

Resources

Policy Priorities Today for a Sustainable Tomorrow

US Climate Technology
Competitiveness

Updates to Permitting
and Regulation

Mitigating the Economic
Impacts of Extreme Events

The Next Generation of
Federal Climate Policies

Power and Electricity
Affordability



Illustration by Nils-Petter Ekwall



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Building on a Legacy and Preparing for the Future

As we look ahead to a new year, folks at Resources for the Future (RFF) have been strategizing. How do we best advance rigorous analysis paired with pragmatic and forward-thinking solutions to address the defining climate, energy, and environmental policy challenges of our time? At a moment when these questions are deeply intertwined with economics, RFF is uniquely positioned to illuminate the trade-offs and opportunities that lie ahead.

In the coming year, we will invest in our traditional and emerging streams of research that reflect both the urgency and complexity of today's world. Our work will address how the nation can meet rapidly growing electricity demand while maintaining both resilience and affordability for households already facing financial pressures. We will explore the shifting global economic landscape, where US competitiveness and innovation in clean technologies are being shaped by trade policies, supply chains, and industrial strategies. We will explore, alongside leaders across the economy, what the next generation of solutions might look like in the face of evolving energy and climate realities. And we will deepen our research into the economic consequences of increasingly frequent and severe extreme weather events, from local labor markets and housing to broader macroeconomic effects that reverberate across sectors and geographies.

Each of these priorities reflect RFF's enduring commitment to providing independent, nonpartisan research that equips stakeholders and policymakers with the insights they need to improve critical decisions. In this issue of *Resources*, you'll get a snapshot of some of these priority areas and the state, federal, or international policy implications of each. It's also an invitation for each of you to partner with us as we build upon our nearly 75-year legacy. Your partnership is vital to solving these energy, environmental, and resource challenges that we all face.

Thank you for your continued partnership and commitment to advancing solutions that address climate and energy challenges with clarity, integrity, and impact. Together, we can shape a future in which a healthy environment and thriving economy is a reality for all.



Sincerely,



Billy Pizer
President and CEO, Resources for the Future

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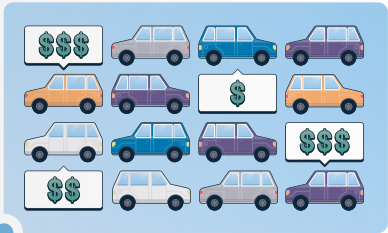
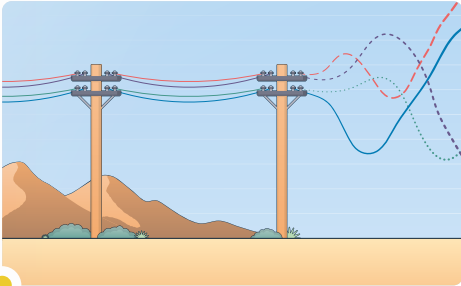
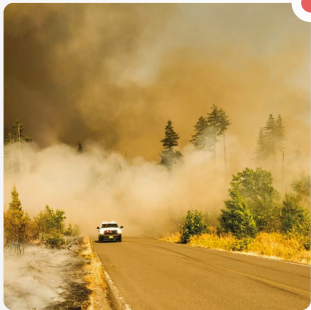
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- 04

Investing in Mitigating the Economic Impacts of Extreme Events
By Margaret Walls
- 20

Investing in US Climate Technology Competitiveness
By Milan Elkerbout
- 40

Navigating the Currents of Law and Climate
A conversation with Clint Vince
Discussing how law, climate, and technology intersect in today's energy landscape.
- 22

If/Then: What's the Cost of Vehicle Import Tariffs?
By Beia Spiller and Joshua Linn
Weighing the fallout from tariffs for consumers, producers, and car manufacturers.
- 42

Investing in the Next Generation of Federal Climate Policies
By Carlos Martín
- 28

Investing in Updates to Permitting and Regulation
By Kevin Rennert and Molly Robertson
- 30

Delays to Wind and Solar Energy Projects: Permitting and Litigation Are Not the Only Obstacles
By Emily Joiner and Arthur G. Fraas
Other factors can delay renewable energy projects more than permitting requirements.
- 06

Hot Spots Are Getting Hotter for Wildfire-Exposed Jobs in the US West
By Emily Joiner
As wildfire hazards intensify, employment opportunities are changing, too.
- 12

Investing in Power and Electricity Affordability
By Karen Palmer and Molly Robertson
- 14

Charting the Course of Electricity Affordability
By Jesse Buchsbaum and Jenya Kahn-Lang
Tracing electricity price trends and their impacts on households.

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Do people understand the hurricane and wildfire risks when they move to these risky locations?

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PHOTO
john finney photography
/ Getty Images



Investing in Mitigating the Economic Impacts of Extreme Events

TEXT
Margaret Walls

Weather extremes are on the rise in the United States and across the globe—and they’re getting even more intense. From the destructive Los Angeles wildfires in January, fueled by drought conditions and wind speeds of more than 80 miles per hour, to a rainfall deluge that led to deadly flooding in the Texas Hill Country in July, examples abound of death and destruction from extreme weather events.

Extreme events can have wide-ranging economic impacts. They often disrupt local business operations and labor markets, have long-term impacts on house prices and mortgage markets, and sometimes lead to ripple effects in sectors and locations well beyond where the event strikes.

Resources for the Future researchers are analyzing these impacts and potential policy responses. We also are investigating the extent to which people and businesses are fully aware of extreme weather risks and incorporate related lessons into decisions about where to live and work and how much to invest in adaptation. For example, increasing development in high-risk areas, such as coastal floodplains and certain parts of the wildland-urban interface, are a concern. Do people understand the hurricane and wildfire risks when they move to these risky locations? Do home prices and insurance costs reflect risks? What policies work best to minimize exposure to harmful weather extremes?

Emily Joiner writes about these concerns in this issue of *Resources*, describing our joint work evaluating the exposure of business establishments and jobs to wildfire risks across the continental western United States. The growth in housing development and population in the wildland-urban interface has been well documented, but much less attention has been paid to businesses and the location of jobs. As Joiner describes, our research reveals that the highest rate of job growth across the West over the past 30 years has been in the areas of highest wildfire risk. ■

Hot Spots Are Getting Hotter for Wildfire-Exposed Jobs in the US West

When wildfire threatens populated areas, residential impacts typically receive the most attention—but jobs are affected, too. Job growth is highest in areas of highest wildfire hazard, with six hot spots of risk for jobs and wildfire in the US West.

TEXT Emily Joiner

Just as wildfires are a major threat to homes in the US West, they also are a threat to livelihoods. While locations in the wildland-urban interface, where vegetation and housing intermingle, contain more homes than commercial establishments, growth in population and growth in industry reinforce each other. People move to high-wildfire-hazard places for the favorable trade-offs between costs and amenities. As people move to previously less-developed areas, businesses tend to follow, motivating further migration. With recent cuts to federal funding for fire prevention and firefighting in the arid West increasing the risk of more frequent and longer-burning fires (and with opportunities dwindling for communities to receive

support for increasing their resilience to fires), greater consideration of threats to jobs should accompany the ongoing focus on residential impacts.

While more homes than commercial structures are typically damaged in wildfires, the financial impacts of commercial damages can be quite large. In the case of California, the state-backed insurer of last resort, the Fair Access to Insurance Requirements (FAIR) Plan, saw a 52.6 percent increase in potential liability for commercial structures from September 2024 to March 2025, up to \$40.6 billion from \$26.6 billion over the six-month period. When commercial property or job sites are damaged or disrupted, the jobs dependent on them are impacted.

“We find that areas of very high wildfire hazard have experienced the highest growth rate of any hazard category since 1990.”

PHOTO (RIGHT)
DaveAlan / Getty Images

Figure 01

Overlap of Number of Jobs and Wildfire Risk Among Western US States

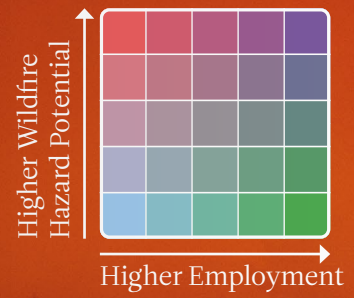


Figure 02
Employment Quintile Mapped on Areas of Very High Wildfire Hazard Among Western US States

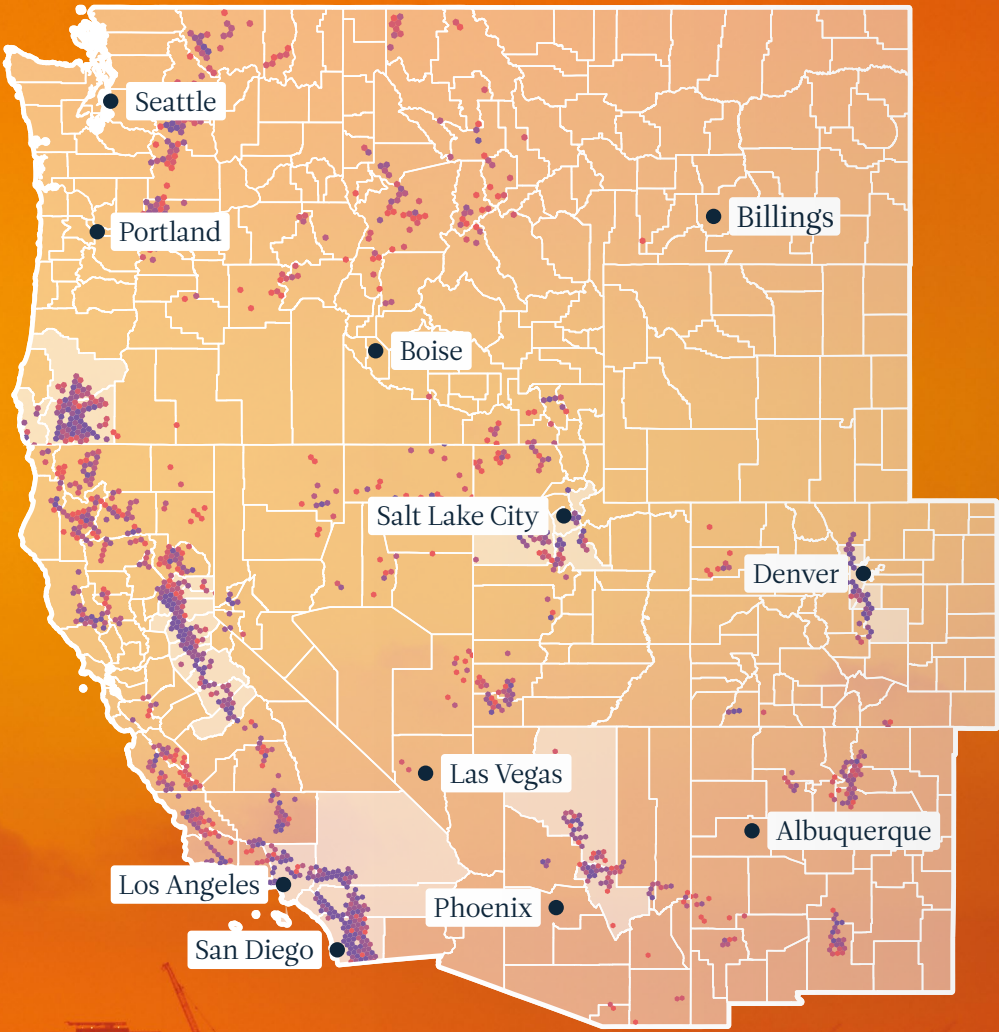


PHOTO (LEFT)
Maren Caruso / Getty Images

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People move to high-wildfire-hazard places for the favorable trade-offs between costs and amenities.
”

Wildfires affect jobs in other ways, too. For instance, wildfires can create nearby labor-market disruptions for jobs performed off-site, and economic and population growth can slow after a community has experienced a wildfire. In the recent Palisades-Eaton fires that ravaged Los Angeles in January 2025, temporary job loss was noted for in-home, service-based jobs, such as house cleaning and yard maintenance. For communities with strong economic ties to their landscapes, such as those that rely on tourism or agriculture, these disruptions can be especially costly. The impacts of the 2017 North Bay Fires on Napa and Sonoma Counties encompassed both the destruction of vineyards and a suspension of wine-country tourism.

Drawing from a report published in spring 2025, my colleagues at Resources for the Future and I looked at the coincidence of wildfire risk and jobs across 11 western US states from 1990 to 2020. We broke up the landscape into equal-sized, five-kilometer grid cells, and we categorized these areas by number of jobs and wildfire risk. To create these variables, we used data on individual businesses across the West merged with data on wildfire hazard potential, a measure of hazard developed by the US Forest Service. We classified cells into discrete wildfire-hazard categories of “very low,” “low,” “medium,” “high,” and “very high” to investigate how jobs in high- and very-high-risk areas differ from lower-risk areas and the region as a whole.

