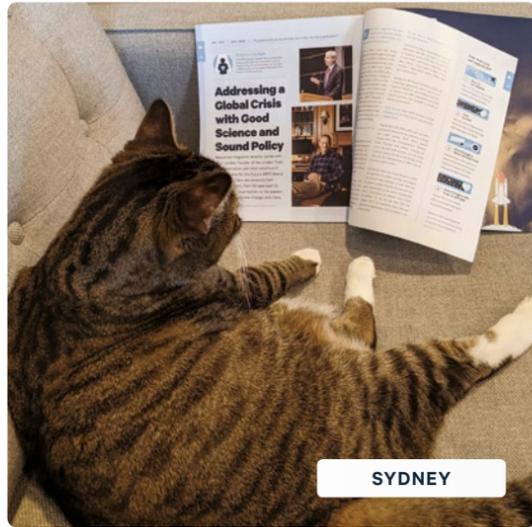
Figure 1 US Bureau of Labor Statistics. “Support activities for mining” mostly consists of workers who provide support services for oil and gas extraction, such as well drilling, hydraulic fracturing, and other services.

Figure 2 State regulator data from Kansas, Montana, Pennsylvania, and Texas. Private operator data from Texas and New Mexico.





NIKO



SYDNEY



REY



Resources Fur the Future

Animals of all kinds don't kibble over the details: they agree that good government policy breeds a healthy environment and unleashes benefits in the economy. For RFF pets, reading *Resources* magazine is a treat.



SCRUFFY



CHESTNUT



TACO

A Climate Resilience Road Map for the New Administration

TEXT
Carolyn Kousky
ILLUSTRATIONS
Studio Muti

Revitalized efforts to prioritize climate change adaptation in a new administration could help set the United States on a path toward climate resilience, with strategies that include rethinking development in risky areas and ensuring that recovery efforts are accessible to lower-income households. RFF University Fellow Carolyn Kousky shares her ideas for how to get there.

The risk of wildfires, storms, hurricanes, floods, and heat waves is growing as the planet continues to warm—and the costs are growing as well. Since 2005, the United States has suffered \$1.24 trillion in economic losses from 173 weather and climate disasters, each one inflicting at least \$1 billion in damages. These events disproportionately harm lower-income and minority households and communities. In addition, climate has been recognized as a threat multiplier, with climate disasters leading to cascading consequences projected to threaten all aspects of life, including worldwide peace and security.

Public policy plays a critical role in either mitigating or magnifying the economic costs of climate change. It is time to put the United States on a path toward climate resilience.

To build a new culture of resilience, we need a complete suite of resilience policies that complement each other. The Biden administration and the new Congress have an opportunity to put in place solutions that address these long-standing policy deficits. To inform this work, I propose the following eight-part federal policy agenda for building climate resilience:

- 1 Provide equitable disaster mitigation and assistance
- 2 Make recovery from climate catastrophes easier
- 3 Improve the financial resilience of households, small businesses, and communities
- 4 Fund actions to reduce climate risk on an annual basis
- 5 Rebuild for the future, not the past
- 6 Strengthen US infrastructure
- 7 Harness nature for risk reduction
- 8 Pay for resilience investments while fighting climate change and inequality



Provide Equitable Disaster Mitigation and Assistance

“Renters sometimes lose homes or possessions, or both, as a result of natural disasters, and the federal government can do more to help.”

Lower-income and minority households and communities are at greater risk and suffer disproportionately from disasters. Despite this reality, our federal policies currently do not provide equitable support; instead, programs often favor more affluent and white households and communities.

For an administration and Congress committed to fair and equitable disaster relief, some commonsense solutions can be adopted. For example, Federal Emergency Management Agency (FEMA) grants, from mitigation grants to recovery assistance, can be “means-tested,” a method that would target federal dollars at those who fall below certain income thresholds. This step would help provide greater assistance to people who need it the most. Congress also can subsidize lower-income families for flood or other disaster insurance on a means-tested sliding scale. A larger share of recovery grants from the Department of Housing and Urban Development (HUD) and mitigation grants from FEMA’s new Building Resilient Infrastructure and Communities (BRIC) program can be made available specifically

to frontline communities with greater needs. Funds also can be increased for the Low Income Home Energy Assistance Program to help low-income families with utility bills after a disaster.

Renters sometimes lose homes or possessions, or both, as a result of natural disasters, and the federal government can do more to help. Momentum has grown in recent years for action; Senator Elizabeth Warren (D-MA) has proposed a federal commitment to replace any damaged affordable housing, which could occur through a new program within HUD or achieved with dedicated funding from the Community Development Block Grants Disaster Recovery (CDBG-DR) program. Existing mitigation grant programs in FEMA and HUD could be harnessed to allow communities to use funds for the establishment of public-private partnerships that can provide parametric microinsurance, a type of insurance that targets lower-income households to provide fast and flexible funding after a disaster—an approach that could be particularly beneficial for renters.

PHOTO A vehicle drives through a wildfire near the town of Lowell in Oregon.

Marcus Kauffman / Unsplash

Navigating the system of federal aid after a disaster is confusing and time consuming at best, and a serious impediment to recovery at worst. Recovery for households generally is provided through three different federal agencies—FEMA, HUD, and the Small Business Administration (SBA)—each with their own application procedures and timelines. Many programs also have inconsistent application requirements and qualifying criteria. Rules restrict households from receiving duplicate benefits, but agencies generally do not coordinate on guiding applicants through the process of navigating multiple agencies, which can generate confusion for those seeking assistance.

Priorities for the new administration should include making recovery from natural disasters easier, reducing the stress of receiving assistance, and helping more people get needed funds sooner—and a variety of policies would further those goals.

First, a universal federal dashboard could clearly explain and help disaster survivors navigate through the aid process. The Hurricane Sandy Rebuilding Task Force identified this need, suggesting a user-friendly tool to navigate all the programs, through what they called a “no wrong door” approach to information access. In addition, funding could be made available to community groups and nonprofits to help survivors navigate the process. This means that data for all applicants (including those denied) would be shared with designated partners, which could further support survivors and help them access necessary resources.

Second, this integrated approach could be linked to one single application for all federal assistance. SBP, a disaster recovery nonprofit, has suggested one idea, which they call OneApp. Through OneApp, disaster survivors could complete just one application

and be simultaneously considered for both FEMA and SBA programs. This type of solution could be facilitated further by aligning eligibility rules, integrating the application process, and establishing a modernized data-sharing platform. As US Secretary of Transportation Pete Buttigieg has said, “We need to figure out how to bring aid to people, not make people figure out how to access the aid they need.”

Third, any required documentation to apply for disaster relief would have to be tailored quickly to the circumstances of the disaster. For instance, in some places, such as Puerto Rico and many rural communities, appropriate title documentation for homes does not exist or may be lost in the disaster, preventing survivors from receiving aid. Clear policies, like FEMA accepting sworn affidavits, would help people in this situation, as would linking datasets across FEMA and other agencies.

Fourth, Congress could make amendments to the Stafford Act to better support people who are recovering from a disaster. One important change could be to remove the limitation that FEMA provide only “temporary” housing, which has led to the provision of trailers at extreme cost instead of more cost-efficient solutions such as repairing homes or quickly establishing cheaper and longer-term housing, such as innovative modular designs that can be expanded over time.

Finally, Congress increasingly has been using the HUD CDBG-DR program to send flexible recovery dollars to communities that have been devastated by severe disasters. This program, however, is not a standing program, and its impermanence creates unnecessary delays with each disaster appropriation. We could resolve some of these challenges by making the CDBG-DR program a permanent program. If also given annual appropriations, HUD could vastly speed delivery of recovery dollars to communities.



Make Recovery from Climate Catastrophes Easier

“We need to figure out how to bring aid to people, not make people figure out how to access the aid they need.”

