RESOURCES
for the **FUTURE**

2018
annual report

Photo Credits

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Letter from the President

In times of intense political polarization, rhetoric often replaces reason, leaving little room for informed decisionmaking. At Resources for the Future (RFF), we embrace a path that looks beyond today's headlines, delivering independent and rigorous research insights and policy solutions that will lead to a healthy environment and a thriving economy for generations to come.

Our instinct for impartiality sets us apart in important ways. Policy and business leaders repeatedly turn to RFF, because credible expertise is increasingly hard to find. So much so that in 2018, our researchers spent more time than ever providing expertise to Capitol Hill, state governments, and leading private-sector decisionmakers. Meanwhile, an authoritative research index ranked RFF #1 for environmental economics and #2 for energy economics out of a field of over

7,500 global institutions—further reinforcing our reputation for research excellence.

As demand for RFF's research and analysis grows, so do the real-world improvements that come with rigorous policy design. In our annual report, you'll find some of the tangible impacts of our work in 2018. We reflect on how RFF has transformed the way decisionmakers and the public think about problems—from working with NASA to identify the socioeconomic benefits of satellite technology, to developing new techniques to detect and manage the spread of invasive species. We showcase how RFF has helped to quantify issues decisionmakers care about, including how we informed a critical ruling by the Federal Energy Regulatory Commission and evaluated landmark carbon pricing policies across the country. Finally, we highlight the impact of bringing together policymakers and

stakeholders—from our innovative "Energy Research Insights for Decisionmaking" conference to important roundtable discussions on water and forest resource issues and policies.

To help amplify our impact and reach, RFF has also undergone a major brand and website redesign. We launched a new weekly podcast, *Resources Radio*, to highlight the most interesting voices and stories in environmental, energy, and resource economics and policy. And we launched the RFF-CMCC European Institute for Economics and the Environment in partnership with Europe's leading climate research organization, the Euro-Mediterranean Center on Climate Change. We've established offices in Milan and Venice and hired more than thirty research experts.

RFF's impact is driven by the creativity, intelligence, instinct,

and collaborative spirit of our people. In 2018 RFF elected Susan Tierney, an expert on energy economics, regulation, and policy, as the new Chair of our Board of Directors. We grew our network through the creation of the RFF President's Council, a high-level advisory committee of distinguished business, scientific, political, and philanthropic leaders. We built capacity and invested in our talent across RFF by recruiting and retaining highly qualified, exceptional individuals in both our research and operational departments.

I want to conclude by acknowledging the passing of Jim Rogers, who served on our Board of Directors since 2017. Jim worked with many of us at RFF long before he joined the Board and was a significant part of the public conversation around electricity, energy, and the environment, to which he dedicated his life's work. Jim will be sorely missed by all who knew him.

As you will see in this annual report, RFF's mission—to improve environmental, energy, and natural resource decisions through impartial economic research and policy engagement—has never been more critical. As our board member Jonathan Silver recently commented to me: "Punditry and bombast generate heat but little light. The light comes from getting the analytics right. Eventually, data wins. RFF does the hard work of getting the data right." There's no better evidence of that than in the pages that follow.

Thank you for your continued support of RFF.

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

HIGHLIGHT

RFF-CMCC European Institute on Economics & the Environment

In June 2018, RFF and the Euro-Mediterranean Center on Climate Change (CMCC) announced the launch of the RFF-CMCC European Institute on Economics and the Environment.

The new Institute is committed to being a focal point for environmental research and policy solutions within Europe, and will connect that work internationally through joint research projects and convenings. Professor **Carlo Carraro**, President Emeritus of the University Ca' Foscari of Venice, will serve as Chair of the new Institute, which has offices in Milan and Venice.

For more information about the Institute, visit **www.eiee.org**.

RFF President **Richard G. Newell** spoke with Axios reporter Amy Harder at RFF's "Energy Research Insights for Decisionmaking" conference, which was hosted in collaboration with the Alfred P. Sloan Foundation.

Susan Tierney, an expert on energy economics, regulation, and policy, became the new Chair of RFF's Board of Directors in 2018.

RFF in 2018
by the Numbers

1,129,400

Our tweets generated more than one million impressions.

14,000

More than 14,000 subscribers received our newsletters.

218

We're funded by 218 individuals and other supporters.

200

Our magazine, *Resources,* published its 200th issue.

107

We released more than 100 research publications.

66

We're 66 years old—the oldest US think tank devoted exclusively to environmental and natural resource issues.

57

We're home to 57 PhD economists and other researchers.