We find that areas of very high wildfire hazard have experienced the highest growth rate of any hazard category since 1990. Examining the locations of jobs in the very-high-risk category, we identify a majority in just six regional hot spots.

Distribution of Jobs in Areas of High and Very High Wildfire Hazard Across the United States

We identify 45 million jobs in 2020 across the Western states in our sample. Approximately 1.7 million of those jobs are in areas with very high wildfire hazard, double the number reported in 1990. Over the 30 years we examined, job growth in

areas of very high wildfire hazard grew by 103 percent, while jobs in the West overall grew by 73 percent. This increase also demonstrates that very-high-hazard areas have claimed a slightly greater share of the region’s jobs, from 3.2 percent in 1990 to 3.7 percent in 2020.

Exposure to wildfire hazard differs across states. California has by far the most jobs in at-risk areas, accounting for 60 percent of jobs in the high- and very-high-wildfire-risk categories across the West.

Areas of high and very high wildfire hazard command a smaller proportion of wages than they do employment. Comparatively, areas of very low wildfire hazard command 5 percent more in total wages than they do in total employment. These results make sense when considering the characterization of the lowest-risk areas as urban and the highest-risk areas as more rural.

We find few differences in the distribution of job industries across hazard categories. The proportions of jobs in each sector by state appear to mirror the distribution of job industries for the US economy as a whole, with many jobs in services. For every hazard category, the most jobs in 2020 were in administration, education, health, and public services.

The Hot Spots

To highlight areas with many jobs and high fire hazard, Figure 1 colors each grid cell based on employment and hazard quintiles. Quintiles are bins representing a 20 percent slice of the given variable’s distribution. At the bottom left of the color legend, blue cells represent areas with the lowest 20 percent of jobs and wildfire risk (hence their concentration in places like northern Montana), while purple cells at the top right of the legend are areas with the highest 20 percent of jobs and wildfire risk. The clusters of purple cells around Los Angeles, San Diego, Salt Lake City, and Denver stand out as areas that are highly exposed to wildfire, with identifiable urban cores.

Filtering our map to only those cells with very high wildfire hazard, the resulting map in Figure 2 reveals “hot spot” areas around Los Angeles,

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Ultimately, jobs are only one in the plurality
of economic risks that wildfires pose.
”

San Diego, and Salt Lake City and three other zones not near a major city. In 2020, six regions—indicated by the adjacent counties shaded with a stronger white—accounted for 85 percent of the approximately 1.7 million jobs in the very-high-hazard category. Those regions also accounted for 81 percent of the wages earned.

So, where are most of the jobs in very-high-wildfire-hazard areas? We name the six hot spots and provide counts of their jobs in descending order:

- **Southern California**
(1 million jobs)
- **Denver-Boulder area of Colorado**
(117,500 jobs)
- **Sierra Nevada foothills of California**
(94,500 jobs)
- **Southern Oregon**
(73,000 jobs)
- **Flagstaff-Globe area in Arizona**
(45,500 jobs)
- **Central Utah near Salt Lake City**
(43,000 jobs)

The job growth experienced in these six areas outpaces both the region as a whole and other areas of very high wildfire hazard. Compared to the overall regional job growth rate of 73 percent and the very-high-hazard growth rate of 103 percent, the number of jobs increased by 114 percent in the Southern California hot spot during the study period, and job numbers grew by 127 percent in the other five hot spots (Figure 3).

Although jobs in high-wildfire-hazard areas tend to have slightly lower wages than jobs elsewhere in the West, the hot spot in Southern California

is an exception. Average wages are 32 percent higher there than in the other hot spots, and 45 percent higher than other areas of very high fire hazard in the West. Unquestionably, the Southern California region drives overall patterns in job and income exposure to wildfire risk in the West, a finding supported by the extreme fires the region has experienced recently, the ongoing insurance crisis, and the status of Los Angeles and San Diego as two of the most populous metropolitan areas in the United States.

Conclusions

Very-high-wildfire-hazard areas experience a higher rate of job growth than the other hazard categories, and these six hot spots drive that rate of growth, laying claim to most of the very-high-hazard jobs in 2020. But continued population expansion in the US West, and a continued predilection for locating homes and businesses in the wildland-urban interface, may portend the emergence of new hot spots in the future.

Areas like the six hot spots identified here offer favorable amenities and, at times, lower costs, but locating in those areas comes with a serious trade-off. While state and local governments can enact policies to better protect existing populations in areas with high and very high wildfire hazard, just as important may be to guide incentives toward supporting new growth and development in lower-risk areas.

Ultimately, jobs are only one in the plurality of economic risks that wildfires pose. Identifying the numbers of jobs that are subject to this risk may help to inform actions from state and local governments. However, because fires can damage local economies in multiple ways, more research into identifying the most impactful points of policy intervention, with the aim of preventing disruption or losses of both labor and capital, is necessary. ■

PHOTO (RIGHT)
Marcus Kauffman / Unsplash



Emily Joiner is a research associate at Resources for the Future. ■

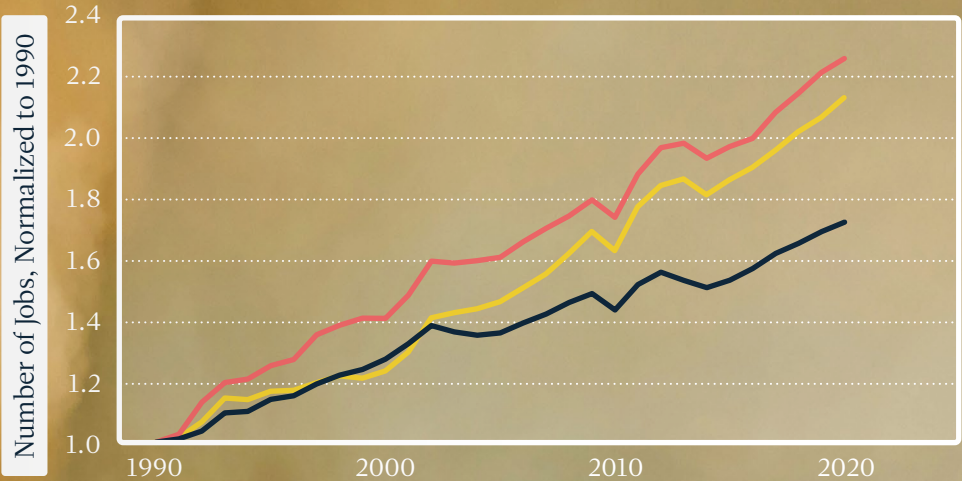


Figure 03
Employment Growth in Areas of Very High Wildfire Hazard: Hot Spots and Western Region of the United States

- Southern California
- Other Hot Spots
- Region as a Whole



Investing in Power and Electricity Affordability

TEXT Karen Palmer
and Molly Robertson

The US electric power sector is facing a dramatic transformation. On the supply side, a combination of innovation, environmental policies, and improving economics have contributed to a growth in renewable power, which accounts for the majority of new generator investment in recent years. Growing reliance on these weather-dependent resources has created a misalignment of hourly electricity demand and supply, posing new challenges for grid operators that aim to maintain system balance and creating opportunities for complementary technologies like batteries and other forms of energy storage. In addition, a combination of increasingly frequent extreme events, planned retirements of aging fossil fuel generators, and delays in getting new generators online all raise concerns about resource adequacy going forward.

On the demand side, anticipated growth in electricity demand due to the proliferation of data centers, increasing electrification of buildings and transportation, and onshoring of industrial processes exacerbate concerns about how the electricity system will adapt. Of particular concern are large data centers (hundreds of megawatts to gigawatts) that bring unique challenges to grid management. Meeting load growth and creating a resilient and reliable grid will require substantial investment that could raise the costs of electricity—an unwelcome development when many US households already struggle to pay electric bills.

Our colleagues Jesse Buchsbaum and Jenya Kahn-Lang explore questions about electricity affordability in the accompanying *Resources* article. This piece is one example of how the Electric Power Program at Resources for the Future (RFF) is conducting research to develop and inform solutions to these challenges.

On the issue of resource adequacy, for example, we are exploring new market designs and other policy mechanisms that can secure sufficient resources to meet demand. We also are exploring how rate design, and other strategies that promote flexible demand, could help protect reliability in the future. We are looking at how customer rate structures and other policies could limit customer exposure to increased costs associated with serving, or anticipating, new large loads. We are assessing the causes and consequences of high electricity rates and exploring policies that can help those who are least able to pay high utility bills. Keeping electricity prices low can help promote electrification, but we are also exploring how policies to confront other barriers, such as contractor unfamiliarity with new technologies, can help advance electrification and reduce consumer reliance on fossil fuels.

While the decarbonization of electricity production is underway, policy shifts will continue to play a role in determining whether emissions reduction accelerates. For example, RFF researchers are studying state-level approaches to electricity decarbonization. We also will pursue a new focus on clean technologies, such as geothermal and nuclear, and how electricity market designs advance the range of technologies that can support resource adequacy in an increasingly decarbonized grid. ■



“Meeting load growth and creating a resilient and reliable grid will require substantial investment that could raise the costs of electricity.”

PHOTO
Alexander Spatari / Getty Images

Charting the Course of Electricity Affordability

Five charts that unpack the trends and cost drivers shaping today's electricity prices—and what these trends mean for households and related policies.

TEXT Jesse Buchsbaum and Jenya Kahn-Lang

ILLUSTRATION James Round

Electricity affordability has become a top concern for US energy policy. In the past few years, affordability has been invoked to justify policies that range from expanding rate-assistance programs and clean energy subsidies to rolling back environmental regulations and electric vehicle (EV) mandates. From the president's numerous executive orders that emphasize energy costs to the proposed Energy Affordability, Independence, and Innovation Act in Massachusetts, leaders across the political spectrum warn of a growing affordability crisis for US households. Publicly available data suggest that some of these fears may be well-founded.

In 2024, the National Energy Assistance Directors Association found that nearly 25 percent of US households and one-third of homes with children would be unable to afford their energy bills over the summer. High bills have led to unsafe behaviors, such as underheating or undercooling homes; dangerous coping strategies to escape the cold (e.g., sitting in cars with the heat running, burning trash for heat, sleeping near a burning fire); or forgoing basic household necessities, such as food and medicine. According to the 2024 Census Household Pulse Survey, 34% of households reported cutting back on basic household necessities, such as medicine or food, to pay for an energy bill. High prices also slow the electrification of buildings and vehicles, a key strategy for combating climate change. We set out to investigate the drivers of this household strain, including electricity grid and fuel costs, as well as broader economic conditions.

The current affordability challenge is set against the backdrop of a clean energy transition and an explosion of new demand sources, including energy-intensive artificial intelligence (AI), in the United States. New energy technologies are challenging the traditional paradigms for attracting and compensating electricity resources, while new, large electricity customers are driving an urgent need for the rapid expansion of grid infrastructure and energy generation.

As the electricity industry considers the future of the power sector, experts are asking, How

can policymakers continue to drive the energy transition and be an AI leader while ensuring affordable power for all?

In this article, we explore recent trends in average residential electricity prices and some underlying causes of the changes that we see. We use data sets (many accessed through the Public Utility Data Liberation Project) from the US Energy Information Administration, the Bureau of Labor Statistics, and the Federal Energy Regulatory Commission. These data document how US electricity prices have changed from 2001 to 2024, how resulting costs have changed, and the various components of costs. Collectively, analyzing these data help us explore some of the underlying causes of changes in electricity prices. Note that certain data series have data available only through 2023. In all charts, we show all available data.

Policy discussions on electricity affordability are complicated by the fact that the concept of affordability can describe a wide variety of ideas, including limiting utility costs, limiting retail electricity prices, measuring electricity bills against household income, and implementing programs that help low-income households pay their bills and maintain access to electricity. Ultimately, we hope to provide insights into how policy and practice can limit residential electricity costs and provide actionable starting points for regulators and policymakers who are looking to make electricity more affordable.

Are Electricity Prices Rising?

Nationally, average real electricity prices have risen in the past four years, after nearly two decades of flat or decreasing real prices. However, this increase is driven by certain regions of the country; many other regions have experienced stable electricity prices.