Repairing disaster damage can be incredibly costly for households. To cover these expenses, households often draw from four primary sources of funds—savings, credit, aid, and insurance. Unfortunately, the majority of American families have very little in liquid funds that can be used to cover disaster losses. Credit may be burdensome or impossible to access for those without sufficient income or credit scores. Aid from neighbors, family, and friends may be difficult when an entire community is hit simultaneously. And government assistance typically is insufficient or too delayed. Insurance provides the needed funds for repair and rebuilding of property, but most households lack disaster insurance—often because it is too expensive.

Several federal policy changes could allow more at-risk households to harness the benefits of insurance, which guarantees the ability to repair and rebuild after a disaster, with positive impacts on their communities and their well-being.

Many natural disasters, such as floods and earthquakes, are not included in standard homeowners policies, which leaves people exposed. Other perils tend to come with coverage limitations, such as higher deductibles. This peril-by-peril approach to insurance in the United States confuses homeowners and leads to a persistent number of at-risk households without disaster insurance. We can learn from other countries and create, through new legislation, a federal program that provides bankruptcy protection to insurers who agree to include all

natural perils in homeowners policies. Additional help from the federal government could come in the form of grants to pilot novel public-private disaster insurance solutions, such as community-based insurance or parametric microinsurance.

We also can future-proof the National Flood Insurance Program (NFIP). Financial protection against floods is not currently provided in standard homeowners insurance. While separate policies can be purchased through the NFIP (housed in FEMA), the NFIP itself is billions of dollars in debt and in need of reform. Repaying this massive debt is not possible, and the debt should be forgiven. To prevent unsustainable debt going forward, Congress could formalize a backstop for catastrophic losses while modernizing rates to better reflect risk.

Several additional improvements to the NFIP are long overdue, such as the “Risk Rating 2.0” effort to modernize pricing so that rates better reflect risk, which effectively would send accurate price signals to housing markets. This effort also would undo a regressive cross-subsidy in the current program: Since home values are not reflected in most premiums, lower-valued homes are paying too much and higher-valued homes too little. In addition, the continued practice of underwriting repetitive-loss properties is too risky. These properties cost more to continually rebuild than they are worth. Potential buyers also need to be aware when a property has previously flooded: publicly mapping areas with repetitive flood claims could inform development and the housing and mortgage markets.



Improve the Financial Resilience of Households, Small Businesses, and Communities

“ Since home values are not reflected in most premiums, lower-valued homes are paying too much and higher-valued homes too little. ”

PHOTO A construction worker inspects the wooden frame of a building in Houston, Texas.

Josh Olalde / Unsplash



Fund Actions to Reduce Climate Risk on an Annual Basis



Rebuild for the Future, Not the Past

“ We can eliminate federal subsidies in areas where disasters occur repeatedly by requiring that any private landowner choosing to build in an extreme-risk area bear the full costs of that decision. ”

”

Actions can be taken to reduce the damages from natural hazards when disaster strikes. For example, retrofitting buildings can lessen the impacts from hurricanes, earthquakes, wildfires, and floods. Green roofs can combat urban heat. Microgrids can limit wildfire risk from power lines. And in the riskiest areas, buildings can be removed and the land returned to open space.

Right now, roughly 90 percent of the federal dollars that are earmarked to reduce disaster damages are appropriated off budget in supplemental legislation that’s tied to specific large disasters. This approach fails to prevent damages before a disaster hits, leads to less dependable streams of funding, and neglects

In some areas of very high risk, the presence of people and property is not cost-effective—and soon will not be safe, as climate risks grow and sea levels rise. If we fail to address these escalating climate risks in our rebuilding—both in terms of *where* we build and *how* we build—we will be doomed to repeat the past. We can prevent continued escalation of disaster costs by using disasters as an opportunity to build back better, retrofitting buildings, curtailing development in the highest-risk areas and assisting with relocation for people who live in those places, and implementing new models of resilient community design.

Many tools can help support this process. For example, some federal rules currently prohibit upgrades during post-disaster rebuilding that are actually important for safety, resilience, and sustainability. After Hurricane Harvey, HUD rules prohibited the use of CDBG-DR funds to incorporate sustainability or resilience retrofits into rebuilding, and similar Stafford Act regulations need a second look, as well.

Former President Obama instituted the Federal Flood Risk Management Standard to guarantee that post-disaster federal dollars

the reality that a changing climate escalates disaster risk.

The establishment of a new climate adaptation grant program—perhaps overseen by an interagency group with representatives from HUD, FEMA, and the National Oceanic and Atmospheric Administration (NOAA)—could develop strategic priorities for investing in climate resilience, encourage proposals that cross local departments, think holistically about adaptation, and set aside a specific percentage of funding for innovative pilot programs. Such a program likely would need to devise incentives for state and local governments to improve disaster building codes, so that all new construction can withstand the growing risk of climate disasters and save billions of dollars in future losses.

would help rebuild to a higher standard, using the best available science on climate impacts. Former President Trump rescinded this order mere days before Hurricane Harvey devastated Texas; reinstating the order across federal agencies can help the federal government prepare for the future.

We can eliminate federal subsidies in areas where disasters occur repeatedly by requiring that any private landowner choosing to build in an extreme-risk area bear the full costs of that decision. This can be done by expanding the Coastal Barrier Resource System—areas in which federal spending on infrastructure, insurance, and post-disaster relief is prohibited—to areas that are at extreme risk for multiple hazards. Government-sponsored enterprises, such as Fannie Mae and Freddie Mac, could be empowered by their regulator to price climate risk, which would send financial signals to housing and mortgage markets about the risks inherent to certain properties.

Finally, the federal government can help facilitate managed retreat through financial incentives for relocation, conservation of coastal ecosystems, and legal and regulatory approaches for transferring ownership to the public sector as rising sea levels threaten private property.



Strengthen US Infrastructure

US infrastructure consistently gets failing grades, prompting frequent calls for reform. Both major political parties have proposed infrastructure legislation in recent years. A large expenditure on infrastructure now could create jobs, pump money back into an economy that's still reckoning with the pandemic, and improve our infrastructure so it can withstand future climate impacts.

Several related actions can further these goals. Congress and agencies have the authority to establish higher standards for any new, federally funded infrastructure, based on climate projections. Grant and loan funding (e.g., through an infrastructure bank) can be expanded so that states, local governments, and tribes can complete needed maintenance and upgrades to guarantee that infrastructure is built according to safety standards that account



Harness Nature for Risk Reduction

Conservation and restoration of natural areas can make people more resilient to natural disasters. For example, coastal wetlands and mangroves can buffer storm surge, while vegetation can stabilize slopes. In addition to reducing our risk of disaster damages, natural areas provide an array of other benefits: carbon sequestration, beautiful areas for recreation, habitats for native species, improved air and water quality, and higher property values. Unfortunately, we do not sufficiently conserve natural areas. We pollute and degrade many ecosystems, which also get stressed by climate change, and we rarely prioritize nature-based solutions.

The year 2021 marks the start of the UN Decade on Restoration, so there's no better time to shift course. In line with the goals of this effort, and to harness the power of nature to promote climate resilience, the new administration can consider launching a Restoration Corps. Inspired by Franklin D. Roosevelt's Civilian Conservation Corps and

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The year 2021 marks the start of the UN Decade on Restoration, so there's no better time to shift course.
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for climate change. Public transportation systems can play an important role in building climate resilience. New investments in transit, to reduce greenhouse gas emissions and with related infrastructure that can withstand climate impacts, will help.

Investments in green infrastructure can grow, potentially through permanent and expanded appropriations to the Land and Water Conservation Fund. Dams and levees need to be evaluated and, when necessary, upgraded to maintain safety—with government funding for dam removal. We can further bolster preparedness by supporting the adaptation of water and electric utilities to climate risks such as salinization of drinking water from sea level rise or grid failure from wildfires and storms. Priority funds can be made available to communities through the Clean Water Act and Safe Drinking Water Act.

our modern AmeriCorps program, such a corps could help young adults find meaningful employment during the economic downturn precipitated by COVID-19, provide training and education on environmental restoration, and help restore North American ecosystems. Some portion of the restoration work could focus explicitly on efforts that help manage climate risks, such as expanding urban forests in US cities and thinning fire-prone forests in the American West.