37

Our new European Institute hired 37 scientists.

5

We were ranked #5 globally for "Best New Idea or Paradigm."

(2018 Global Go To Think Tank Index)

1

We were ranked #1 for environmental economics from a field of 7,500 global institutions.

(2018 IDEAS/RePEc Rankings)

Impact

There are three distinct ways RFF improves legislation, regulation, and other policies and decisions at the federal, state, local, and international levels. We transform the way decisionmakers and the public think about problems, delivering facts, providing new ideas, and expanding the solution set. We quantify issues decisionmakers care about, enabling them to understand impacts, identify opportunities, weigh competing options, and resolve tradeoffs. And we bring together decisionmakers and stakeholders to learn from one another, develop a shared understanding of issues, and find common ground. In the pages that follow we explore some of RFF's most important policy impacts in these three areas during 2018.

Transforming the Way Decisionmakers and the Public Think

Employing Satellite Technologies to Monitor Air Quality

Compliance with the US Clean Air Act's National Ambient Air Quality Standards (NAAQS) is determined at the county level using ground-based air pollution monitors. However, many US counties have no monitors, and counties with pollution monitors may not be classified accurately if their monitors are located in cleaner parts of the county.

As part of RFF's VALUABLES collaboration with NASA, **Daniel M. Sullivan** and **Alan Krupnick** investigated how satellite data might improve monitoring for compliance with the NAAQS. Sullivan and Krupnick used satellite imagery to reveal that

about 24.4 million Americans live in areas misclassified as attaining NAAQS standards for fine particulate matter concentrations, commonly known as PM2.5. Their research showed that more than 5,400 premature deaths would have been avoided—with a welfare gain to society of $51 billion—if satellite technologies had been used to monitor PM2.5 levels and and misclassified areas came into attainment as fast as properly classified nonattainment areas.

Sullivan and Krupnick presented their findings to the US Environmental Protection Agency and in several other research forums, including at the American Geophysical Union 2018 Fall Meeting and the World Congress of Environmental and Resource Economists.

Dissecting Wildfire Risk Factors and Mitigation Strategies

In 2018, nearly two billion acres in California were consumed by wildfires. The Camp Fire, the most destructive wildfire in the state's history, took 85 lives and destroyed more than 18,000 structures. As the flames were quenched, allegations relating to the ignition of the fires—and larger issues around wildfire management—took center stage in public debate. Assessing these questions required a combination of scientific knowledge and on-the-ground familiarity with forest and land management issues across the western US—expertise that RFF is able to draw upon.

In the inaugural episode of RFF's *Resources Radio* podcast series, **Matthew Wibbenmeyer** assessed the factors that have contributed to a 500 percent increase in the number of large wildfires over the past 30 to 40 years—climate change among them. Following claims that the fires could be blamed on mismanagement of California forests, Wibbenmeyer collaborated with **Ann M. Bartuska** to write for Axios about the complexity of wildfire causes, identifying ways for the state to reduce risk in the face of a changing climate. RFF analysis extended beyond the fires' causes; **Alan Krupnick** wrote about the public health impacts of fire smoke and its exclusion from the Clean Air Act, and Wibbenmeyer coauthored an article in *Nature Climate Change* on the potential for disaster response to be inefficient and maladaptive.

Demonstrating the Value of Ecosystem Services along the Hudson River

Investments in green infrastructure, habitat restoration, and conservation can pay big dividends for communities. However, the impact of projects is often difficult to gauge, because many environmental goods—from clean air to healthy wildlife populations—are not traded in markets and therefore have no observable monetary value. Incorporating the price

people would be willing to pay for such goods—their "nonmarket value"—helps to ensure that decisionmakers allocate resources so as to accurately reflect their value to communities.

James Boyd and **Leonard Shabman** are advising local decisionmakers in New York on ways to measure and communicate the benefits of investment in estuary and coastal habitat restoration. They are also providing guidance on how to integrate benefit-cost analysis into decisionmaking by the US Army Corps of Engineers, a potential funder of projects in the estuary. In 2018, Boyd and Shabman produced a report and met with key stakeholders, including the US Army Corps of Engineers, the Hudson River Foundation, the Environmental Defense Fund, and a number of federal agencies. They will hold a follow-up workshop in early 2019 to present their findings and work toward consensus among public agencies and philanthropic organizations on ecosystem services research priorities for the estuary.