The United States has seen historic increases in nominal average electricity prices since 2021, and these prices have risen even faster than inflation during the same period (Chart 1). As of 2024, nominal electricity prices had risen 27% since 2019 and 21% since 2021, while inflation-adjusted prices (normalized by

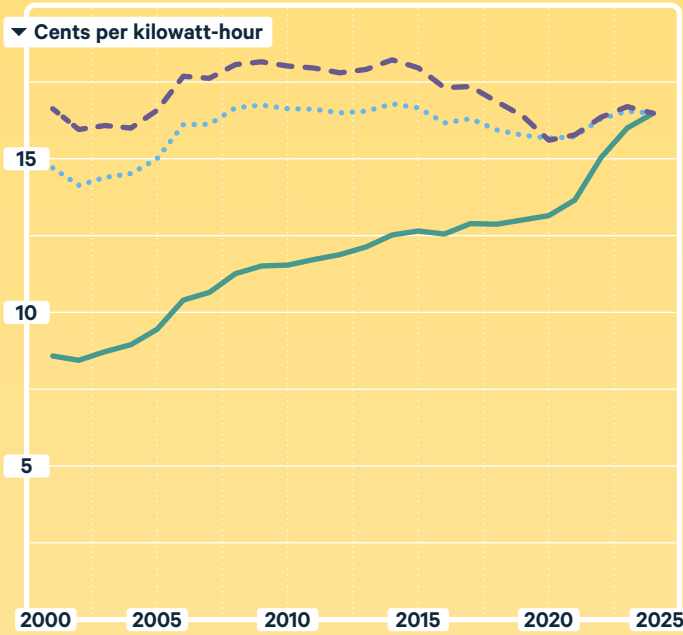


CHART 01
Average US Residential Electricity Prices, 2001–2024

Wage Adjusted
Inflation Adjusted
Unadjusted

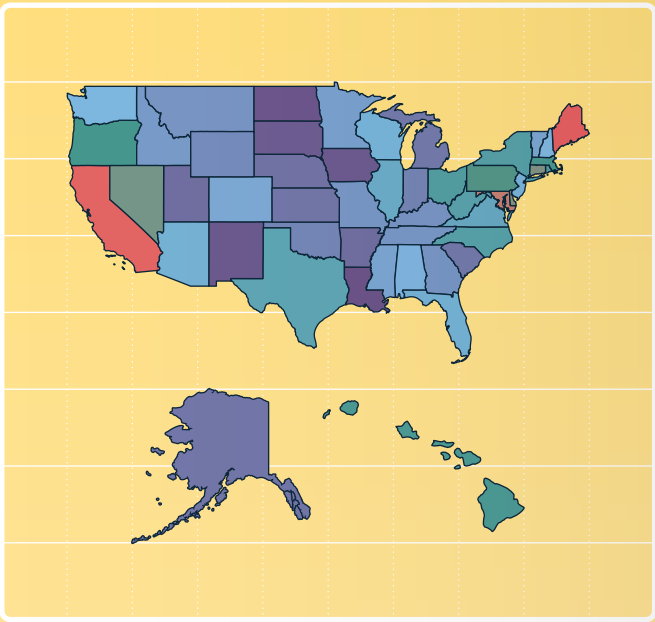


CHART 02
Percent Change in Inflation-Adjusted Electricity Prices, 2021–2024

0 10 20
Change in Average Price (%)

the Core Consumer Price Index as measured by the Bureau of Labor Statistics) had risen by 4.5% and 4.9%, respectively.

However, this recent increase comes on the heels of 15 years of electricity prices that grew more slowly than inflation, on average. In fact, current inflation-adjusted average US electricity prices are similar to or lower than the prices that prevailed during most of the 2010s.

Although current inflation-adjusted average US electricity prices are similar to or lower than prices during most of the 2010s, some households may be struggling with the rapid change over the past few years. When electricity prices, inflation, and median wages all rise rapidly, as they have since 2021, the price increases may be felt most by households that have not experienced wage increases, including households in which members

live on fixed incomes, work in sectors that experience slower wage growth, or are unemployed. Now, many of these households may be unable to afford their electricity bills.

Average national prices also mask geographic disparities in recent price increases across the country. Electricity prices have not risen everywhere; only a few regions have experienced real price increases of over 10%. Chart 2 displays the change in average inflation-adjusted electricity price by state between 2021 and 2024. The largest price growth occurred in Maine and California, which both experienced increases of over 20% in real prices. Other regions with especially large price increases include the Northeast and Mid-Atlantic. In contrast, many states in the Central, Southeast, and Mountain regions experienced flat or decreasing prices during this time frame.

*Chart 3 data represent the 14 US states with the highest price increases during the time period represented, which are CA, CT, DE, HI, MA, MD, ME, NC, NV, NY, OH, OR, PA, and RI, along with Washington, DC.

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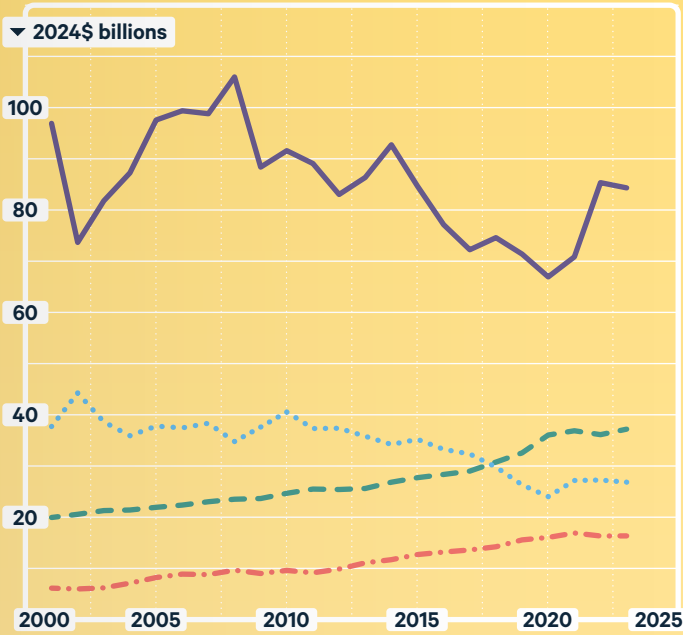


CHART 03
Electricity Costs by Category for 14 US States with the Highest Recent Price Increases, 2001–2023*

Power Production
Distribution
Other
Transmission

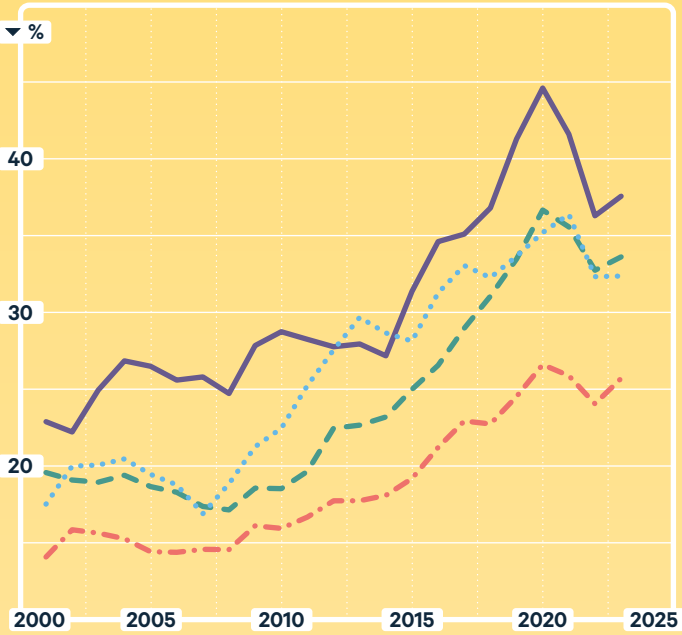


CHART 04
Transmission and Distribution Costs as a Percentage of Total Electricity Costs by Region, 2001–2024

California
Mid-Atlantic
Northeast
Rest of Country

What Is Driving the Recent Increases in Electricity Prices?

Recent electricity price increases coincide with a temporary spike in natural gas prices, but we also observe longer-term, steady increases in the cost of transmission and distribution.

Average electricity prices are effectively calculated as the total costs collected by utilities through electricity bills—including infrastructure costs, fuel costs, and profits—divided by electricity consumption. Average prices rise when overall costs increase or when electricity consumption declines. Electricity consumption has remained relatively flat or grown modestly over the past two decades, with average annual growth of less than 1% since 2001, so this discussion focuses on analyzing trends in the underlying costs.

Costs to the electricity system can be broken down into several broad categories. Power production costs accrue through generating the electrons that consumers use; transmission costs are incurred when transporting electricity across long distances, such as large power lines along the highway; and distribution costs arise when delivering electricity throughout a community. Utility companies also incur other costs, such as employee salaries and administrative expenses.

Chart 3 shows these costs over time, adjusted by inflation, in the 14 states with the highest price increases from 2021 to 2024 as shown in Chart 2. Chart 3 largely reflects trends in utility costs throughout the New England, Mid-Atlantic, and Pacific regions. In areas with retail competition, we include revenues from non-utility suppliers in power production.

The uptick in costs around 2021 primarily comes from power production, seemingly from

the costs of natural gas generation in particular. From 2020 to 2022, a stark increase in the costs of power production aligned with a period of high global natural gas prices during the first years of the Russia-Ukraine war. However, the longer-term trend is a reduction in the costs of power production, as real natural gas prices generally have been decreasing since the boom in hydraulic fracturing methods to extract natural gas around 2010 and as new renewable generation has reduced fuel expenses. Although we do not have complete 2024 data, natural gas prices returned to roughly pre-conflict levels by 2024, and the data available indicate that power production costs decreased commensurately, suggesting that natural gas prices are a temporary driver of high electricity prices.

A short-term natural gas price shock may affect states differently for several reasons. Retail prices in restructured areas (where utilities and other suppliers purchase a large share of

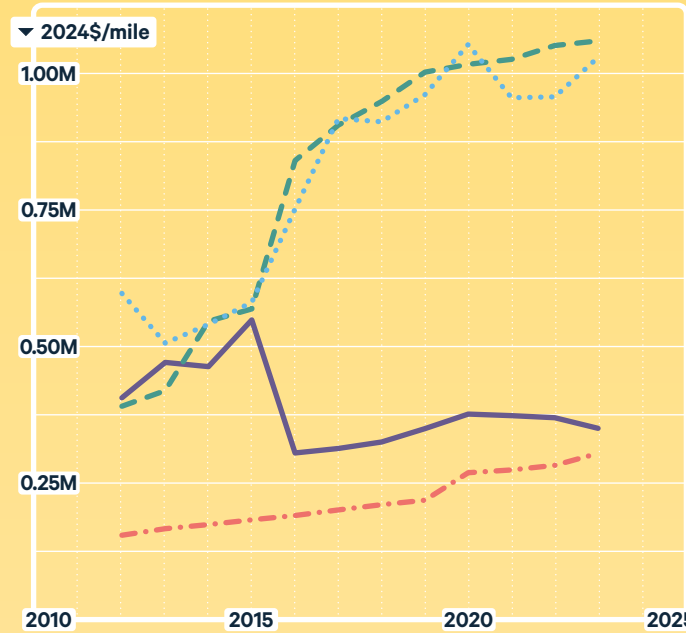


CHART 05 A
Transmission Cost per Mile by Region,
2013–2024

California Mid-Atlantic
Northeast Rest of Country

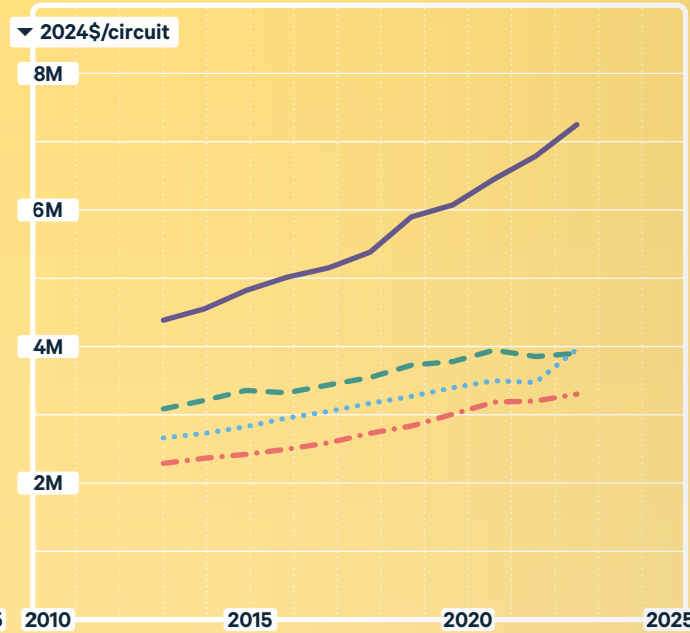


CHART 05 B
Distribution Cost per Circuit by Region,
2013–2024

California Mid-Atlantic
Northeast Rest of Country

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Going forward, electricity prices may continue to rise, especially in the Northeast, Mid-Atlantic, and Pacific regions of the United States.
”

their electricity from a uniformly priced spot market) may be more sensitive to a natural gas price shock than in areas with traditionally regulated utilities that own most of their generation. Additionally, suppliers in some areas hedge more of their power production costs by signing long-term contracts with generators or companies that specialize in hedging power prices. Some areas also have a more diverse resource mix that includes a larger share of non-fossil fuel generation, which can reduce exposure to volatile prices for fossil fuels.