Other federal actions can explicitly prioritize nature-based approaches; for instance, NOAA's Coastal and Estuarine Land Conservation Program would benefit from more funding, while the public and private sectors can cooperate more often to finance approaches that can be scaled successfully. Finally, we must imagine new ways of living that heighten our climate resilience while enhancing our well-being, such as a Florida community that lives behind its mangroves, benefiting from recreation, storm protection, and the full beauty of the beach and mangrove ecosystem.



Pay for Resilience Investments While Fighting Climate Change and Inequality

PHOTO Devils Tower National Monument in Wyoming.
NOAA / Unsplash

Many of the actions that can improve our climate resilience require public funds. Our revenue-raising approaches will either enhance or undermine our resilience goals. Taxes are more than just a tool to raise revenue; taxes can discourage destructive activities and promote beneficial practices.

For example, we need to mitigate our carbon emissions as quickly as possible to prevent the devastating intensification of climate change impacts. A tax on carbon would increase the expense of emitting carbon, thereby creating a powerful incentive for polluters to emit less. The revenue raised by a carbon price can in turn support climate resilience efforts.

In addition, inequality in the United States is at its highest peak of the past 50 years. Inequality in income and wealth spills over to create inequality in health and disaster recovery. Lower-income families suffer disproportionately from climate disasters and lack the needed resources to invest in resilience. Current levels of inequality are not inevitable; they're the result of public policy choices. Alternative tax policies—like implementing a wealth tax on the ultra-rich (a policy supported by a growing chorus of stakeholders) or undoing the 2017 tax cuts—would address inequality and generate substantial funding, which could be put toward the resilience-enhancing policies discussed here, including policies that target those who are most in need.



Next Steps

Climate impacts are hurting American communities and stressing all sectors of the US economy. Too much time has been wasted already. As we begin the urgent work of transitioning to a low-carbon economy, we also can begin the task of building equitable climate resilience across the country. ■

Carolyn Kousky is a university fellow at Resources for the Future and the executive director of the Wharton Risk Management and Decision Processes Center at the University of Pennsylvania. A version of this article was originally published on Medium, the digital publishing platform.

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Climate impacts are hurting American communities and stressing all sectors of the US economy.
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Policy Options for Oil and Gas Leasing Reform on Federal Lands and Waters

TEXT Brian Prest

The Biden administration has ambitious climate goals, and it likely will need to rely heavily on policies that can be implemented by executive authority. One such policy that received major attention during the presidential campaign was President Joe Biden's promise to reduce oil and gas drilling on federal lands and waters. (I'll call these "federal lands" for the rest of this article.) Greenhouse gas emissions associated with fossil fuels produced on federal lands amount to about 25 percent of total US emissions. Historically, coal has been responsible for most of those emissions; however, oil and gas now are the main culprits due to the decline of the coal industry and the rise of shale. As a result, federal oil and gas leasing policy has attracted increasing attention, and Biden will see significant pressure to follow through with his campaign promise.

What may have gone unnoticed is that Biden floated several different policy options for federal oil and gas leasing. While a leasing ban was the proposal that received the most attention, the campaign also proposed modifying royalties to incorporate a "carbon adder" (or fee) to internalize the negative externalities associated with climate change, potentially based on the social cost of carbon. This idea might be more appealing to an economics-minded audience, due to the general preference among economists

for carbon pricing over inflexible regulations or outright bans.

The idea of carbon adders is not new. In fact, it's an extension of a similar approach considered by the Obama administration for federal coal leasing policy. Specifically, the Obama administration halted federal coal leasing while it considered carbon adders for coal. The Biden campaign's proposal is a natural extension of this idea to oil and gas leasing.

It's important to note that a leasing ban and carbon adders are, for the most part, mutually exclusive policies. For legal reasons, carbon fees likely would be charged only on newly issued leases, which would not exist at all under a leasing ban. Since the two policy options are substitutes, it's worth considering their trade-offs, both in terms of how much they could reduce emissions and how they would affect revenues generated by the federal oil and gas leasing program.

While both policies would reduce oil and gas production and the associated emissions, the magnitude of these reductions is not clear ex ante, in part due to the likelihood that some of the reduced production on federal lands would be offset by increased production elsewhere. The revenue impacts of the policies would differ in direction because ending new leases clearly would reduce royalty revenues, whereas a carbon

The Biden administration has highlighted some possibilities for reforming oil and gas drilling—and thus reducing emissions—on federal lands. RFF Fellow Brian Prest draws from recent modeling results to make the case for carbon adders as a promising option.

charge would generate a new revenue stream. Currently, royalty revenues are shared among the federal government, state governments, and conservation and reclamation projects. States like New Mexico depend heavily on these revenues to support their budgets, creating intense local interest in these policies.

Important Trade-offs

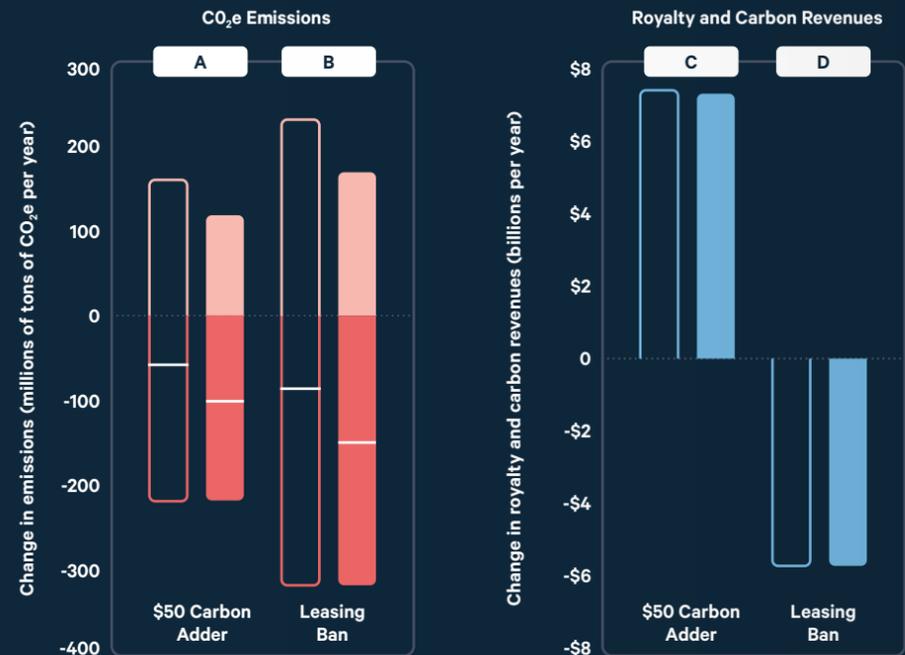
In a recent working paper, I used a detailed economic model of US oil and gas supply to quantify the impacts that these policies would have for global greenhouse gas emissions and government revenues. The bottom line: both a carbon adder and a leasing ban would lead to nontrivial reductions in emissions. However, their effectiveness would be tempered by production "leakage," an economic term for when emissions reductions by regulated activities (in this case, on federal lands) would be offset by emissions increases in unregulated areas (e.g., increased oil and gas production from producers on state, private, or foreign lands).

Federal lands in the United States account for only about 15 percent of global oil and gas supply, and both products feature relatively inelastic demand; thus, much of the decline in federal production (and the associated emissions) would be offset by increases elsewhere. In my paper, I estimate

"Biden has ambitious goals but limited tools available for achieving them. His platform clearly acknowledges that a wide suite of complementary policies will be necessary to effectively reduce emissions."

PHOTO
President Joe Biden speaks in Des Moines, Iowa.
Gage Skidmore / Flickr

FIGURE 1
Average Annual Effects
of Proposed Oil and
Gas Leasing Policies
on Emissions and
Revenues (2020–2050)



this leakage rate to be in the range of 50 to 75 percent, meaning global emissions reductions would amount to only about one-half to one-quarter of the direct reductions from federal lands. Nonetheless, even accounting for this leakage, my model estimates that a leasing ban ultimately would reduce global greenhouse gas emissions by around 100 million tons of carbon dioxide equivalent (CO₂e) annually (reflecting average annual reductions projected for 2020–2050). That’s about one-quarter of the reductions originally projected for the Clean Power Plan, a policy often referred to as the Obama administration’s “signature climate policy.”