Analyzing Statewide Ballot Initiatives

During the 2018 midterm elections, voters across the United States weighed in on statewide energy and environmental ballot initiatives. These initiatives ranged from pricing carbon in Washington

State, to restricting available land for fracking in Colorado, to expanding renewable energy requirements in Arizona and Nevada.

As leaders in the fields of energy and environmental policy, RFF experts provided timely analysis of these proposals. **Marc Hafstead**, Director of RFF's Carbon Pricing Initiative, weighed in on Washington State's carbon fee initiative, appearing in national publications such as Axios and *Wired* as well as several Seattle-based radio stations. In *Resources* magazine, **Alan Krupnick** and **Daniel Raimi** examined the nuances of Proposition 112, Colorado's ballot initiative on fracking. In the days leading up to the election, **Dallas Burtraw** provided commentary in the *New York Times* on the impact of Arizona and Nevada's initiatives on renewable energy prices around the country. And, after the elections, the *Washington Post* turned to **Richard G. Newell** for his analysis of the failure of certain environment-related ballot initiatives.

Helping to Detect New Invasive Species through Bioeconomic Modeling

Invasive species present a major threat to America's agriculture and forest resources, along with health risks to both humans and animals. The annual

environmental and economic costs from biological invasions have been estimated at $138 billion in the United States. A key strategy for reducing impacts from invasive species is investing in surveillance to detect and control new invasive species quickly. A perpetual challenge is the allocation of scarce resources—personnel, technology, funds—to detect invasive agricultural and forest pests before they can propagate and spread.

When the US Department of Agriculture (USDA) needed to optimize its allocation of resources for detecting, monitoring, and preventing the spread of invasive species, it turned to **Rebecca Epanchin-Niell**. Epanchin-Niell is working to develop a decision support tool to guide cost-effective targeting of surveillance efforts for rapid detection of new invasive species—when pests are less costly to control and fewer damages have accumulated.

The tool is based on a bioeconomic model developed at RFF, which identifies cost-effective allocations of surveillance resources across sites and pest groups. It was presented to USDA's Animal and Plant Health Inspection Service for initial reactions and has now been shared with diverse audiences across the USDA. The model also has drawn interest from researchers, managers, and other stakeholders as far away as Australia and New Zealand to inform their surveillance activities. ●

HIGHLIGHT

RFF's Carbon Pricing Initiative

Countries, states, and regions around the world—including a number of US states—are driving down carbon dioxide emissions by putting a price on carbon through cap-and-trade programs or carbon taxes. To design carbon pricing policies that jointly consider environmental gains and economic vitality, policymakers need credible information on how these policies affect greenhouse gas emissions, vulnerable households, and the overall energy mix.

Experts in RFF's Carbon Pricing Initiative are informing the design and examining the impacts of carbon pricing policies to help leaders better understand the impacts of their decisions and pave the way for the design of pragmatic and equitable policies.

The initiative is led by **Marc Hafstead**, and more information about it can be found at **www.rff.org/cpi**.

How RFF is Working with NASA to Evaluate the Socioeconomic Benefits of Satellite Data

The Consortium for the Valuation of Applications Benefits Linked with Earth Science (VALUABLES) is a cooperative agreement between RFF and the National Aeronautics and Space Administration (NASA).

Created in 2016 with a $3.5 million award from NASA, we are working to quantify and communicate how the use of satellite information in decisions

Lowering the Cost of Wildfire Management

RFF is working to estimate the cost savings from using satellite data to protect human safety, property, and critical natural and cultural resources after a wildfire.

Mitigating Health Impacts from Algal Blooms

RFF scholars are quantifying the value of using satellite data to detect harmful algal blooms and manage recreational advisories, using a case study from Utah Lake in 2017.
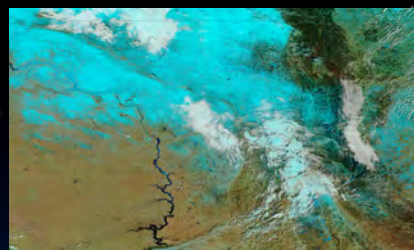
Improving Flood Forecasting

RFF scholars are assessing the economic value of using terrestrial water storage information from satellites to improve flood and river flow forecasts that inform local decisions about flood mitigation measures.

can improve outcomes for people and the environment. The consortium brings together economists, NASA scientists, remote sensing experts, and members of the wider Earth science community.

Our work is motivated by the science of the value of information, a microeconomic approach to determining what information is worth by assessing the difference in how people make

a decision with and without this information. Case studies, known as impact assessments, form a major part of the consortium's work, and include the six listed below.

Find out more about VALUABLES at **www.rff.org/valuables**.