Chart 3 shows that the costs of transmission and distribution have been increasing steadily over time. This trend is especially stark in regions of the country where electricity price increases have been highest, including the Northeast, the Mid-Atlantic, and California. In California, for instance, inflation-adjusted distribution costs have increased by 18% since 2021. Chart 4 shows that these regions

experienced larger increases in transmission and distribution costs as a share of total costs, relative to other regions.

These cost increases reflect the higher costs of building new infrastructure for transmission and distribution or maintaining existing infrastructure. The increases are not related to increases in the distance that electricity is transported nor the number of distribution circuits.

Chart 5 displays the inflation-adjusted costs for transmission and distribution by region since 2013, normalized by the miles of transmission lines (A) and the number of distribution circuits (B), highlighting regions with the largest recent price increases.

Nationally, inflation-adjusted transmission costs per mile have increased 98.8% since 2013, with especially large increases in the

Northeast and Mid-Atlantic. Inflation-adjusted distribution costs per circuit increased 42.5% over the same period, with especially large increases in California. These cost increases come as net growth in transmission miles and distribution circuits has remained roughly unchanged.

Multiple factors could explain these increases in per-unit costs for transmission and distribution. Nationwide, much of the current transmission and distribution infrastructure was built in the 1960s and 1970s and is nearing its end of life. Growing penetration of intermittent renewable resources and generators on customer premises also accelerate the need for upgrades to this aging, twentieth-century infrastructure.

Furthermore, some regions have faced increasing climate risk that has resulted in higher grid costs; for instance, California has invested an enormous amount in upgrading its distribution system to mitigate wildfire risk.

In addition, the cost of siting, permitting, and constructing infrastructure for transmission and distribution may be increasing due to community opposition and local building restrictions.

As a last example, research also suggests that utilities that divested their generation assets as part of electricity restructuring may invest more in transmission and distribution assets to maintain comparable shareholder returns, which is consistent with the trends in Chart 4.

Distinguishing among these and other potential drivers may be a fruitful area for future research.

What’s Next?

Going forward, electricity prices may continue to rise, especially in the Northeast, Mid-Atlantic, and Pacific regions of the United States, for several reasons.

In the near term, recent capacity auctions cleared at high prices in New England and Pennsylvania–New Jersey–Maryland. However, these costs only just started to be included in rates beginning in 2025 and are not reflected in this analysis. Pending extreme rate

increases in Florida (Florida Power & Light) and New York (Consolidated Edison) also are not reflected in this analysis.

Nationwide, electricity demand is expected to increase in the coming years as new sources of load, including data centers and electrified transportation and heating, come online. Rapid growth in grid resources will be needed to meet these new sources of demand and maintain reliability; without careful procurement practices, market reform, cost allocation, and rate setting, residential electricity prices could increase in response. In addition, rising distribution costs in California may be a harbinger of future grid costs across the country due to increasing climate change–induced natural disasters and wildfires.

Policymakers may be able to mitigate future electricity price increases and price volatility, protecting the most vulnerable households from high bills. For example, to mitigate grid costs, policymakers can reduce obstacles to building new energy infrastructure, reform markets and procurement practices to attract an efficient portfolio of resources, and support demand-side alternatives like subsidies for rooftop solar and energy efficiency. Beneficial reforms to limit price volatility may include reducing reliance on fossil fuels.

Furthermore, policymakers may be able to soften the impact of rising electricity prices on the most vulnerable households by carefully allocating who pays for new costs on the grid and equitably designing rates and policies. In the short run, direct assistance programs can help customers afford their electricity bills, stay connected to the grid, avoid unsafe heating and cooling practices, and pay for other essential goods and services.

Beyond its implications for pocketbooks and electric bills, electricity affordability is critical for mitigating climate change. The future of power involves electrifying the heating of buildings and operation of vehicles, but realizing this future requires electricity prices to be low enough that millions of households can choose to purchase electric technologies over the existing fossil fuel alternatives. Keeping electricity affordable not only helps households in the present but also improves the climate for future generations. ■

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Policymakers may be able to mitigate future electricity price increases and price volatility, protecting the most vulnerable households from high bills.
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Jesse Buchsbaum and Jenya Kahn-Lang are fellows at Resources for the Future.



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The question of which countries will be competitive in future climate technologies and manufacturing industries will be critical, both for climate policy and for other economic and political reasons.
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PHOTO
seksan Mongkhonkhamsoo / Getty Images

Investing in US Climate Technology Competitiveness

TEXT
Milan Elkerbout

To decarbonize the economy—globally, and domestically in the United States—new technologies will need to be adopted across all sectors that are energy and carbon intensive. Clean energy technologies will be critical, such as renewable energy resources and batteries, but climate technologies go far beyond technologies that deliver or store clean energy or electricity. Technologies that enable the electrification of industry, facilitate the production of clean molecules, or capture carbon also can play an important role in decarbonizing the economy. In many cases, the question of who will dominate these technologies is still open, with all possibilities in play.

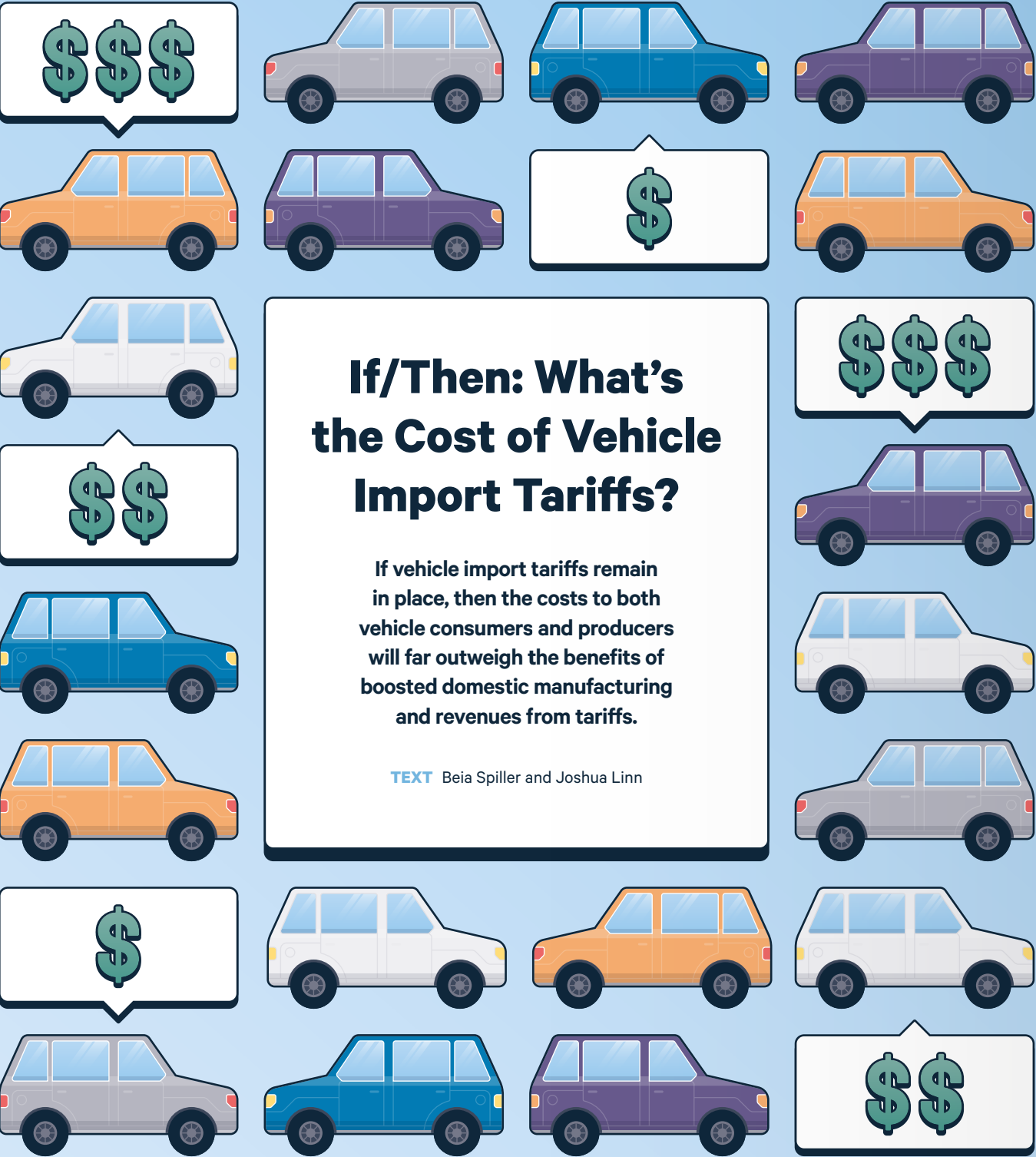
For many cleantech options, however, China has become highly competitive; for example, in the production of solar photovoltaics, batteries, and electric vehicles. These clean technologies often require a new set of critical minerals, the processing of which China also dominates.

Dependencies on critical resources in a time of geopolitical tension creates its own concerns. Chinese strength in the manufacturing of cleantech, in turn, is part of the country’s general competitiveness in industrial manufacturing, much of which gets exported to global markets.

Trade and competition with China, including for climate technology, therefore has risen to political prominence in the United States, but also elsewhere around the world. The concerns range across purported unfair trade practices, protectionist industrial policy, intellectual property, and the general impacts of a huge economy becoming a powerful exporter in sectors that used to be a source of domestic economic strength in Western countries.

The question of which countries will be competitive in future climate technologies and manufacturing industries will be critical, both for climate policy and for other economic and political reasons. The United States (but also its competitors, allies, and adversaries alike) will need to balance environmental performance, domestic manufacturing competitiveness, affordability, and security. Trade-offs are inevitable. Climate and energy policies might merge with policies related to innovation, trade, industry, and even national security.

At Resources for the Future, we plan to analyze this economic landscape of current and future climate technologies, who is or can be competitive in what sectors, and how all these considerations dovetail with other policy and political goals in the United States and globally. ■



On March 26, 2025, President Donald Trump imposed 25% tariffs on vehicles and auto parts imported from outside North America, aiming to jump-start US manufacturing and reduce imports. (On April 29, the administration clarified that the tariffs would stay at 25%, even though imports of materials like steel and aluminum would be subject to additional levies.) Though framed as protecting American industry and boosting tariff revenues—the Trump administration claimed these tariffs would raise \$100 billion in revenues—the reality is far more complex. For example, industry observers have predicted that the tariffs would increase vehicle prices by \$3,000 to \$20,000, hurting consumers.

Questions about the effects of the tariffs remain, particularly as their details continue to evolve. How much would these tariffs boost domestic industry, and would they raise as much revenue as the administration expects? What would the tariffs cost consumers and vehicle producers? Are these tariffs aligned with the administration’s goals of promoting gasoline vehicles over electric vehicles?

To answer these questions, we modeled the impact of these tariffs (and potential variations) on broad outcomes across the auto industry. We find that the tariffs would raise substantial revenue, though far less than the amount asserted by the Trump administration, and that the costs to consumers and producers would far outweigh the revenues. The tariffs would boost domestic vehicle production—particularly for gasoline vehicles—but only modestly under the current structure of the tariffs (i.e., tariffs are imposed on vehicles and vehicle parts that are imported from outside North America). Domestic production

would decrease if vehicle parts produced in Mexico and Canada are subject to the tariffs. In sum, our modeling suggests that costs to consumers from the tariffs would far exceed both the benefits to domestic producers and the amount of revenue raised by the tariffs.

Tariff Scenarios Explored

The vehicle tariffs imposed in March apply to imported vehicles; on May 3, additional tariffs will apply to vehicle parts that come from countries outside North America (i.e., excluding Canadian and Mexican imports). The evolution of the tariffs is uncertain. Given ongoing trade tensions with Canada and Mexico, the tariffs could be extended to vehicles and parts that those countries produce; alternatively, future tariffs may exclude imported vehicle parts. We modeled three possible scenarios (Table 1), in order of increasing stringency:

- 1. Only imported vehicles face 25% tariffs.
- 2. Vehicles and vehicle parts imported from outside North America face 25% tariffs (i.e., the current situation).
- 3. Imported vehicles and imported parts face 25% tariffs, regardless of the country of origin.

President Trump is expected to sign an executive order on May 5, which would return up to 15% of the tariffs paid on imported parts to manufacturers that assemble vehicles in the United States. Though we did not model this adjustment, the results from such modeling should reflect a midpoint between the outcomes from Scenarios 1 and 2.

Editor's Note
The modeling results and analysis described here are current as of May 2, 2025.

TABLE 01

Tariff Scenarios Summarized

Tariff scenario	Tariff imposed on imported vehicles	Tariff imposed on imported vehicles and vehicle parts from countries outside North America	Tariff imposed on imported vehicles and vehicle parts from countries outside and within North America
1	25%	0	0
2	25%	25%	0
3	25%	25%	25%

Impacts on Vehicle Prices

We used the Resources for the Future Vehicle Market Model to estimate the effects of these three tariff scenarios, relative to a baseline that excludes any tariffs on vehicles or parts.