The carbon adder, applied only to leases and operators that pay for the climate impacts of their emissions, achieves somewhat more modest emissions reductions than a leasing ban (about two-thirds as much) (Figure 1A versus 1B). But even though the carbon adder achieves smaller emissions impacts, this policy raises about \$7 billion per year on average, while the leasing ban *loses* about \$6 billion per year (Figure 1C versus 1D).

This result suggests that carbon pricing could help internalize externalities while also raising government revenues (which

could be used for transition assistance, for example). A carbon adder also could be an easier political lift than a leasing ban, as it still allows companies access to federal land, but only for projects that can pass a benefit-cost hurdle that accounts for climate damages.

Timing Matters

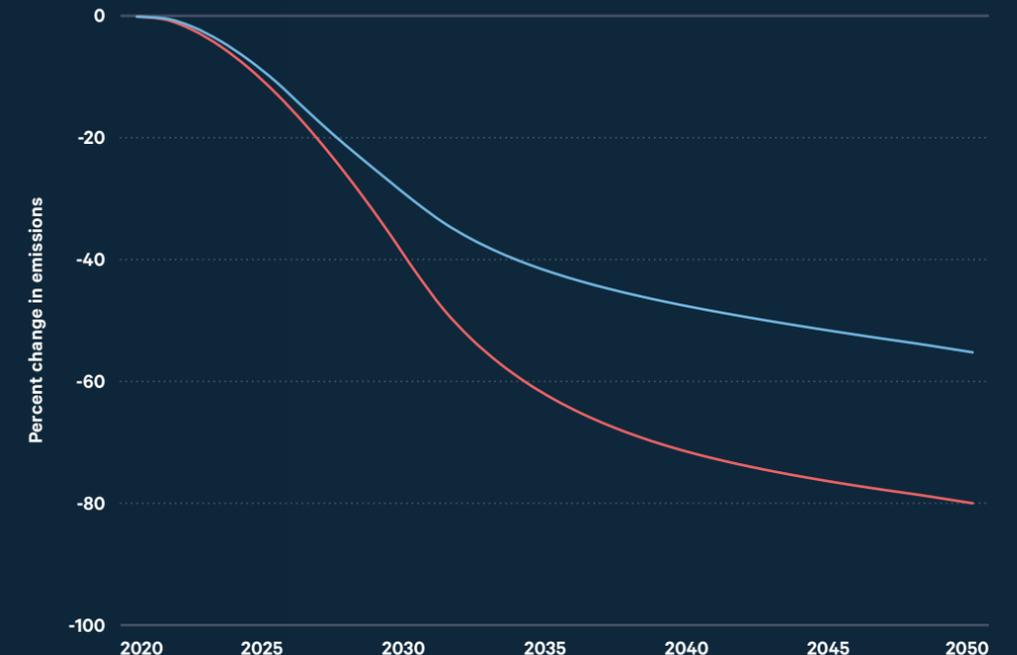
These top-line estimates have a few important caveats, however. First, all of these estimates are long-run, cumulative estimates through the year 2050, which is the appropriate measure from the big-picture perspective, since long-run climate impacts are driven primarily by cumulative emissions. But the short-run effects are considerably more modest, which is important both politically and in the context of net-zero emissions goals (e.g., net zero by 2040 as endorsed by the US House Select Committee on the Climate Crisis). In particular, Figure 2 shows the percentage reduction in emissions associated with federal oil and gas production under both policies over time. In short, both a leasing ban and a carbon adder would have only modest effects on federal oil and gas production during Biden’s first term. As a result, the Biden

Figure 1 Two sets of results show the sensitivity to assumptions about “demand elasticities” for oil and gas—that is, how responsive global oil and gas demand is to price increases induced by supply reductions, which is the biggest source of uncertainty in the estimated emissions reductions. Specifically, the high-elasticity case assumes that oil and gas demand is about 2–2.5 times more price responsive in the base case, which leads to larger global emissions reductions.

Figure 2 Expected emissions reductions from oil and gas produced on federal lands through the year 2050. Values are presented as percentages of oil and gas emissions from federal lands in each year, not including emissions from other sources such as coal.

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Carbon pricing could help internalize externalities while also raising government revenues.
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FIGURE 2
Projected Emissions
Reductions for Federal
Oil and Gas Production
Under Alternative
Proposed Leasing
Policies (2020–2050)



administration is unlikely to be able to point to major emissions reductions from this policy during its tenure—whether Biden’s time in office lasts four or even eight years.

The reason for the delayed impact is that these policies would apply only to new leases issued by the federal government. Existing leases would continue under business as usual, and wells already producing would continue to do so until exhausted. In addition, a large stock of existing leases have not yet been drilled and likewise would be unaffected by these new leasing policies: The Trump administration issued nearly 5,000 leases covering almost 10 million acres from 2017 to 2019. Since leases typically give companies the right to drill at any point within 10 years, the bulk of the potential impact of those unaffected leases will persist through the end of the decade. Further, since many operators sit on their leases for many years before drilling them, the immediate effect of a leasing ban would be minor.

Indeed, energy consultancy Wood Mackenzie recently noted that in the Gulf of Mexico, the site of much federal oil production, “we do not expect a potential ban on leasing to materially impact production in the region until the end of

the decade.” Only once the industry’s stockpile of leases starts to dwindle—either because the wells are exhausted or the leases expire—will the lack of new leases start to bite. On the other hand, the Biden team has floated another idea that I did not model in the paper: a ban on permitting new wells—even on existing leases. This approach is much more aggressive than a ban on leasing but would likely be subject to legal challenges. Leaseholders would argue in court that their previously issued leases give them a right to extract resources and that a ban on permits for drilling would violate that right.

How realistic it is to end drilling on existing leases remains an open question—but this approach, or other carbon-cutting efforts on federal lands, will be necessary if policymakers are serious about achieving net-zero emissions. Another option is for the federal government to buy back existing leases, which would circumvent the legal question but would require funding. Today, with very low oil and gas prices making many drilling prospects only marginally profitable, some leaseholders might jump at a buyback. Even with buybacks or a ban on permits, other complementary policies would be

needed to reduce net emissions from federal lands, including the promotion of renewable energy development (such as offshore wind in the Atlantic or solar in the Southwest) and the facilitation of carbon sinks through approaches such as reforestation.

Tools for Transition

Biden has ambitious goals but limited tools available for achieving them. His platform clearly acknowledges that a wide suite of complementary policies will be necessary to effectively reduce emissions. For federal lands, a carbon adder has merits well worth considering—particularly in light of the alternatives. The policy would simultaneously cut emissions, raise revenues for vulnerable states and communities in transition, and soften industry opposition. ■

Brian Prest is a fellow at Resources for the Future. This piece was originally published online as part of our Common Resources blog series in the lead-up to Inauguration Day, which explored the outlook for climate policy in the coming years.

How Permanently Can One Presidential Administration Impact Environmental Policy?

The Trump administration has reshaped how environmental regulations are implemented and how benefit-cost analyses are conducted. RFF's Arthur G. Fraas and Richard D. Morgenstern debate how enduring these changes might be, and what the Biden administration can do to reorient the regulatory process around sound science.



VIEWPOINT

"Viewpoint" gives economists and climate researchers the opportunity to provide a new perspective on an important topic. In this issue, two RFF scholars discuss how the Trump administration's approach to benefit-cost analysis may shape Trump's environmental legacy as he leaves office.

Thoughts on this?

Send a response to the editor by letter at attn: Managing Editor, 1616 P St NW, Suite 600, Washington, DC 20036 or email at wason@rff.org for possible inclusion in the next issue of *Resources* or on the *Common Resources* blog.