Monitoring Air Quality

In 2018, RFF researchers quantified the benefits of using satellite data instead of ground-based air quality monitors to enforce the Clean Air Act's National Ambient Air Quality Standards.
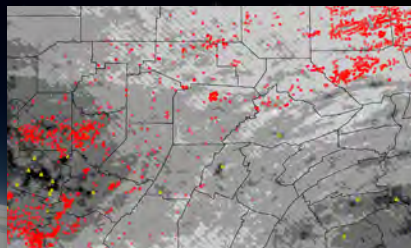
Analyzing Linkages Between Oil and Gas and Health

RFF scholars are using satellite data to better understand whether air pollution near oil and gas wells in Pennsylvania affects infant and maternal health.

Quantifying Uncertainty over Ice Sheets and Sea Level Rise

RFF is quantifying experts' uncertainty about how much ice sheet melting contributes to sea level rise, providing a baseline needed for future studies.

Yusuke Kuwayama, Director of RFF's VALUABLES Consortium, is coauthoring impact assessments on the socioeconomic benefits of using earth observations to detect harmful algal blooms and to lower the cost of wildfire management.

Paul Picciano, **Daniel Shawhan**, and **Karen Palmer** (left to right) are providing crucial technical assistance as New York's state government seeks to understand the impact of incorporating carbon emissions prices into wholesale electricity markets.

Quantifying Issues Decisionmakers Care About

Evaluating the Implications of Replacing the Clean Power Plan

Power plants are a major source of the carbon emissions that lead to global warming. In 2015 the US Environmental Protection Agency released a standard called the Clean Power Plan that aimed to cut emissions from electric power generation while encouraging energy conservation and the adoption of renewable energy. In August, the Trump administration proposed a replacement for the Clean Power Plan called the Affordable Clean Energy (ACE) rule, and **Dallas Burtraw** and **Amelia Keyes** quickly got to work assessing its implications. In an article

later accepted by a prominent scientific journal, *Environmental Research Letters*, they projected that under the ACE rule, carbon emissions will actually increase at 28 percent of power plants, as well as in 18 states and the District of Columbia. Burtraw and Keyes pointed out that these findings may leave the new rule vulnerable to legal challenges under the Clean Air Act, and their incisive analysis was picked up in multiple news outlets, including Axios and Vox.

Informing High-Profile Federal Regulatory Decisions

In the fall of 2017, the US Department of Energy published a Grid Resiliency Pricing Rule,

which proposed that eligible coal and nuclear generators should be guaranteed revenues sufficient to make them profitable. When the Federal Energy Regulatory Commission rejected the rule in a landmark decision the following January, it cited analysis by **Daniel Shawhan** and **Paul Picciano**, who found that the policy would add 53 million tons of carbon dioxide emissions annually and result in more than 25,000 premature deaths by 2045. Shawhan and Picciano's research, which used RFF's E4ST simulation model, was the only comprehensive benefit-cost analysis of the administration's policy proposal. Their findings were published in *Energy Policy* and were featured prominently in media outlets like the *New York*

Times, the *Houston Chronicle*, and the *Washington Post*.

When the Department of Energy subsequently proposed preventing the retirement of coal plants for two years, Shawhan and Picciano again used the E4ST model to produce a rapid, detailed analysis. They projected the emission increases and premature deaths that would result from preventing the retirement of coal-fired plants for two years and found that they would cause a total estimated welfare loss of between $4 billion and $9 billion. Their research paper received significant media coverage in outlets like Axios, Bloomberg, and POLITICO. The administration ultimately

dropped the new proposal, reportedly because of opposition from the president's economic advisors.

Modeling Carbon Pricing in New York Electricity Markets

As part of New York State's efforts to meet its goal of reducing greenhouse gas emissions 40 percent by 2030, policymakers are considering incorporating carbon emissions prices into wholesale electricity markets. These prices on emissions, known as "carbon adders," make it more expensive to produce carbon-intensive electricity, encouraging generators to emit less carbon.

Before making decisions about implementing carbon adders, New York needs to understand likely economic and environmental impacts.