Vehicle prices are projected to increase with the stringency of the tariffs. In the current situation (approximated by Scenario 2), prices on average go up by about \$3,500, or 7.4% (Figure 1). However, if Canada and Mexico also face 25% tariffs (Scenario 3), prices would increase by over \$5,000.

Because domestically assembled vehicles do not rely entirely on imported parts, the prices of domestic vehicles increase less than the prices of imported vehicles, which would increase by more than \$8,000 in Scenario 3 (Figure 2).

FIGURE 01 Change in Vehicle Price Due to Tariffs

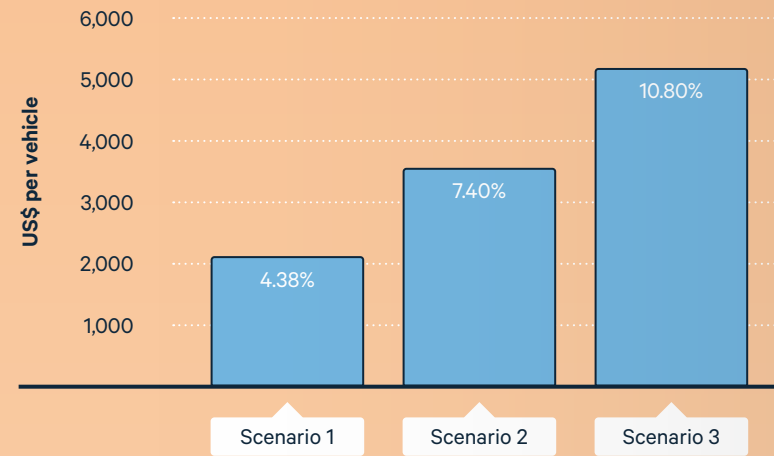


FIGURE 02 Change in Price of Domestic and Imported Vehicles Due to Tariffs

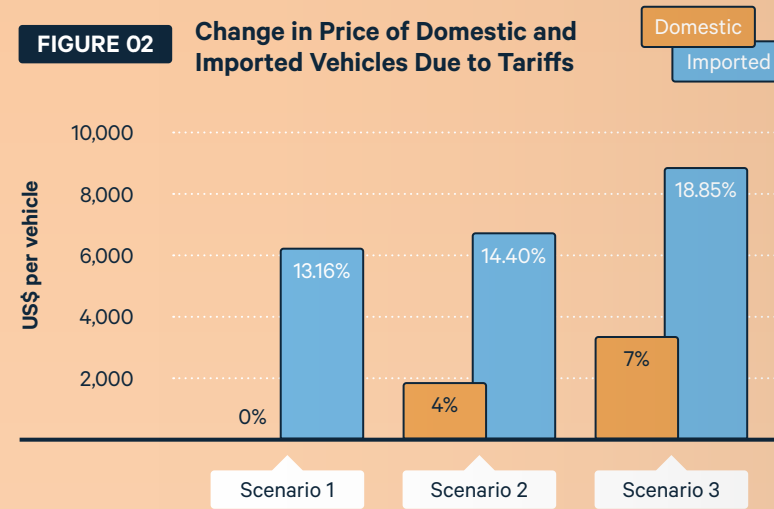


FIGURE 03 Change in Vehicle Sales Due to Tariffs

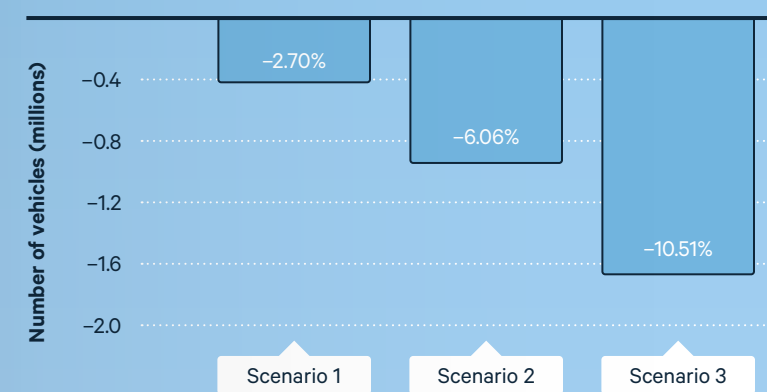


FIGURE 04 Change in Gasoline Vehicle Production, by Country of Origin

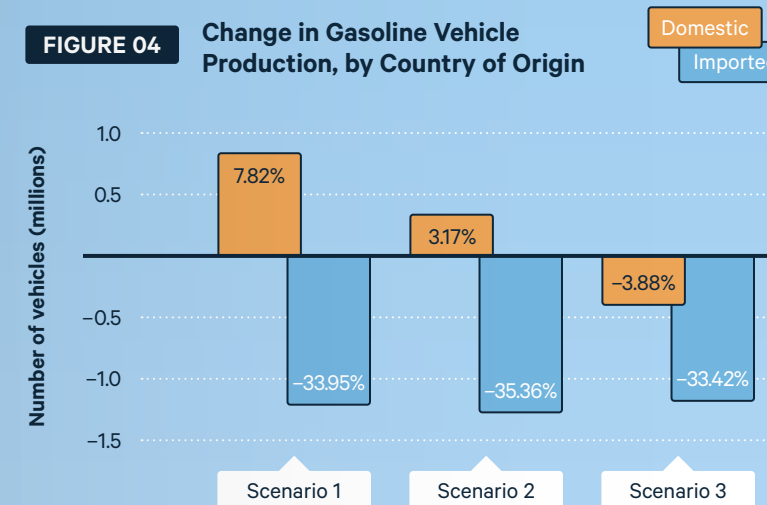
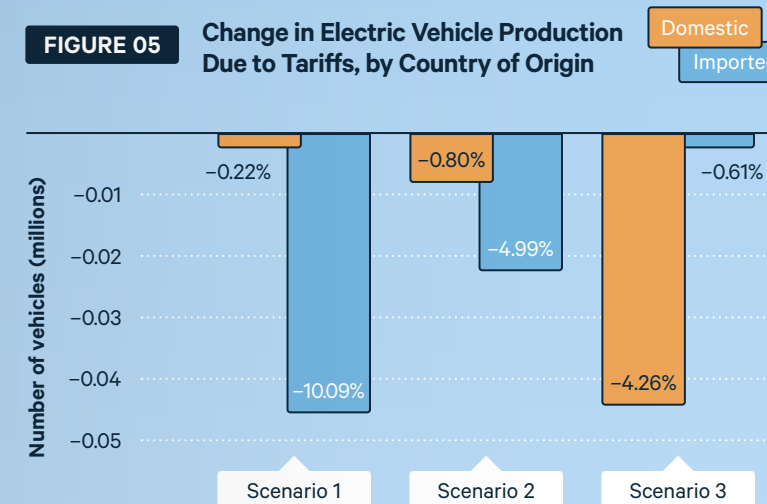


FIGURE 05 Change in Electric Vehicle Production Due to Tariffs, by Country of Origin



Vehicle Production

Higher vehicle prices reduce total sales, as consumers respond to more expensive new vehicles by buying used vehicles or skipping the purchase of a vehicle altogether. In aggregate, demand for new vehicles goes down with the current tariffs, reducing total annual sales by almost a million units (Figure 3).

One of the main goals of imposing tariffs is to increase domestic manufacturing. We find that the tariffs would increase the domestic production of gasoline vehicles by approximately 3% (340,000 units) per year under the current tariff setting (Scenario 2). However, if imports from Mexico and Canada were no longer exempt from the tariffs (Scenario 3), domestic manufacturing of gasoline vehicles would decrease by almost 4% (420,000 units) (Figure 4).

Production of electric vehicles (including both battery electric vehicles and plug-in hybrids) tells a different story. No matter the tariff scenario, domestic manufacturing of electric vehicles decreases, and with the most stringent tariff (Scenario 3), production of electric vehicles would decrease by 4.3%.

The tariffs would reduce total sales of electric vehicles. As the tariffs become more stringent, domestic electric vehicles become more expensive, which would lead some consumers to shift to purchasing imported electric vehicles (Figure 5).

“No matter the tariff scenario, domestic manufacturing of electric vehicles decreases.”

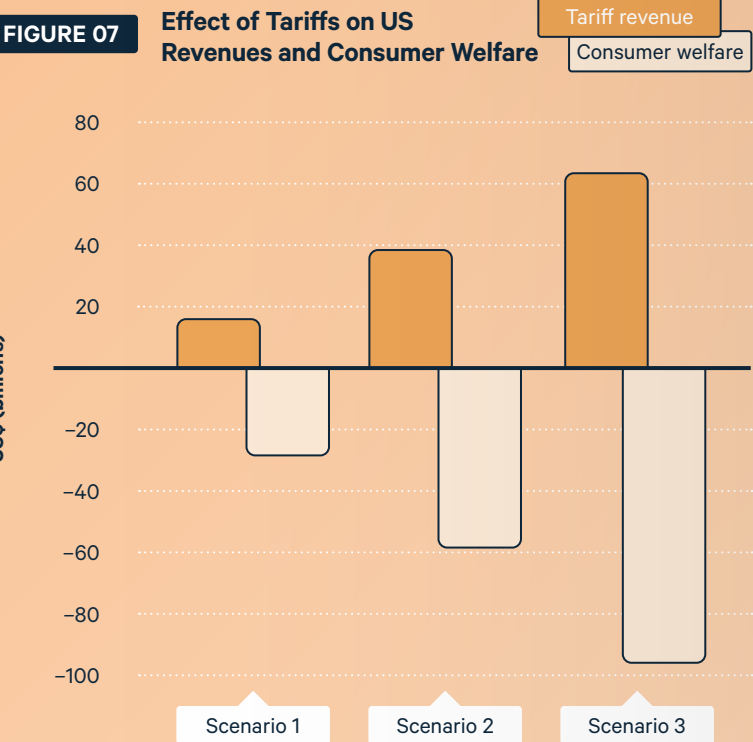
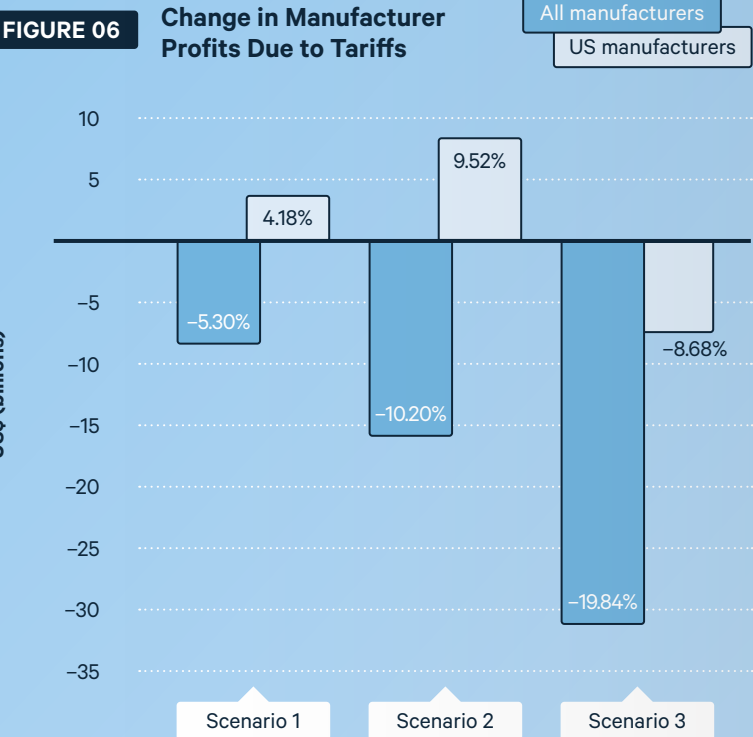
Manufacturer Profits

The tariffs decrease manufacturer profits when considering all manufacturers, though domestic vehicle manufacturers would see increases in profits under the less stringent (Scenario 1) and current (Scenario 2) tariffs (Figure 6). Under the most stringent tariff (Scenario 3), however, profits for domestic manufacturers would decrease by almost \$8 billion per year, given their reliance on parts imported from Canada and Mexico and reduced consumer purchases of new vehicles.

Tariff Revenues and Consumer Welfare

The tariffs generate government revenue, yet at the same time, they increase vehicle prices and are projected to cause consumers to shift their purchases toward less desirable vehicles (Figure 7). Because the tariffs would increase the cost of individuals' first-choice vehicles, many consumers would shift to their less preferred options. For example, consumers who wanted to purchase an imported vehicle (which could end up being \$8,000 more expensive due to the tariffs) would more likely choose a cheaper domestic vehicle. Because some consumers switch to their less preferred options, the tariffs would make consumers worse off—and we quantify that impact as consumer well-being (or “welfare,” as we economists call it).