IN CONVERSATION

Art Fraas and Richard D. Morgenstern

ILLUSTRATION

James Round



Resources: In light of our recent history of regulatory rollbacks, you both have expressed concern over a general erosion of trust in science and economic analysis. Looking now toward the prospect of applying science and economics to ambitious federal climate policy, do you think the general public can recover from what's been interpreted as a recent debasing of economic analysis? Will people make space for scientists and economists again?

Art Fraas: Let's take benefit-cost analysis as a major example: the whole idea came out of the Reagan administration. The Left has always been skeptical of benefit-cost analysis, even before the Trump administration. In about the last 10 years, as the US Environmental Protection Agency (EPA) has been able to generate large net benefits associated with its rules, the Right has become more and more skeptical of benefit-cost analysis as well.

Richard D. Morgenstern: The previous administration undermined the reputation of benefit-cost analysis by cutting away and attacking the benefit side in particular, but also by overemphasizing the cost side. Benefit-cost analysis by its very nature is a balancing of the two. If you attack one side and focus only on the other, then you've radically undermined the integrity of the discipline.

Having said that, I guess the question remains: Is benefit-cost analysis doomed forever, or is there a way forward?

Before we articulate a way forward, I would make the obvious point that EPA statutes are not by any means set up in a perfect way for the use of benefit-cost analysis. Each statute is a little different; there are some opportunities to use benefit-cost analysis in some sections of the Clean Air Act and some parts of the Clean Water Act and so on, but these opportunities are limited. Some court cases in the four or five years preceding the Trump administration actually were favorable to benefit-cost analysis, such as *Michigan v. EPA*. But an explicit incorporation of benefit-cost analysis is still not the way decisions are routinely made. The statutes don't require these analyses and don't even invite the analyses in large part.

At the same time, executive orders that have been issued going back to the Reagan era, and reaffirmed by several Democratic presidents since, always take note of the statutory limits but nonetheless establish that benefit-cost analysis can help us more fully understand the nature of the decisions we're making.

So, there's always been this tension. But even though we haven't and won't thrust benefit-cost analysis into the center stage of EPA decisionmaking anytime soon, there's still great value in having a high-integrity set of analyses that can guide our thinking about the economic and environmental impacts of regulation. The way forward could be for the new administration to make certain pronouncements, starting out, about benefit-cost analysis. It's a nuanced issue, but pronouncements could establish that benefit-cost analysis has an important role and should return, but with the level of integrity and quality to the analysis that was present before the Trump administration. There are several ways to do that.

One way is to speak publicly about the issues; a complementary way is through hiring. The new administration will be hiring a lot of new presidential appointees, some of whom undoubtedly will be asked at their confirmation hearings what they think of benefit-cost analysis. That's an opportunity for the administration to go on record and make the case at the very outset, in the course of the confirmation process, for the value of benefit-cost analysis—not to embrace it in a way that departs from history, but to turn the clock back to the pre-Trump era.

Issues like co-benefits also clearly need to be revisited by the new administration.

Art Fraas: The Trump administration argued that the co-benefits—that is, other benefits that are ancillary to the objective of the regulation—should be downgraded and not considered in benefit-cost analysis. But the consensus among economists is that co-benefits are a critical element of benefit-cost analysis. That goes as well for costs—perhaps secondary cost effects also should be included in benefit-cost analysis.

Are these kinds of ancillary costs incorporated now—or, have they been in the past?

Art Fraas: Yes, although not fully. There's an argument, for example, that environmental rules may result in job loss. So, although unemployment benefits and re-training costs typically would be included, maybe substance abuse and suicide would not be.

Richard D. Morgenstern: There's always nuance in how far you go in quantifying benefits and costs. Anytime EPA does an analysis, they typically start out with some kind of list of the most important benefits, direct and indirect (i.e., co-benefits). They also start out with a list of the most important costs—also direct and indirect, such as job loss. It's always a challenge because doing these studies has constraints in terms of resources and time.

Historically, EPA has been criticized by the business community for going light on the costs and heavy on the benefits. Unsurprisingly, the agency also has been criticized by the environmental community, which often says that analyses look at the subtle costs but don't focus on the benefits, too. That's a long-standing debate.

The Trump administration announced as a matter of principle that co-benefits were going to be downplayed or diminished in their analysis—whereas in the past, the constraints on evaluating either benefits or costs have been driven more by data and analytic capacity that the agency can access. I would say the Trump approach was a huge step in the wrong direction. And I believe that's also the consensus of the economics community: it's been a step in the wrong direction.

The Trump administration actually used co-benefits in at least one regulatory rollback. Can you talk about that example and speak to how this type of inconsistency plays into the public perception of science and economics?

Art Fraas: The National Highway Traffic Safety Administration and EPA issued a joint regulation that rolled back an Obama-era rule, saying that substantial safety benefits would be associated with the rollback of the rule. Their argument was that if we adhered to the more stringent standards, fewer new cars would be purchased, and we would miss the safety benefits associated with relatively new vehicles.

So, by citing co-benefits here and not elsewhere, for example, the Trump administration was inconsistent in its treatment of co-benefits.

The Trump administration was inconsistent in other ways, as well; it adopted inconsistent baselines, for example. That's another part of the declining integrity in the application of economic analyses that we've seen lately.

I think, as a broader matter, part of the erosion of confidence in benefit-cost analysis is that it seems like one could make reasonable assumptions and come out either way on most of these rules. You could show that a rule has net benefits, or you could look at the same rule with an analysis that differs in only one or two assumptions and show that the rule has net costs associated with it.

Richard D. Morgenstern: The inconsistency applied by the administration cuts across a number of areas. Typically, you'd think of the US government as having a position on benefit-cost analysis. And in fact, the Office of Management and Budget (OMB) has issued multiple guidance documents that apply to all regulatory agencies—not just EPA. What we've seen in the previous administration is EPA taking on some of the issues by themselves (with co-benefits as one example), and not OMB taking on those issues government-wide.

The transportation rule technically was a joint US Department of Transportation (DOT) and EPA rule, but it's my understanding that that piece of the analysis was brought to the table by DOT. So, what you have is two agencies of the US government, both of which have legal obligations to issue rules, but both operating under different criteria. One of them is generally trying to back away from co-benefits—that is, the Trump EPA—and the other one, DOT, is adhering to the traditional role of co-benefits. In addition, they have been criticized for the particular studies they used, which showed the reduction Art mentioned in terms of health and safety from lower sales of new cars; those studies have not been widely vetted in the academic community and have not been given the legitimacy that you would expect for studies that would quantify an effect like that. So, a number of different inconsistencies come across here, which I think the new administration has the opportunity to fix.

OMB could play a constructive, positive role by issuing, reinforcing, or updating guidelines. Discount rates and the social cost of carbon are other areas in which the Trump administration departed from mainstream thinking, and a new administration has the opportunity to fix it. The new administration could start through the appointments process, and then it can find specific rules which demonstrate the importance of these factors. In doing so, the administration would be signaling to the scholarly community and the broader regulatory community that it's going to adhere to serious and mainstream economic principles when conducting these analyses. That doesn't obviate the fact that new rules may still be rejected because of certain legal constraints—but analysis should be free of the manipulation and bias that's been introduced lately.

How can we incorporate benefit-cost analysis objectively, impartially, and optimally?

Richard D. Morgenstern: Economic science, like any other science, is complex and best evaluated by experts in the field. The peer review process tends to sort out the stronger from the weaker arguments, and I'd say peer review is essential. The Trump administration abolished EPA's Environmental Economics Advisory Committee, which I think is very unfortunate, both in substance and for the broader anti-science message that such a move sends. The message was that we can just manipulate the regulations and the data, and we don't really need peer review. To their credit, EPA set up an ad hoc subcommittee (of which Art Fraas is a member) to review the agency's guidelines. And that seems like a step in the right direction. But the ad hoc subcommittee was established only after EPA had abolished the Environmental Economics Advisory Committee.