In 2018, **Karen Palmer**, **Paul Picciano**, and **Daniel Shawhan** provided the state's power market operator, government, and stakeholders with crucial technical assistance as they sought to understand the impact of carbon adders on emissions, public health, and electricity costs. The effects of carbon adders on emissions can be difficult to predict, given that carbon adders in New York could shift emissions to elsewhere in the region because the state is part of a broader regional cap-

RFF's Future of Power Initiative

RFF has conducted pioneering research on the US power sector for decades, bringing economic insights to bear on the design, functioning, and improvement of power sector markets and a broad sweep of related government policies. Now, RFF's Future of Power Initiative is helping decisionmakers to transform the 21st century US power sector through four crucial areas of research and engagement: the reform of wholesale

competitive markets and investment planning in regulated markets; accelerated integration of renewables and storage; system integration of distributed energy and demand side services; and economy-wide electrification.

The Initiative, directed by **Karen Palmer**, was launched in 2018. Find out more at **www.rff.org/fop**.

and-trade program. However, by deploying RFF's sophisticated E4ST model of the power sector, Palmer, Picciano, and Shawhan found the policy would still be likely to drive down emissions, by also reducing emissions from generators that are not subject to that cap-and-trade program. This finding will likely play an important role as NYISO decides whether to implement carbon adders.

Evaluating Changes to Fuel Economy Standards

Fuel economy and greenhouse gas standards for passenger vehicles are at the heart of previous administrations' efforts to decrease transportation emissions in the United States. In 2018, the US Environmental Protection Agency (EPA) and the National Highway Transportation and Safety Administration (NHTSA) proposed to freeze the current fuel economy standards—maintaining model-year 2020 levels through model-year 2026—rather than continue to ratchet them up.

After the EPA and NHTSA announced their initial proposal to freeze fuel economy standards, **Alan Krupnick** and **Virginia McConnell** quickly provided policy commentary, explaining how the incorporation of flexibility into fuel economy standards could result in a less costly and more effective policy. **Joshua Linn** coauthored a report analyzing the economic

justifications for this change and found that while the freeze will have a relatively small effect on greenhouse gas emissions, its effect could be larger if it impacts technological innovation or political momentum for tighter fuel standards. During the public comment period, RFF experts—including Krupnick, McConnell, Linn, and **Benjamin Leard**—undertook analysis helping the federal government to understand the economic and emissions implications of the proposed changes. They found that the agencies' cost-benefit analysis was not conducted in accordance with sound economic principles, and that "more reasonable assumptions would dramatically reduce the net benefits of freezing the standards."

RFF scholars have become must-read experts on issues related to fuel economy standards. After the EPA and NHTSA released their proposal, Linn's analysis was cited in publications like Bloomberg Environment, E&E News, Forbes, *Science*, and *Scientific American*.

Analyzing Landmark Carbon Pricing Proposals

Carbon pricing policies have recently generated widespread attention as policymakers in the United States and internationally seek effective solutions to climate change. In Congress, lawmakers on both sides of the

aisle regularly turned to RFF experts during 2018 to model their carbon pricing proposals.

Marc Hafstead provided technical assistance and led modeling work on two landmark conservative climate proposals: the MARKET Choice Act introduced by Rep. Carlos Curbelo (R-FL) and the Climate Leadership Council's Carbon Dividends Plan. Hafstead's analysis of both policies received coverage in POLITICO, along with other media outlets like Axios and *Fortune*. Meanwhile, RFF's economic modeling work was cited by Sen. Sheldon Whitehouse (D-RI), Sen. Brian Schatz (D-HI), Rep. Earl Blumenauer (D-OR), and Rep. David Cicilline (D-RI) in their press release introducing an updated American Opportunity Carbon Fee Act.

RFF scholars also worked with policymakers in California, Oregon, and states involved in the Regional Greenhouse Gas Initiative (RGGI) to assess the impacts of state and regional carbon pricing policy designs. In July 2018, **Dallas Burtraw** was appointed by California Governor Jerry Brown to the state's Independent Emissions Market Advisory Committee, which annually evaluates California's cap-and-trade program. And in August of 2018, Vermont (a RGGI state) hired RFF to analyze potential decarbonization methods.

Exploring the Extent of Seafood Mislabeling

Seafood mislabeling in the United States creates a variety of economic, health, and ecological harms, but the magnitude of the problem remains largely unknown. For starters, how much mislabeled seafood do Americans actually purchase and consume? In 2018, **Kailin Kroetz**, **Patrick Lee**, and coauthors wrote a report providing a framework to address questions surrounding the volume of mislabeled seafood purchased in the United States, spotlighting mislabeled salmon and cod species as case studies.

In 2019, RFF researchers and collaborators will produce more in-depth articles and convene a public event and workshop on the economics of seafood mislabeling.