Due to the higher vehicle prices and consumer transitions to less preferred options for their vehicle purchases, consumer well-being declines far more than the total tariffs collected, with consumer welfare losses approximating \$100 billion per year under the most stringent tariff (Scenario 3).



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Our analysis shows that vehicle import tariffs would substantially distort the market, increasing vehicle prices across the board and decreasing vehicle sales significantly.

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Braking the Market

Our analysis shows that vehicle import tariffs would substantially distort the market, increasing vehicle prices across the board and decreasing vehicle sales significantly.

For the tariffs as they are currently implemented, we see some transfer of benefits from consumers to domestic manufacturers, though in aggregate, vehicle producers and consumers both would be worse off, and consumers would lose far more than the domestic manufacturers would gain. Moreover, the tariff revenues would not offset the costs to the market.

Our analysis evaluates the short-term effects of these tariffs, due to the fact that domestic manufacturing of vehicles and vehicle parts conceivably could increase over the next decade,

though that outcome is unlikely to occur in the next few years. Without the ability to change suppliers or build new manufacturing plants, vehicle manufacturers will be less likely to avoid the fallout of these tariffs.

In the longer run, these results could change. For example, if the currently implemented tariffs hold, then manufacturers could readjust their supply chains and invest in scaling up or building more domestic manufacturing plants (for both vehicles and parts). However, without long-term certainty on the structure and magnitude of the tariffs, these expensive investments are unlikely to happen, and consumers will not just continue to face sticker shock when making their purchases—they’ll be priced out of the vehicles they want to buy. ■



Beia Spiller is a fellow and director of the Transportation Program at Resources for the Future.

Joshua Linn is a senior fellow at Resources for the Future.



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Siting, permitting, and other regulatory barriers continue to provide substantial hurdles in modernizing the energy system.

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PHOTO
kali9 / Getty Images



Investing in Updates to Permitting and Regulation

TEXT Kevin Rennert
and Molly Robertson

The United States has a pressing need to build out its energy infrastructure—including clean electricity generation, pipelines, electricity transmission, and more—to address domestic and global priorities.

However, siting, permitting, and other regulatory barriers continue to provide substantial hurdles in modernizing the energy system. These challenges exist regardless of the changing landscape of financial incentives for energy infrastructure that were put into place after the 2022 Inflation Reduction Act and partially repealed by the 2025 congressional reconciliation bill.

Resources for the Future has been engaged over the past two years, under its “Obstacles to Energy Infrastructure” project, in identifying, quantifying, and investigating solutions to such obstacles that get in the way of building beneficial energy infrastructure. Our work has focused on how regulatory processes affect the construction of energy infrastructure, and on the effects that policy changes to those processes might have on the US energy system.

Under the Obstacles to Energy Infrastructure project, we have built a community of practice, composed of experts, stakeholders, and policymakers, to inform federal policy development such as the Energy Permitting Reform Act of 2024. We also have conducted original analysis and commissioned research to better understand issues related to grid interconnection, interregional transmission, the National Environmental Policy Act, federal leasing for energy development, and local ordinances and opposition to energy development.

Each of these papers is being released this year through public webinars that will feature panels of experts, highlighting key results and placing those insights into the current policy and economic context. In the following article, for instance, Emily Joiner and Arthur G. Fraas summarize a set of reports that focus on the role of the National Environmental Policy Act as an obstacle to expedited energy infrastructure.

Much has changed since we started this project two years ago. In a time of unprecedented growth in electricity demand, and policy changes that have reduced the availability of federal support for new solar and wind energy production and transmission, continued work under this project will be critical to provide information to policymakers who seek to support new energy infrastructure of all kinds.

As we kick off this next phase of our work, we see a strong and persistent need to address basic information gaps about projects to develop and inform policy interventions; provide a single clearinghouse with information about related research and happenings at the local, state, and federal levels; and increase engagement with the federal government to support bipartisan efforts to reform the US permitting system. ■

Delays to Wind and Solar Energy Projects: Permitting and Litigation Are Not the Only Obstacles

The National Environmental Policy Act often takes heat for slowing down energy and infrastructure projects because of the permitting requirements it imposes. Looking at the data, we find that other factors may pose more prominent obstacles to development.

TEXT Emily Joiner and Arthur G. Fraas

IMAGE Andriy Onufriyenko / Getty Images

Developers of renewable energy projects in the United States have long discussed the environmental-review process as a key obstacle to wind and solar power plants reaching operation. Established in 1970 through the National Environmental Policy Act (NEPA), environmental review is required for major projects located on federal lands or seeking federal financial support. NEPA requires federal agencies to assess the environmental effects of major proposed federal actions prior to the execution of those actions, either through a full environmental impact statement (EIS) or the limited, concise review of an environmental assessment. In many cases, reviews can take years to complete.

Court challenges claiming violations of NEPA represent another major obstacle to renewable project development.

But how much do permitting and court challenges actually affect wind and solar energy project development? And how does the pace of development differ for projects with court challenges than for projects without?

The length of NEPA review, the burden it places on renewable project developers, and other associated delays such as court challenges have been a focus of debate over the reform of federal agency review of renewable energy projects. In 2023, federal lawmakers adopted changes via the Fiscal Responsibility Act to shorten the length of



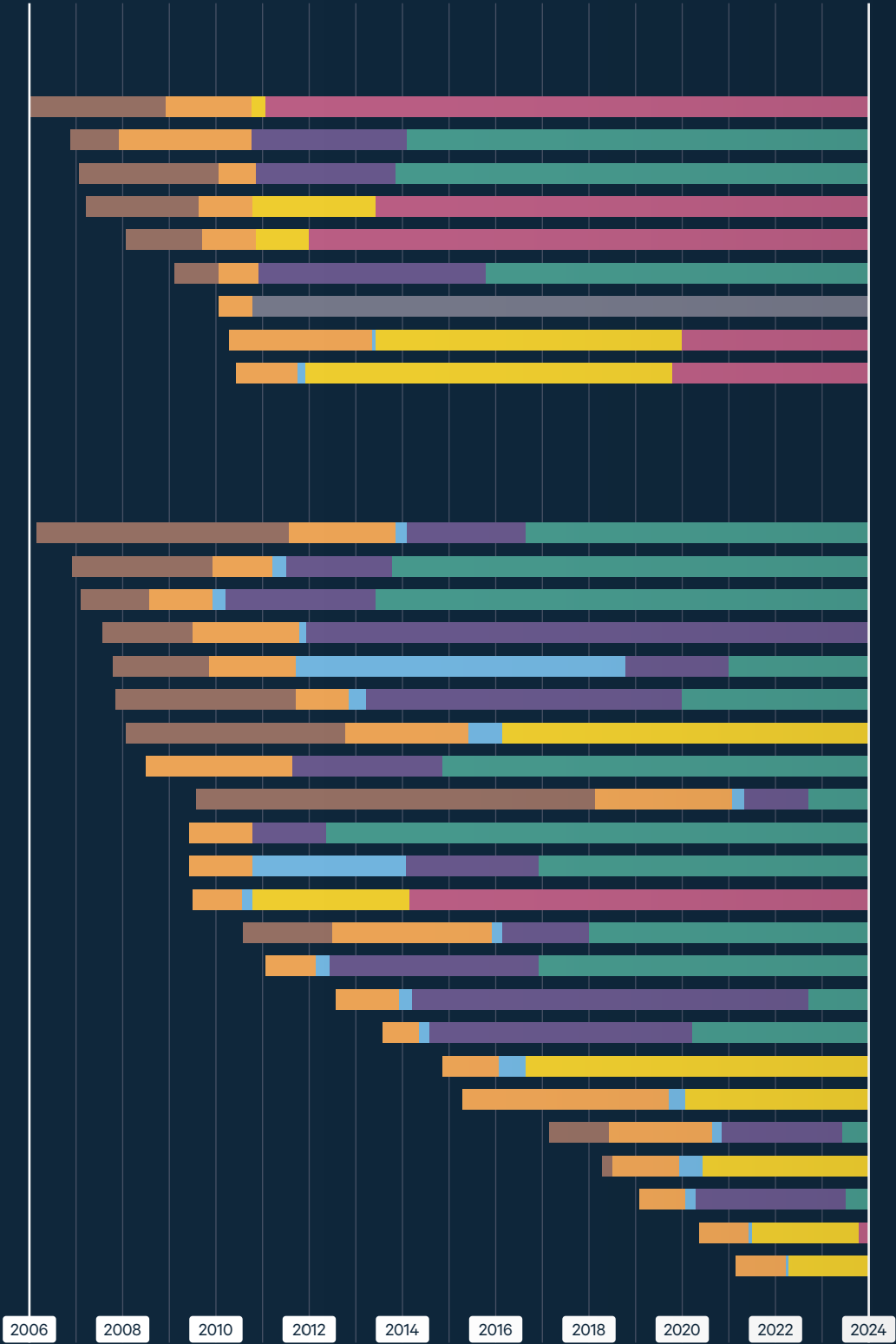
FIGURE 01 Timelines for Solar and Wind Energy Projects

A Concentrated Solar Projects

Imperial Valley
Ivanpah
Genesis
Calico
Amargosa Farm Road
Tonopah Crescent Dunes
Blythe
Quartzite
Rice

B Photovoltaic Solar Projects

Desert Stateline
Desert Sunlight
McCoy/Arlington
Sonoran
Palen
Desert Harvest
Soda Mountain
Topaz
Crimson
Silver State North
Silver State South
CES Lucerne Valley
Panoche Valley
K Road Moapa
Moapa SEC/Arrow Canyon
Modified Blythe
Aiya
Desert Quartzite
Yellow Pine
Gemini
Eagle Shadow Mountain
Southern Bighorn
Skeleton Creek Solar



KEY

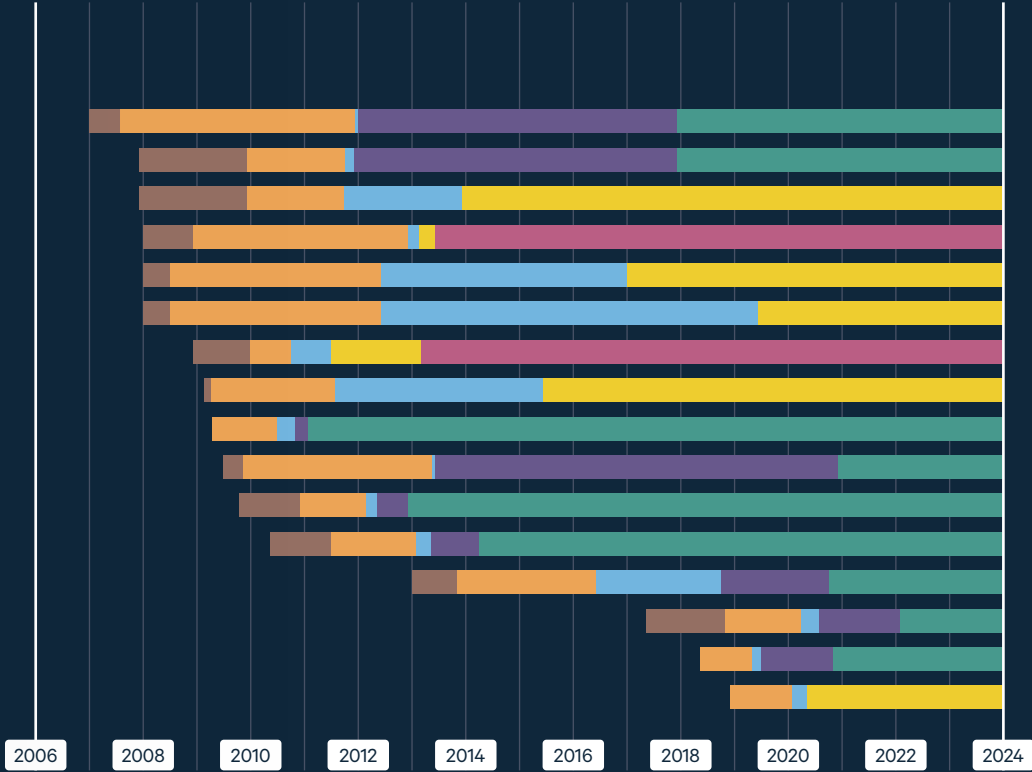
- Initial Application to NOI
- NOI to FEIS
- FEIS to ROD
- ROD to Operational
- Pending
- Operational
- Terminated
- Modified

NOTES

NOI = notice of intent
FEIS = final environmental
impact statement
ROD = record of decision

C Onshore Wind Projects

Deerfield
Tule Wind Valley Phase I
Tule Wind Valley Phase II
Searchlight
Chokecherry Phase I
Chokecherry Phase II
West Butte
Whistling Ridge
South Dakota Prairie Winds
Mohave County
Ocotillo Express
Alta East
Na Pua Makani
Borderlands
Skookumchuck
Campo Wind Phases I, II, and III



NEPA review and increase the types of actions that are eligible for categorical exclusions. As a result of the recent executive order from the Trump administration that declares a national energy emergency, federal agencies are making further reductions in the length of NEPA review by limiting environmental assessments to 14 days and EIS reviews to 28 days for specific types of energy projects. Solar and wind projects are not included as eligible for expedited review. In addition, Congress continues to consider additional changes to expedite federal environmental reviews, including proposals to reduce the number of NEPA lawsuits by amending the statute of limitations.