The other point I'll make is that, when legitimate uncertainty exists among experts, we have ways of incorporating uncertainty into benefit-cost analyses—and this has been done for many years at EPA. Whether it's done rigorously and vigorously enough, one can debate. But one can subject the uncertainty analysis to peer review as well.

Art Fraas: To some extent, I agree that the statutes certainly did not think about benefit-

“**In terms of the climate-related regulations that the previous administration has rolled back, and the additional environmental regulations that could have been implemented by a different administration, EPA has lost more than four years.**”

cost analysis very often. Over the past 40 years, though, benefit-cost analysis has intruded into a lot more areas of the statutes than one would have expected in 1970. And benefit-cost analysis also—perhaps unfortunately—has taken on the role of defending the rule after the rule already has been promulgated. So, the agency can say, “We adopted this stringent regulation (or this rollback), and look: it has net benefits.”

A second point is, maybe benefit-cost analysis has taken on a reputation of being able to provide a very precise answer, when in fact substantial uncertainty often is associated with the choice of assumptions that underlie the benefit-cost analysis. So, it should not be too unsettling that by changing one or two assumptions, you can substantially swing where the benefit-cost analysis points.

Richard D. Morgenstern: Looking back over EPA’s 40-year history of doing these studies, benefit-cost analysis increasingly has been useful and has helped the agency think through complex issues. A growing number of people inside EPA would recognize that it’s also true that Congress, in more recent legislation (I’m thinking of the Safe Drinking Water Act of 1996), explicitly introduced benefit-cost analysis as a criterion—whereas in the earliest legislation in the Clean Air Act and Clean Water Act, benefit-cost analysis was either omitted or was treated negatively. The implication was that other criteria should drive the decisions.

Having said that, I think the biggest limitation of benefit-cost analysis probably is not its treatment of discounting or co-benefits—although both of these are important problems—but rather the agency’s failure to consistently consider alternatives at the very beginning of the regulatory process. There’s a tendency—both a human and an institutional tendency—that once you point in a certain direction, you tend to build a case to support that direction. We all do that—it’s human nature. And if I were going to advise a new Biden administration, I would probably put the most emphasis on instituting careful, up-front consideration of alternatives. Maybe not a full benefit-cost analysis done on each option, but at least some analysis and review, which could then play a role in further, more specific, and more detailed regulatory development.

Art Fraas: I think that’s a great idea. Within EPA and other agencies, establishing a rule involves the development of the rule, with the economic analysis stovepiped separately—which means that program decisions about the rule don’t get informed by the regulatory analysis. In some cases, the rule development and economic analysis come together only at the point when the assistant administrator is making a decision about whether to go forward with the proposal. It would be useful to include, at the beginning of the rule development process, some analysis of alternative approaches.

Another point is that, while I think it would be hard to set up, it would be worthwhile to have a third-party institutional review of agency benefit-cost analysis that’s separate from the administration. Economics panels currently don’t tend to comment on the Regulatory Impact Analyses (RIAs) of rules. Maybe a really important rule, like the Clean Power Plan, gets that kind of attention. But a lot of the major rules don’t. Most rules get comments from the affected industry or environmental organizations. But there’s no institutional, third-party review of the quality of RIAs.

Richard D. Morgenstern: I hate to disagree with my esteemed colleague, but I think the regulatory development process is already quite complicated. When RIAs were first introduced back in the 1980s, their cost (recognizing inflation) was a couple hundred thousand dollars. Now they cost several, oftentimes multiple, millions of dollars. For big rules especially, these reviews can cost a lot. Since public comment periods happen with these rules, and the OMB conducts reviews, the addition of RIA reviews generally would not be worth the additional time and resources involved.

However, I do have another thought—one that I think Art will agree with—which is that EPA should embrace, as the government is starting to embrace, retrospective analysis of regulation. That is to say, let’s look back at some of these rules and see how they’ve worked out compared to what we thought.

Art and I have been working together in this area for some time now. Our work so far has revealed that in some situations, the agency

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Other than the lost time involved, which is an irreversible loss—if you have the commitment and the willingness ... then almost anything is reversible.

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has gotten the costs wrong by understating them, along with quite a few situations in which EPA has gotten the benefits wrong by understating them. By looking back at rules, you can find many of these examples—and we have a new paper coming out on the subject that talks about lessons we can draw and ways of advancing this work in the future.

The agency can help with the implementation of retrospective analysis by building some elements into the design of rules that will make retrospective analysis easier to do later on. And EPA can identify alternatives that could be evaluated in this way—for example, EPA could investigate the distributional impacts of major environmental problems, or they could initiate other data collection that would facilitate retrospective analyses. The value of this would be considerable.

Retrospective analyses certainly need not be done for all rules, but they could be done for major rules. It seems like this kind of practice could help increase the legitimacy of benefit-cost analysis and help improve it over time, which I think is an objective that everybody seeks.

Art Fraas: Just to defend my idea a bit: I think this kind of third-party review would be separate from the rule development process, and one way to do it could be a National Academy of Sciences effort to take, for example, 20 RIAs to evaluate and critique, suggesting ways to improve the RIA methodology. At one time, the Congress approved but never funded that kind of systematic review in the Government Accountability Office. It’s a possible mechanism for keeping the agencies a little more honest.

And going back to the question of the extent to which recent rules and rollbacks are reversible or not: In terms of the climate-related regulations that the previous administration has rolled back, and the additional environmental regulations that could have been implemented by a different administration, EPA has lost more than four years. As the new administration comes in, it will take time to develop a new record to support climate-related regulation. And the new rules will have to go through formal proposal, take comments, respond to those comments, and then become a final rule. And there may even be a court review after that. So it may be a

delay of at least six years—maybe even more—associated with the four-year interlude of the Trump administration.

Some have mentioned the “brain drain” from federal agencies, which might require a rebuilding of agencies such as EPA.

Richard D. Morgenstern: That’s an important point; the brain drain has been significant in terms of the number of people who have retired early, quit, or been pushed out in some cases—along with the number of new people who have *not* been brought in at the junior level with the Trump administration. There’s not as much fresh blood as there normally would be in the agency, which is a problem.

Now that we’ve been talking about the potential changes that the new administration can make: Are those changes going to be durable?

Richard D. Morgenstern: I think the problem with durability, as we’ve seen in recent history, is that there’s very little that’s truly durable—certainly not on the regulatory side of affairs. Changing rules is possible; established procedures exist for doing that. And if rules are not the operative mechanism, then it’s even easier to change guidance documents. The whole effort to undermine the use of benefit-cost analysis is really one of the mechanisms by which the recent administration has tried to change regulations—by simply changing and deviating from practices that have been established in executive orders.

In fact, some of the greenhouse gas rules from the Obama administration aren’t really rules—they’re executive orders. And those can be turned around readily. If it’s an actual regulation, then you have to go through a more formal process with the Administrative Procedure Act. But that’s totally doable, as we’ve seen in the past.

By that logic, is everything reversible?

Richard D. Morgenstern: Other than the lost time involved, which is an irreversible loss—if you have the commitment and the willingness to go through the sometimes lengthy, time-consuming, and resource-consuming process, then almost anything is reversible.

Art Fraas: I agree for the most part with that, but when a rule is fully adopted and industry largely has absorbed the costs of compliance, the push to change the rule dissipates. In addition, where the courts get involved, agency flexibility can be constrained in the future.

Maybe this is reaching a little too far, but the Supreme Court changed substantially during the Trump administration. Some are concerned over the potential reversal of the flexibility that EPA has been able to exercise in interpreting statutes; the Supreme Court might in a case find that those actions are not allowed. One possibility (though I’m not sure how it would be teed up) would be if *Massachusetts v. EPA* went back to the Supreme Court: it’s possible that the Supreme Court could come out with a different decision. There’s also a long-standing court decision, the *Chevron* decision, which defers to the expertise of the agencies that administer the statute. The present makeup of the Supreme Court may challenge that decision, and the thrust of that change would require Congress to be very specific in its direction to the agencies on what sorts of regulations they can adopt. And that would mean, for example, that EPA would be quite constrained in developing new regulatory programs for climate change under the Clean Air Act.