Exploring Public Attitudes Toward Climate Change

In July 2018, RFF partnered with Stanford University and ABC News to publish a major new survey on Americans' opinions about climate change. The poll found that 74 percent of Americans believe global temperatures have increased over the past 100 years, and 61 percent of Americans believe the government should be doing "a great deal" or "a lot" to address the issue. The poll documented widespread agreement among Americans that government action should be taken to reduce greenhouse gas emissions, and its findings were featured in the *New York Times*, the *Los Angeles Times*, and on ABC News.

This latest poll is a continuation of RFF's "Surveying American Attitudes toward Climate Change and Clean Energy" project, led by RFF University Fellow and Stanford University Professor **Jon Krosnick**. The project is a collaboration between RFF and Stanford University that began in 2013.

Curating Information on Oil and Gas Impacts

As decisionmakers seek to keep pace with the proliferation of research on the impacts of increased oil and gas development in the United States, the need for a unified source of trustworthy, up-to-date information has become increasingly clear. In response, **Daniel Raimi** and **Alan Krupnick** developed the Shale Research Clearinghouse (SHARC), a one-stop-shop providing comprehensive, clear information on the positive and negative effects of oil and gas development.

Created with feedback from experts in government, business, NGOs, and academia, SHARC was designed to be simple and powerful. Through its web interface, users are able to quickly access summaries of peer-reviewed research on the impacts of oil and gas development on human health, climate change, local economies, groundwater, and more. Raimi and Krupnick launched the tool with an instructive webinar, with NPR affiliate StateImpact Pennsylvania covering the launch. ●

Marc Hafstead, Director of RFF's Carbon Pricing Initiative, provided technical assistance and led modeling work on carbon pricing policies proposed by legislators on both sides of the aisle.

Raymond J. Kopp, Vice President of RFF's Energy and Climate program, helped to develop and launch the RFF-CMCC European Institute on Economics and the Environment.

Bringing Together Decisionmakers and Stakeholders

Convening the Nation's Leading Energy Experts

Energy research is quickly evolving, and insights from that research can lead to better policy outcomes, market designs, consumer incentives and benefits, and more. To connect decisionmakers with the energy research they need, RFF assembled more than 120 leading global energy and climate researchers and decisionmakers in November for our "Energy Research Insights for Decisionmaking" conference. The conference, a collaboration with the Alfred P. Sloan Foundation, included thought-provoking discussions on topics such as the policy uses of the social cost of carbon, the effectiveness of

energy efficiency policies, and the impact of new technologies on a changing energy landscape. The conference culminated in a lively public discussion, during which three leading energy journalists explored the next generation of energy and climate policies.

Identifying National Water Resource Priorities

The United States faces water challenges from growing population needs and a changing climate. Municipalities and water management agencies are charged with an increasingly complex task: to maintain safe, clean water resources amid ever-intensifying climate

conditions, from extended drought to catastrophic flooding. In the fall of 2018, RFF organized regional roundtable workshops and discussions in Chicago, Denver, the District of Columbia, Houston, and San Francisco to identify the most important areas in which environmental economics expertise could enable policy, business, and industrial leaders to make better decisions on water resources management. Experts and stakeholders from over 80 organizations and agencies converged to develop a shared understanding of regional and national priorities around water. The conversations at each roundtable honed in on a unified set of priorities, positioning RFF to conduct the research that

decisionmakers need in order to effectively manage water resources. **Ann M. Bartuska** and **Casey Wichman**, two principle organizers of the roundtables, later contributed to a report summarizing their results.

Finding Common Ground on Forestry Policy

Forests are home to many invaluable ecosystem goods and services as well as a source of wood products for economies around the world. Experts at RFF are evaluating key forestry issues in the United States: the effectiveness of forest management policies, land use challenges associated with

forestry offsets, the balance between forest coverage and biomass production, and policies that govern timber and forest product markets.

In May 2018, RFF partnered with American Forests and the Forest-Climate Working Group to convene a discussion on "Forest-Climate Solutions for a Carbon Constrained Economy." The event featured speakers representing private forest landowners, academic institutions, and philanthropy, and participants found consensus on ways to turn America's forest lands into a tool for achieving national climate change goals. **Kevin Rennert**, Director of RFF's Social Cost of

Carbon Initiative, talked about the diverse approaches that states are pursuing for carbon pricing mechanisms, including pricing the value of carbon in forestry. Subsequently, RFF held a series of facilitated workshops with forest sector companies, environmental organizations, and federal and state agencies to discuss the challenge of carbon accounting for forest biomass as an energy source. Reaching an agreed-upon framework will be critical for firms and countries hoping to manage forest resources as an energy source while reducing overall carbon outputs and maintaining forest lands.