Building on previous work involving utility-scale solar projects with a capacity of 20 megawatts or greater, we cataloged the NEPA, litigation, and operation timelines for solar and wind energy projects that completed the environmental permitting process from 2009 to 2023. Our timeline analysis focuses

on outcomes for projects that underwent an EIS, as an EIS is the more challenging and complicated of the two permitting processes. Note that the solar and wind projects reviewed under NEPA account for only a small fraction of the increase in installed renewable capacity during the 2010–2023 period.

Here, we describe the results from two recently published reports.

National Environmental Policy Act: Timelines for the Review Process

Formal NEPA EIS review includes three official stages: the notice of intent, which initiates the preparation of an EIS; the publication of the final EIS, which indicates the completion of the review; and the record of decision, in which the agency approves the permit, lease, and financing decisions. The end of the review process signals that a project can move forward in its development, though if the

project is located on land held by the Bureau of Land Management, it still needs final approval from the agency (which is known as a notice to proceed).

Our timelines also include initial action dates. One example of an activity that qualifies as an initial action is the date the developer submits an application for a lease, permit, or financing. Another example is the date of operation, typically when the first unit of the project begins producing power.

We find that the full NEPA review process for the solar and wind projects we evaluated—from the notice of intent to the record of decision—generally was completed more quickly than for other major infrastructure projects as reported by the Council on Environmental Quality. Compared with the reported average of 54 months, our sample shows that solar and wind projects require about 27 and 45 months, respectively.

In our sample, about 60 percent of wind and solar projects completed the formal NEPA EIS process within two years (Figure 1). However, one-third of the solar projects and half of the wind projects exceeded the two-year deadline specified in the Fiscal Responsibility Act. These types of projects likely account for a disproportionate share of the policy conversation about problematic NEPA-related delays in clean energy development.

In analyzing the time from initial action to date of operation, we observe other significant periods of delay for project developers. For the subset of 16 solar projects that completed EIS review and for which we have an initial action date, none completed construction and commenced operation within five years of the date of initial action; 4 of these projects required more than eight years to reach operational status.

For wind projects, 3 of 10 went from initial action to operation within five years; but 4 wind projects required more than eight years. For the post-NEPA review period, 11 of 24 solar projects and 6 of 14 wind projects required more than four years to complete construction and begin operation from the date that a record of decision had been issued. This delay in completing construction



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We find that the full National Environmental Policy Act review process for the solar and wind projects we evaluated—from the notice of intent to the record of decision—generally was completed more quickly than for other major infrastructure projects.

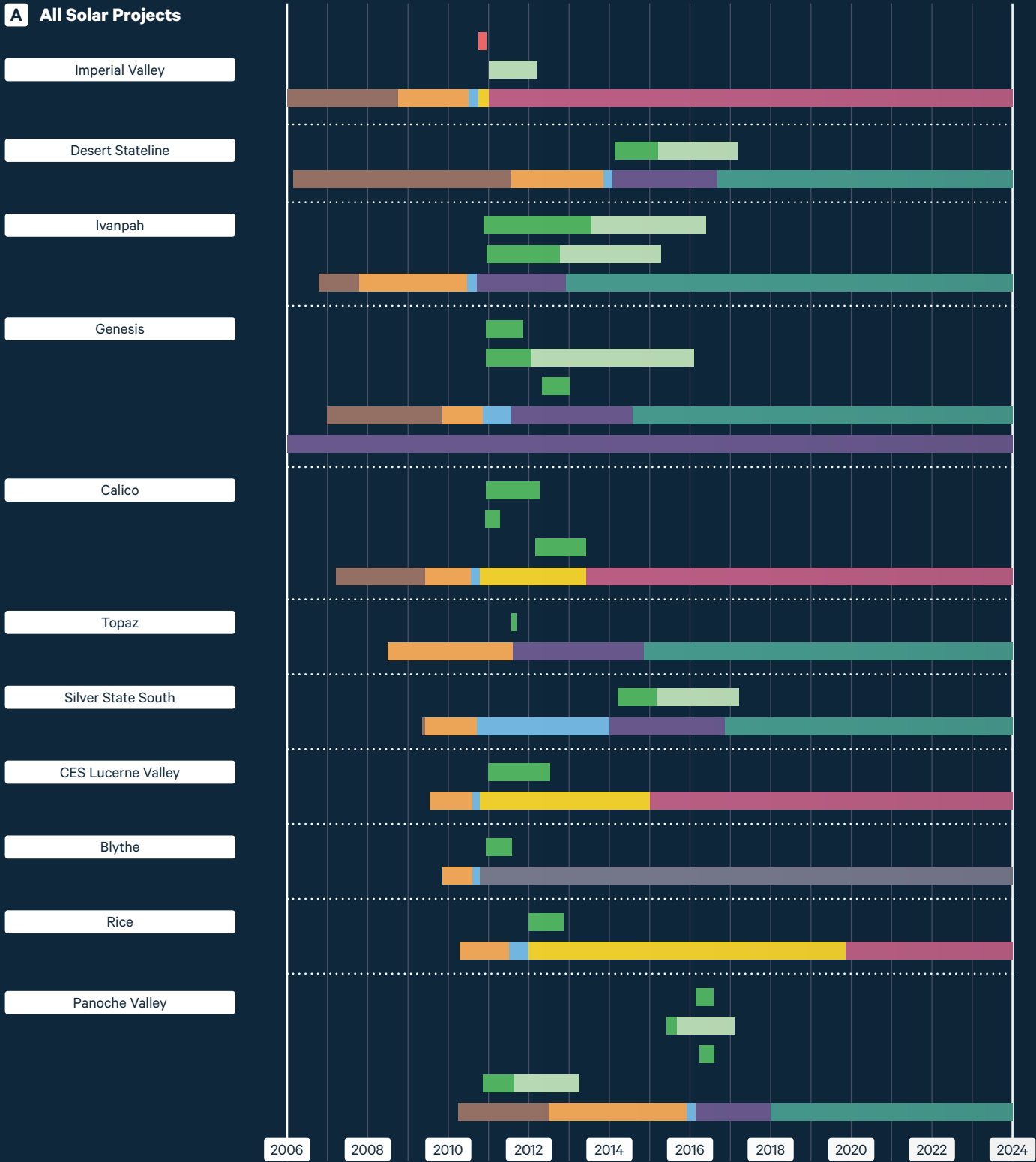
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PHOTO
adamkaz / Getty Images



FIGURE 02 Timelines for Solar and Wind Energy Projects and Court Cases

A All Solar Projects



KEY

- Initial Application to NOI
- NOI to FEIS
- FEIS to ROD
- ROD to Operational
- Pending
- Operational
- Terminated
- Modified
- Court Filing to Decision - Defendant Win
- Appeal Filing to Decision - Defendant Win
- Court Filing to Decision - Plaintiff Win
- Appeal Filing to Decision - Plaintiff Win

NOTES NOI = notice of intent, FEIS = final environmental impact statement, ROD = record of decision

All Solar Projects (Cont'd)

Modified Blythe

B Onshore Wind Projects

Deerfield

Tule Wind Valley Phase I

Tule Wind Valley Phase II

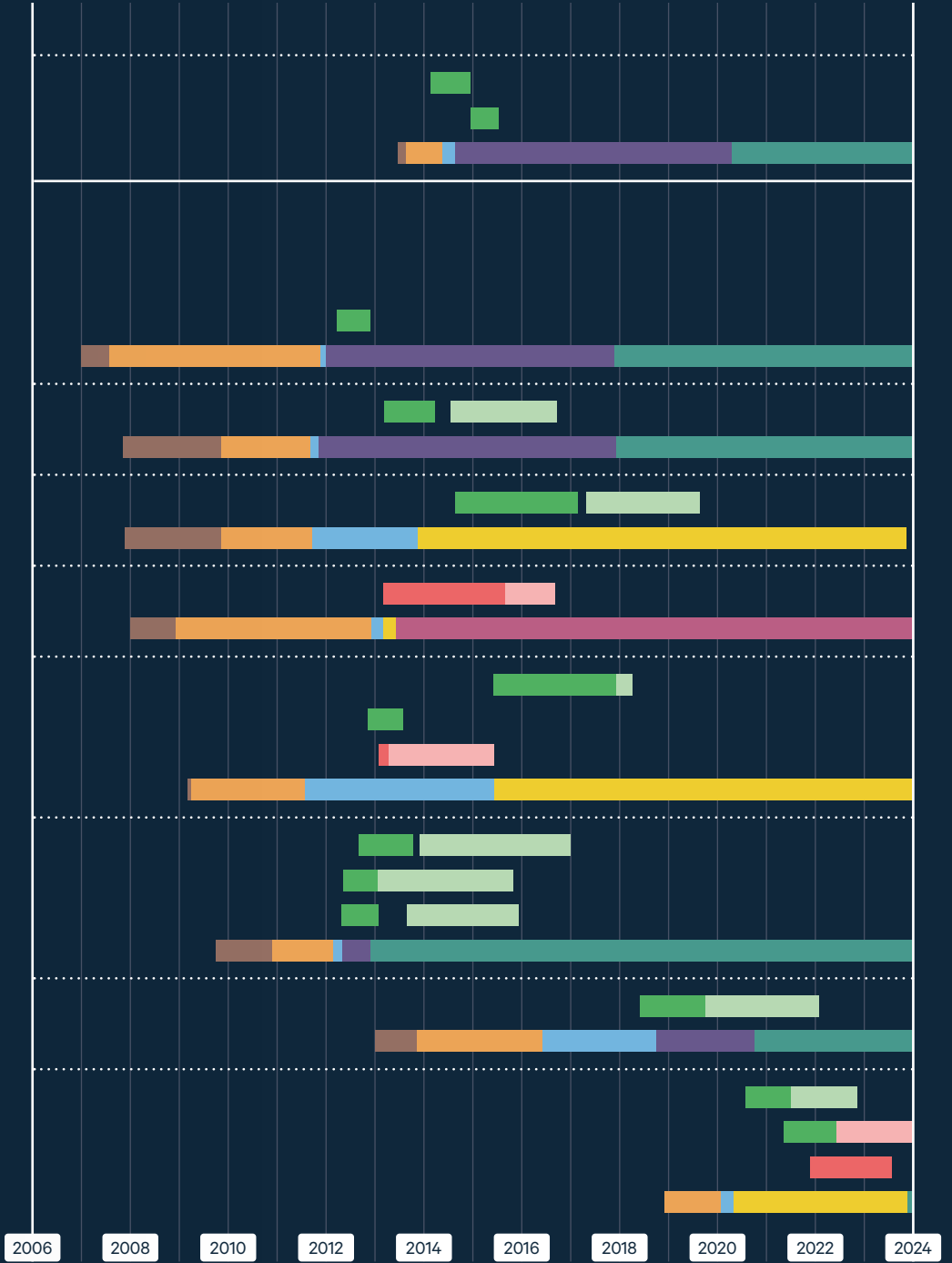
Searchlight

Whistling Ridge

Ocotillo Express

Na Pua Makani

Campo Wind Phases I, II, and III





and beginning operation suggests that these projects encountered additional obstacles after the formal NEPA review process.

For comparison, we also looked at projects that underwent environmental assessments. The equivalent step to a record of decision in the environmental assessment process is the issuance of a finding of no significant impact after an environmental assessment has been completed. While most projects completed review with a finding of no significant impact within two years, 13 of 19 solar projects required more than one year from their initial action date, the review period established in the Fiscal Responsibility Act of 2023.

Litigation Outcomes

One-third of the solar projects and half of the wind projects that completed NEPA EIS review faced court challenges. In nearly every instance, court cases were filed after the government agencies had issued a record of decision. We identified court cases that raised NEPA-related concerns (or similar violations of state or local requirements) for 12 of the 32 solar projects and 8 of the 16 wind projects that completed an EIS.

Regional or local environmental groups and Tribal representatives were the primary groups initiating court challenges to solar and wind projects. National environmental groups filed court challenges for five solar projects that underwent EIS review; the defendants were permitting agencies and project developers. As the most frequent permitting agency in our sample, the Bureau of Land Management was the primary defendant for the federal cases. All the filed court challenges that contested NEPA reviews by the Bureau of Land Management addressed the Obama administration’s “fast-track” candidates, a select number of projects that had their EIS review expedited in the first years of the Obama administration.