Richard D. Morgenstern: There’s also an active debate in the legal community on the extent to which the court—even before Amy Coney Barrett’s confirmation—might take an opportunity to interpret *Chevron* in a way that constrains the agency. That’s certainly a possibility, and I think it raises a question: How does EPA in the new administration go forward with climate regulation? And the answer, I think, is: very carefully, because of potential legal challenges.

You could imagine a situation in which the agency invests a lot of time and resources in developing a rule, and then it encounters legal challenges. Potentially, the rule even could be overturned by the Supreme Court. Thus, the agency needs to be cautious in how it proceeds. ■

Art Fraas is a visiting fellow and Richard D. Morgenstern is a senior fellow at Resources for the Future.



More from the Climate Insights 2020 Survey

Our recent *Climate Insights 2020* survey—a collaboration by researchers at Stanford University, Resources for the Future, and survey research company ReconMR—has yielded real-world insights about American public opinion on climate change and the policies that could help with its mitigation. The effort stems from a long-standing polling partnership that’s been featured in publications such as the *New York Times*, *LA Times*, *USA Today*, *Time* magazine, ABC News, and elsewhere.

Our latest *Climate Insights* reports have offered valuable insights in a pivotal year marked by a historic presidential election and a public health crisis triggered by the novel coronavirus. In the previous issue of *Resources*, we took a close look at the overall trends from the *Climate Insights 2020* survey. These summaries of our additional reports provide even more details about American opinions on climate change and clean energy.

TEXT Jon A. Krosnick, Bo MaInnis, and Jared McDonald



Policies and Politics

Contrary to the media-driven message of climate action as an issue that’s hopelessly polarized across party lines, some climate change mitigation policies could be pursued with widespread public support. Our survey demonstrates that a majority of Americans support the principles underlying major climate policies. In addition, the *Climate Insights* survey suggests that the COVID-19 pandemic and associated economic upheaval have not exacerbated perceptions of the unintended economic side effects of climate mitigation efforts. Nor have those events reduced public support for mitigation policies, as shown by the steady levels of support, comparable to previous years.

- An overwhelming majority of Americans favor government efforts to shift electricity generation toward renewable sources through tax breaks (83%) and to reduce greenhouse gas emissions from power plants (81%).
- More than three-quarters of Americans favor government policies that lead to the construction of more energy-efficient buildings (75%), cars (71%), and appliances (71%)—whether by requirement or through tax breaks.
- Increased consumer taxes on electricity and gasoline to incentivize people to use less are the least popular policy options that we asked about (favored by 28% and 43%, respectively).
- Two-thirds of Americans (66%) believe that coronavirus-related federal stimulus packages should include efforts to create new jobs and technologies to combat global warming.
- Majorities of Americans favor policies implemented by the Obama administration but rolled back by the Trump administration. In particular, more than three-quarters of Americans support the policies that comprise the Paris Agreement (81%) and the Clean Power Plan (77%).

- A majority of Americans are more likely to vote for a candidate that makes “green” statements (64%) and less likely to vote for a candidate that makes “anti-green” statements (67%).



Opinion in the States

Most elected government officials represent only a portion of the nation. Our national survey results can be complemented in more granular detail by evidence describing state-level opinions. This state-level analysis provides the opportunity to see how opinions vary across the United States and allows us to test hypotheses about where pockets of skepticism might be most likely. Although we do see differences among the 44 states that we could analyze in this way, not a single state in the country emerges as majority skeptical about the existence or threat of global warming.

- The majority of residents of all analyzed states hold “green” opinions—for example, more than 70% of residents in all states believe that global warming has been occurring.
- At least 60% of Americans in all analyzed states believe that global warming will be a serious problem for the United States and the world.
- The size of the “issue public”—the people who consider global warming extremely personally important and vote, donate, and act on the issue—varies from state to state. For example, in Rhode Island, 33% of people care deeply about global warming, whereas in South Dakota, 9% do.
- People in states that conferred more votes to former President Trump in the 2016 election demonstrated a lower level of belief in the fundamentals of global warming and reduced support for policies to mitigate it.
- The larger the majority in a state expressing “green” opinions on global warming, the more likely its US congressional representatives

are to vote for “green” policies. And the more a state’s population is passionate about the issue, the more likely its representatives are to vote for those policies—an indication that representatives pay attention to their constituents on these matters.



Electric Vehicles

Transportation is the top source of greenhouse gas emissions in the United States, accounting for almost 30 percent of total emissions. In the national and global effort to reduce emissions and mitigate climate change, electric vehicles (EVs) provide an attractive option. But despite dropping prices and rising popularity, EVs continue to make up a small percentage of the automotive industry’s market share. Are Americans resistant to purchasing these vehicles? What are some of the biggest barriers—or perceived barriers—to widespread adoption? Our *Climate Insights* survey reveals American perceptions of EVs and which of these perceptions may lead to purchasing reluctance.

- 57% of future car buyers are willing to consider buying an EV.
- The most important examined determinant of willingness to purchase an EV is the belief that global warming will be a serious problem for the United States in the future.
- The perceptions that batteries may catch on fire, that maintenance costs for EVs are higher, and that EVs have weaker acceleration than gas-powered vehicles are sources of hesitation among potential buyers.
- Perceived difficulty of replacing batteries and lack of mechanics qualified to repair EVs as compared to gas-powered vehicles are additional predictors of purchasing reluctance.
- 65% of respondents have not driven nor know anyone who has driven an EV.



Partisan Divide

Climate change is much less politically polarized than people think. Our survey reveals the climate-related issues on which political groups agree and disagree. Though opinions differ along party lines on some issues, bipartisan support is evident for a number of issues related to clean energy investment and climate change mitigation strategies. Majorities of Republicans, Independents, and Democrats agree on the existence, causes, and threat of climate change; they also agree about various government policies that could be used to mitigate future warming.

- 94% of Democrats believe global warming has been happening, as do 78% of Independents and 67% of Republicans.
- Majorities of Republicans (56%), Independents (77%), and Democrats (86%) report having personally seen the effects of global warming.
- Majorities of Republicans (53%), Independents (71%), and Democrats (96%) favor pursuing the goals of the Paris Agreement.
- Majorities of all three groups think that the US government should act to address global warming: 63% of Republicans, 79% of Independents, and 98% of Democrats.
- 43% of Democrats attach extreme personal importance to global warming, compared to 22% of Independents and 4% of Republicans. ■

Jon A. Krosnick and Bo MaInnis authored all the *Climate Insights 2020* reports; **Jared McDonald** contributed to the “Opinion in the States” report.

Jon A. Krosnick is a professor at Stanford University and a university fellow at Resources for the Future. **Bo MaInnis** is an adjunct lecturer and **Jared McDonald** is a postdoctoral researcher at Stanford University.

The Best Work Gets Done in Partnership

Resources magazine recently spoke with Elaine Dorward-King, a longtime environmental strategist in the mining, chemical, and engineering sectors and a member of the Resources for the Future (RFF) Board of Directors.

Here are excerpts from the conversation, which touched on her passion for sustainable development, the importance of partnerships in facing the climate challenge, and more.

Resources magazine: What sparked your interest in addressing environmental and energy issues?

Ever since I decided what I was going to do with my life, my driving motivation has been environmental conservation. Throughout my corporate career, I've focused on how we can protect and restore the environment while achieving business objectives. More broadly, nowadays, my driving motivation is to help make sure that we're doing the right thing for people and society by helping businesses and others apply a sustainability lens to decisions.

How did you first get introduced to RFF?

Since the early 1980s, I've been very involved with the Society of Environmental Toxicology

and Chemistry (SETAC). Its premise is that we have to solve environmental problems through multidisciplinary, multisectoral engagement, rather than government, business, or academia developing solutions in isolation or using only one scientific approach.

In 1993, SETAC co-sponsored a workshop on sustainable environmental management, and Paul Portney [at that point RFF's vice president, and later RFF's president and CEO] happened to be there. He and I hit it off, in part because RFF also is multidisciplinary and focuses on the wide use of resources.