RFF's Social Cost of Carbon Initiative

The social cost of carbon (SCC) assesses the benefits and harms to society of reducing and increasing carbon dioxide emissions, respectively. The prominent and expanding role of the SCC in the analysis of policies that affect climate change makes it critical that SCC estimates are transparent and based on the best available science.

A recent National Academy of Sciences (NAS) report highlighted the need for

revision of the SCC estimation methodology. In response to these recommendations, RFF launched a Social Cost of Carbon Initiative to improve the transparency and scientific basis of SCC estimation. The initiative, led by **Kevin Rennert**, provides leadership on SCC estimates, supporting and informing climate policy choices by decisionmakers and analysts worldwide.

Find out more at **www.rff.org/scc**.

In November 2018, RFF partnered with World Resources Institute to host a workshop on the financing of new electricity generation such as wind and solar.

RFF's **Kevin Rennert** (second from left) and **Maureen Cropper** (right) discussed the social cost of carbon with fellow experts Trevor Houser (left), Janet McCabe (center), and Emily Wimberger (second from right) during the "Energy Research Insights for Decisionmaking" conference.

Providing Crucial Analysis on the Farm Bill

As a major source of federal conservation funding, the farm bill is a crucial instrument for policymakers concerned with the conservation of lands across the United States. In May 2018, RFF hosted a discussion with Cornell University's Atkinson Center for a Sustainable Future on "Conservation Opportunities and Challenges in the Farm Bill." **Ann M. Bartuska** spoke alongside a panel of distinguished experts on ways to strengthen conservation and reduce ecological impact in the farm bill. Later in the year, Congress passed a new $867 billion farm bill with bipartisan support. RFF continues to work closely with the US Department of Agriculture to identify opportunities for achieving conservation goals in agriculture and forestry, including through the farm bill.

Gathering Stakeholders to Explore the Future of a Changing Power Sector

Resilience of the electric power system has become an increasingly relevant issue due to extreme weather events, cyber security concerns, and growing reliance on variable generators such as wind and solar. The Federal Energy Regulatory Commission initiated a rulemaking process to address grid resilience, seeking input from grid operators. To help interpret this input and inform subsequent decisions, RFF collaborated with the R Street Institute to organize an economics-oriented expert workshop on resilience in the electric power system. In May 2018, 40 participants attended the workshop, ultimately producing detailed economic insight to guide policy decisions addressing grid resilience.

In November 2018, RFF cohosted a workshop with World Resources Institute to explore challenges surrounding electric sector decarbonization and how new electricity generation, including wind and solar, is financed. With four expert panels and open, in-depth discussions, the workshop provided space for participants to deepen their understanding of clean energy finance issues and work together to identify a path forward.

Projecting a Global Energy Outlook

The global energy sector has changed dramatically over the last 25 years, with larger changes possible over the next 25 years. The magnitude and direction of these changes, however, is highly uncertain. Numerous public and private organizations produce long-term energy projections that vary widely based on their assumptions and methodologies.

In 2018, **Richard G. Newell**, **Daniel Raimi**, and **Gloria Aldana** collaborated to produce the latest Global Energy Outlook, which provides a unique "apples-to-apples" comparison of long-term energy outlooks from organizations such as the International Energy Agency, US Energy Information Administration, the Organization of Petroleum Exporting Countries, ExxonMobil, BP, and Shell. As in previous years, the team is writing a report highlighting key findings. The 2019 edition of the Global Energy Outlook will incorporate new projections from Bloomberg New Energy Finance, Equinor, and the Institute for Energy Economics (Japan). The team is also developing a new interactive web tool that will allow users to produce interactive visualizations and explore Global Energy Outlook data. ●

Recognizing RFF Experts

Ann M. Bartuska

In November 2018, **Ann M. Bartuska** was appointed to the National Academies' Standing Committee on Advancing Science Communication Research and Practice. This interdisciplinary committee aims to connect more people with scientific information.

Dallas Burtraw

Dallas Burtraw was appointed by Governor Jerry Brown to chair the California Independent Emissions Market Advisory Committee in June 2018. The committee helps to guide the state toward its goal of reducing greenhouse gas emissions to 40 percent below 1990 levels by 2030.

Richard G. Newell

In September 2018, RFF President **Richard G. Newell** received the 2018 Adelman-Frankel Award and spoke at the 36th USAEE/IAEE North American Conference. This is described as "the highest award that USAEE can bestow" and is made "for unique and innovative contributions to the field of economics."