Our country currently is facing many pressing issues—the COVID-19 pandemic and our national reckoning on racial justice, not to mention climate change. Where does RFF fit into the current moment?



Supporter Spotlight

In this RFF Supporter Spotlight feature, we hear directly from donors about their commitment to issues in climate, energy, and the environment; how they make a difference; and why they support Resources for the Future—all in their own words.

“**We know that every year we delay taking action on climate change means it will cost the next generation even more to fix the issue and mitigate the impacts.**”



Whether local or global, problems can't be solved adequately if we come at them from a technical or sociological point of view without taking into account economic factors. It's a tenet of sustainability that all these parameters are crucial: economic, environmental, and social. RFF brings the economic analysis to partnerships—and often the best outcomes are achieved in partnership.

We know that every year we delay taking action on climate change means it will cost the next generation even more to fix the issue and mitigate the impacts. If you're only thinking about the immediate consequences and costs, rather than the long-term impacts and the cost of *not taking action*, you won't be able to reach the best decisions.

How would you describe the role of the corporate community in this work?

If you're trying to influence policy in the social or environmental arena, you can't talk to just government folks; you must be able to influence industry thought leaders and decisionmakers who are managing the material risks that affect their business. RFF needs to continue making the case to companies that they benefit from

objective analysis of the challenges they face and that they shouldn't fear fact-based results.

What do you think RFF's greatest impact has been over the time you've supported the organization?

A very important contribution I've noted has been RFF's ability to engage with not just the federal government, but also state governments, which are able to accomplish things despite, at times, a lack of federal action. People who are trying to collaborate on these issues have access through RFF to information they can trust and use. I think that examining trade-offs and providing understandable analysis of what the choices are and what the effects of those choices are—from electricity use to carbon dioxide emissions—has had a real impact.

What continues to keep you engaged?

RFF has stayed true to its mission of providing nonpartisan, data-based analysis and presenting its findings to a range of stakeholders that either need the analysis or can use the information to make policy. I think that's hugely important—in this day and age more than ever—and I want to support that. ■

Four Ways You Can Support RFF



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Send your check to Resources for the Future | 1616 P Street NW, Suite 600 | Washington, DC 20036



3 Give through a donor-advised fund

Donate through a DAF account at a community foundation or financial institution to support RFF while receiving favorable tax benefits.



4 Give through a will, trust, or gift plan

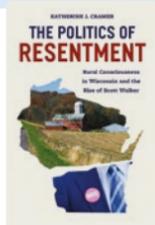
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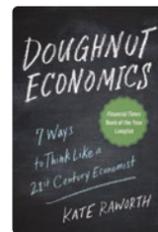
“Everyone who cares about renewable energy needs to read it. Cramer went to coffee shops and gas stations across rural Wisconsin to understand how people feel about the government. What she finds, as the title suggests, is resentment—that the state government is setting policy, and urban people are driving policy that’s affecting rural communities. It’s really important to understand how rural communities feel about the policies.”

In the rural communities in Michigan where I’ve spent most of my time, a renewable portfolio standard [RPS] is seen as a strike against a project. Even if they would otherwise be supportive of it, people see the RPS as ‘proof’ that wind energy needs a state mandate, that it doesn’t pay for itself, that it needs the government to prop it up. There’s not one word in the book about energy and the environment, but it’s so helpful to understand the kinds of communities where we’re putting energy infrastructure.”

Sarah Mills
Senior Project Manager,
University of Michigan

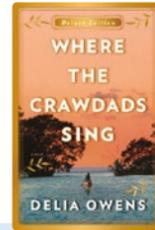


The Politics of Resentment
by Katherine J. Cramer



Doughnut Economics
by Kate Raworth

Where the Crawdads Sing
by Delia Owens



“It takes place in a coastal wetland in North Carolina. It is evocative; the beauty and values of nature come through on every page. It helps you understand why we’re so worried about the definition of Waters of the United States (WOTUS) and why it’s so darn important to read things like this and go out in nature. During this time, we should all be taking walks, and enjoying nature, and realizing how important it is to protect these things.”

Ellen Gilinsky
Former Associate Deputy
Assistant Administrator for Water,
US Environmental Protection Agency

“If you want to go more futuristic, I highly recommend it. Raworth is talking about where we want to go with the economy in the long run, and she has a reconception of the purpose of economics. Inside her doughnut diagram is sustainable water, clean air, electricity, all the resources for everybody on Earth; and then there’s a thin area of what we call sustainability of all those items; and then there’s a point where we start pushing beyond. We’re starting to break the planetary boundaries for those things. What she’s articulating is that we can feed everybody—we can give good lives to everybody on this planet—but we have to stay within those planetary boundaries. It’s a very fun, provocative read that might change how you think about economics.”

Chris Bataille
Associate Researcher, Institute
for Sustainable Development and
International Relations



What’s at the Top of Your Stack?

A recurring segment on *Resources Radio* is “Top of the Stack,” when podcast hosts Daniel Raimi and Kristin Hayes ask each guest what’s on the top of their literal or metaphorical reading stack.

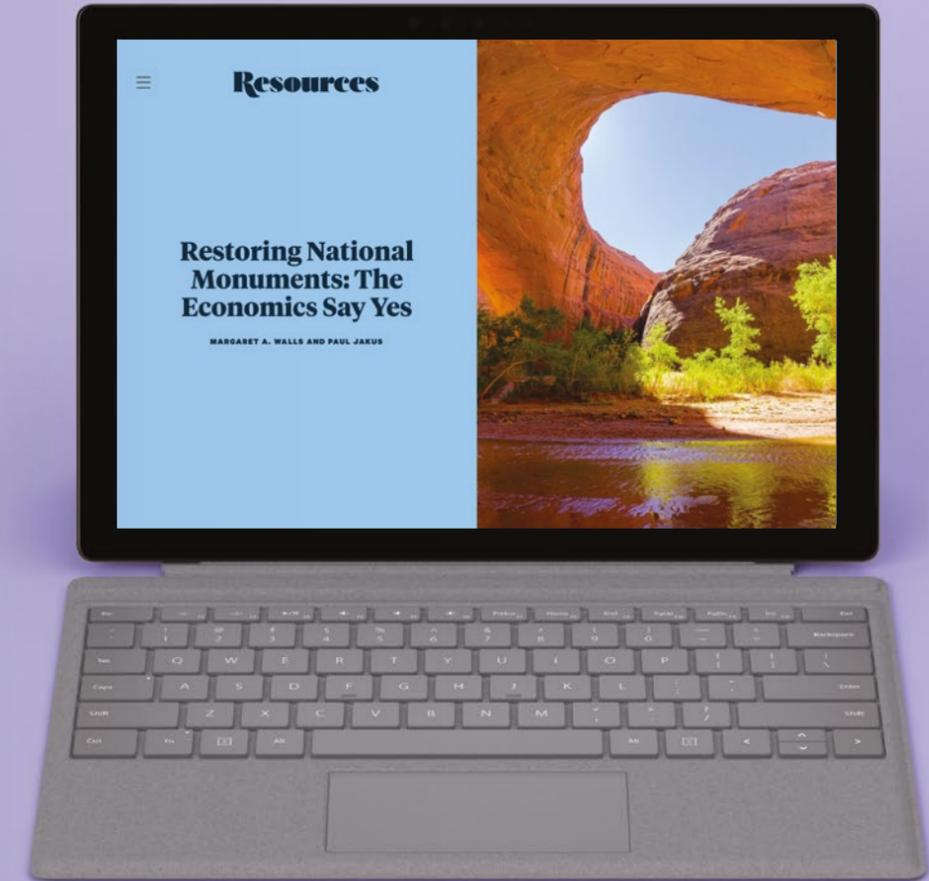
Economics and the environment tend to be common themes for the recommended readings, so these books might be right up your alley. See if you agree that experiencing nature can extend to the printed page.



During this time, we should all be taking walks, and enjoying nature, and realizing how important it is to protect these things.



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Read more about options to support RFF on page 49 of this issue.