Leonard Shabman

In June 2018, **Leonard Shabman** received the Warren A. Hall medal from the Universities Council on Water Resources, recognizing "a career-long commitment to exemplary interdisciplinary scholarship and academic excellence in water resources."

Margaret A. Walls

RFF's Castle Rural Lands Fund was established through the generous bequest of former RFF President Emery Castle, who passed away in 2017. The fund supports research on economic issues associated with rural lands and communities—a matter of great importance to Emery Castle. The first award from this fund was presented to **Margaret A. Walls** in October 2018. Walls is investigating the impacts that national parks, national monuments, and other protected lands have on business growth and employment in communities located near such lands. In particular, she will be assessing how the economy of communities near national monuments and other protected sites—the mix of industries and overall economic output and jobs—changes after such sites are designated. This research builds on work supported by a grant from the Pew Charitable Trusts.

The first award from the Castle Rural Lands Fund will support work being undertaken by **Margaret Walls** to investigate the impacts that national parks, national monuments, and other protected lands have on business growth and employment in communities located near such lands.

Ann M. Bartuska, Vice President of RFF's Land, Water, and Nature program, was appointed to the National Academies' Standing Committee on Advancing Science Communication Research and Practice in November 2018.

Leadership & Finances

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● *This list includes members of RFF's Board of Directors serving as of April 2019.*

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Rubén Kraiem, a corporate partner at Covington & Burling LLP and Co-Chair of the firm's Clean Energy & Climate Industry Group, became the Vice Chair of RFF's Board of Directors in 2018.

At a reception in October 2018, RFF President **Richard G. Newell** (left) thanked two departing members of RFF's Board of Directors: Vice Chair **Linda J. Fisher** (center) and Chair **Richard L. Schmalensee** (right). Fisher will now serve as the Co-Chair of RFF's President's Council.

President's Council

The President's Council is a high-level advisory committee of distinguished business, policy, scientific, and philanthropic leaders designed to provide RFF with advice and support on critical environmental, energy, and natural resource issues.

Leadership

Linda J. Fisher – *Co-Chair*
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● *This list includes members of RFF's President's Council serving as of April 2019.*

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Financial Summary

Revenues

In fiscal year 2018, total operating revenue for RFF reached $12.8 million, 70 percent of which came from individual contributions, foundation grants, corporate contributions, and grants from governments and other organizations. RFF augments its operating revenue with net income from its building and earnings from its reserve fund. At the end of fiscal year 2018, RFF's reserve fund was valued at $58.5 million.
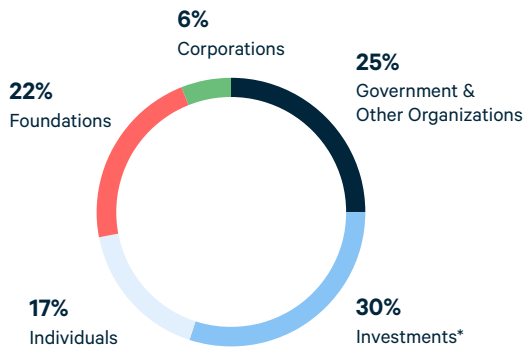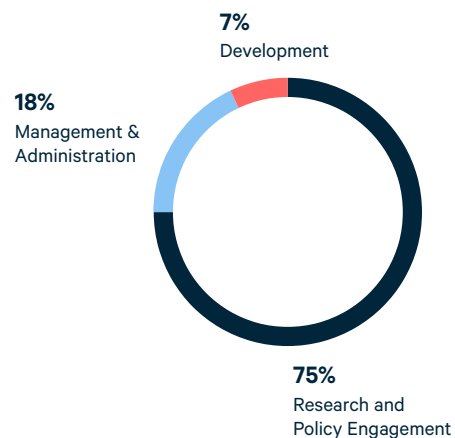
Expenses

RFF research and policy engagement continued to be vital in 2018, representing 75 percent of total expenses. Management, administration, and development expenses combined were 25 percent of the total.

RFF's audited financial statements are available at **www.rff.org/about/financial-reporting**.

2018 REVENUE BREAKDOWN

6%
Corporations

25%
Government &
Other Organizations

22%
Foundations

17%
Individuals

30%
Investments*

2018 EXPENSES BREAKDOWN

7%
Development

18%
Management &
Administration

75%
Research and
Policy Engagement

* The investments category includes investment earnings designated for operations and net building income before depreciation. Building expenses of $1.8 million for space not occupied by RFF are included in net building income.