Though the defendants prevailed in most cases, court challenges caused or contributed to the termination of three projects, and six additional projects experienced significant delays as developers waited for final court decisions

(Figure 2). However, a comparison of our timelines reveals that, when terminated projects are excluded, the wind and solar projects that faced court challenges had similar average project development timelines to the wind and solar projects without court challenges following the completion of NEPA review.

A reduction in the statute of limitations to require the filing of court challenges is one of the changes proposed in recent NEPA reform legislation. Two proposed limits are 60 days (as indicated by the Revitalizing the Economy by Simplifying Timelines and Assuring Regulatory Transparency Act) and 120 days. For 10 of the 27 cases (covering 20 energy projects) brought to federal court, plaintiffs filed their initial claim within 60 days of the date that the federal agency issued the record of decision. All but four of these cases were filed within 120 days.

Conclusion

The number of wind and solar projects that underwent NEPA review are a minority in the total US wind and solar energy portfolio. Increasing renewable energy capacity on federal lands may depend on gauging and reducing the risk that developers perceive NEPA review poses to their projects.

As Congress considers further reforms to NEPA, this discussion of development timelines offers a perspective on how NEPA reviews and associated litigation affect renewable energy projects. Our data on the timeline for the development of projects that are subject to NEPA EIS review suggests that NEPA review is just one of several factors that adversely affect project development. Financial problems faced by developers, for example, sometimes contribute to post-review delays, and projects also likely face challenges in interconnecting to the grid.

Permitting agencies also could benefit by working with developers to keep a record of the various factors that contribute to project delays. Obtaining this information also would facilitate further research into the factors beyond NEPA that hinder the construction of renewable energy projects on federal lands. ■

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The number of wind and solar projects that underwent National Environmental Policy Act review are a minority in the total US wind and solar energy portfolio.
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PHOTO (LEFT)
Andreas Nesslinger
/ Getty Images



Emily Joiner is a research associate and **Arthur G. Fraas** is a visiting fellow at Resources for the Future.

Navigating the Currents of Law and Climate

Resources magazine recently spoke with Clint Vince, chair of the US Energy Practice at the global law firm Dentons and co-chair of its Global Transportation and Infrastructure Sector for the US Region. A longtime supporter of Resources for the Future (RFF), Clint was among the founding members of the RFF President's Council when it launched in 2018. Below are excerpts from the recent conversation, which touched on clean energy technology, court cases, ocean sailing, and more.

Resources: How did you start working in the field of energy and the environment? And what interests you about these issues?

I fell into the energy and environmental field totally by accident. I was a student at Georgetown Law School, looking for a way to earn some money, and I clerked with a firm that happened to work on these issues. I wanted to become a trial lawyer. After I graduated, I joined the firm full-time when they offered to make me the head of their litigation department. I later went to Dentons and founded their energy and environmental practice, so I've been steeped in this area of the law my whole career.

The subject of oceans is very near and dear to my heart. I was on an ocean racing team with sailboats for several decades, and I still sail—it's in my DNA. I care a lot about oceans, and I've seen their deterioration. The more work that can be done there, the better.

What do you most appreciate about RFF?

I consider the people at RFF to be honest truth tellers. That type of dependable, nonpartisan research is more valuable now than ever. There's so much misinformation out there. I love reading RFF reports on everything about climate and transportation decarbonization, especially on heavy-duty vehicles. I also think RFF's work on critical minerals has



Supporter Spotlight

In the RFF Supporter Spotlight, our partners and colleagues share their insights about climate, energy, and environmental issues and how they've made a difference by working with Resources for the Future—all in their own words.

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PHOTO Clint Vince, his wife, and his family travel to far-flung places all over the world.



been strong. The economic analysis that RFF contributes is unparalleled. I can't think of anyone that tackles economic analysis with the rigor that RFF does.

Because RFF is nonpartisan, it doesn't choose technologies, and it doesn't choose winners or losers. Technology changes often, and something that's popular this year might morph into something completely different in a few years. What RFF does is provide economic analysis of different technologies and their applications, and I think that's incredibly helpful.

How would you describe the value of RFF's research and analysis within the climate-policy landscape, and from your perspective as a legal expert?

My observation is that members of Congress, congressional committees and staff, executive agencies, state governments, and even municipal and county officials really value the work that RFF is doing and feel that they can depend on it. RFF is often asked by policymaking organizations to research, analyze, or write about certain issues. I think

the work that RFF produces is so consistently rigorous and reliable that it's well accepted.

In terms of RFF's value to my own work, I have a broad-based practice. I argue cases before state courts, federal courts, and the US Supreme Court, and I also do advocacy in Congress, with government agencies, and at the state level. It's helpful to have RFF's data so that I can advance my own position or argument. I expect RFF to be quoted in even more legal decisions in the future.

Finally, what do you think sets RFF apart from other organizations?

A lot of organizations are conveners, but what stands out to me about RFF is that it produces economic analysis at the highest possible level. RFF truly is an economic analytical force in the world of think tanks today. It's not an advocacy organization—it's an honest broker doing careful work. I saw recently that RFF is rated as the number one think tank for energy economics, which doesn't surprise me. I've always thought of RFF as the gold standard for economic analysis. ■

Four Ways You Can Support RFF



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Political swings in the United States are not new, but recent changes have illustrated the importance of having a clear, objective, and nonpartisan understanding of the options to address environmental, energy, and climate challenges.

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PHOTO
Tverdohlib / Getty Images



Investing in the Next Generation of Federal Climate Policies

TEXT
Carlos Martín

Resources for the Future (RFF) was founded in 1952 as the first think tank to focus exclusively on environmental and natural resource decisions, a mission we still carry today. And since the middle of the twentieth century, our researchers have contributed impartial and rigorous research toward informing the policymakers who have crafted, debated, and passed landmark laws such as the Clean Air Act of 1970.

RFF also has been around to witness major legislation that fell short of becoming federal law but still made a lasting impact on the evolution of climate policy in the past several decades. One such example is the Climate Stewardship Act, which fell short of passing in both 2003 and 2005. This bill was introduced by the bipartisan team of Senators John McCain and Joseph Lieberman; it aimed to limit greenhouse gas emissions through a cap-and-trade system.

That era in RFF’s history also involved the organization bringing together industry leaders through a series of events known as the Climate Policy Forum. With a presidential campaign on the horizon, RFF and industry leaders gathered in 2006 to pose questions and motivate research with a shared aim of informing economically viable policy solutions that could mitigate carbon emissions.

In the article that follows, RFF’s vice president for communications, Kristina Gawrgy, offers a history of the Climate Policy Forum, the subsequent research paper that came out of the event, and thoughts from RFF researchers and partners on the possibility of a similar effort in RFF’s future.

Now is the perfect time to reflect on this legacy. With recent efforts underway to repeal the Inflation Reduction Act, questions abound about the contours of new climate policy. Political swings in the United States are not new, but recent changes have illustrated the importance of having a clear, objective, and nonpartisan understanding of the options to address environmental, energy, and climate challenges. RFF’s effort two decades ago can and must be revisited.

Regardless of current and future political swings, climate change is here. The challenges are mounting, and we will need trusted leaders and organizations to bring the best thinking to climate and energy solutions. Never before has the need been more imperative for leaders across business, academia, government, and philanthropy to shape the next generation of climate policies that can help ensure a healthy environment and thriving economy for all people and communities. ■



Time for the Next Climate Policy Forum?

Looking Back and Ahead at Critical Moments in Climate Change

TEXT Kristina Gawrgy
ILLUSTRATION James Round

Framing the next generation of climate and energy policies will involve the engagement of researchers, policymakers, and industry leaders to move the business conversation forward about climate policy. Resources for the Future is here for it.

Nearly 20 years ago, Resources for the Future (RFF) started an ambitious project to gather the most innovative corporations that were taking the threat of climate change seriously and aiming to be part of the solution.

To give a bit of a flavor of what life was like in 2006, let's look at the headlines in *Resources* magazine from the Winter 2006 issue:

- Heating Subsidies Make a Difference in Offsetting Winter Mortality Rates Among the Poor and Elderly
- Voting for Conservation: What Is the American Electorate Revealing?
- Malaria Among African Children: Hope for Progress Against a Growing Menace
- Making Tough Choices: Hurricane Protection Planning After Katrina and Rita
- Examining China's Mineral Consumption

Climate change, though embedded in the causes and consequences discussed among the articles, was not explicitly mentioned in these headlines. Significant US climate change mitigation and adaptation policies had not been enacted. Attempts to pass the Waxman-Markey bill were still three years away, and a decade would elapse before the United States signed the Paris Agreement. In 2006, climate policy was still open terrain.

Now, nearly 20 years later, it may be hard to keep track of all the climate policies that have been proposed, implemented, enacted, dissolved, or rolled back. The policy story around climate and energy over the past two years is overwhelming in its plot twists, and

yet the environmental, health, and economic threats from the effects of climate change continue unabated.

A Bit of History

In 2006, RFF leaders saw an opportunity in the years ahead to really understand the wide range of potential policy responses and their costs. With the 2006 Climate Policy Forum and subsequent report in 2007, titled *Assessing US Climate Policy Options*, RFF made substantial progress toward a set of solutions for climate change. The aim was to provide policymakers and stakeholders with well-vetted, detailed options; important criteria for assessing the strengths and weaknesses of different approaches; and early identification of industrial and economic challenges across the options.

At RFF, the late Raymond J. Kopp and current President and CEO Billy Pizer, who was then a fellow, led the effort. In an article celebrating Kopp's life, Pizer describes the project: “Over the course of 18 months, we provided a forum for business leaders across major sectors—electricity, fossil energy, transport, agriculture, heavy industry—to meet one another and learn about the various facets of climate policy,” Pizer writes. “The Climate Policy Forum helped these leaders understand their own issues and questions, target RFF research and expertise to answer those questions, and move the business conversation forward about climate policy.”

Pizer also remembers a genuine curiosity and interest by industry leaders to understand and inform the next generation of climate policies.

“There was a recognition by the companies that they should be prepared,” Pizer says.

“In 2006, Resources for the Future leaders saw an opportunity in the years ahead to really understand the wide range of potential policy responses and their costs.”

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“Now, nearly 20 years later, it may be hard to keep track of all the climate policies that have been proposed, implemented, enacted, dissolved, or rolled back.”

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David Raney, now retired, was an executive at Honda when the idea came up to gather corporate leaders together for the 2006 forum. “The confidence I had in RFF was the foundation,” Raney explains about joining RFF’s Business Leadership Council (then called the RFF Council). “RFF had enormous credibility on Capitol Hill and had earned respect inside Honda’s executive and engineering ranks. RFF had grown to respect the opportunity they had with Honda and its credibility and engineering prowess, honesty, and environmental leadership—we ‘liked’ each other. It was a good fit.”

Raney, an early cheerleader of the effort alongside Kopp, helped convince about 25 corporate executives to participate in a series of events. Raney emphasized that executives were open to joining these convenings because they were confident that the end product would be unbiased and informative, rather than an advocacy document. The diverse set of companies included automobile companies like Honda and Toyota, oil companies like Chevron and ExxonMobil, energy companies like Duke Energy and Southern Company, and financial institutions like Goldman Sachs. Goldman Sachs, the Doris Duke Charitable Foundation, and the William and Flora Hewlett Foundation supported the effort. (A full list of participants and funders can be found on page 202 of the 2007 report that came out of the original Climate Policy Forum.)

At the time, the political outlook was a 2008 presidential election that was anyone’s to win. With no incumbent running, the election was a fresh slate for either party to bring big ideas to the table, and there was bipartisan support for action. Even prior to nominees being named for the 2008 election, Democrat and Republican state governors and members of Congress had different ideas but a shared willingness to address climate change. Research focused on a variety of economy-wide policy solutions, including offsets, agriculture, international competitiveness, and the cost and pace of emissions reductions.

Raney, now retired, still has a copy of the 2007 report, and he shows the report to friends when they ask about what he did for a living. He calls it one of the “proud achievements” of his career.

Raney says that the fact that it still stands the test of time is testament to the vision of the report. “We didn’t want it to end up as just another document on the shelf,” Raney says. “We wanted it to be a living document that government staffers refer to, and I think we did that.”

Joseph E. Aldy, a current RFF university fellow and the Teresa and John Heinz Professor of the Practice of Environmental Policy at Harvard Kennedy School, was a fellow at RFF between 2005 and 2009, authoring two issue briefs that were included in the 2007 report. He later served in the Obama White House as Special Assistant to the President for Energy and Environment. In the 2007 piece he authored, titled “Assessing the Costs of Regulatory Proposals for Reducing US Greenhouse Gas Emissions,” Aldy compares economic impacts associated with achieving different domestic emissions targets over the following two decades. In his working paper “Competitiveness Impacts of Carbon Dioxide Pricing Policies on Manufacturing,” Aldy (along with authors Richard D. Morgenstern, Evan M. Herrnstadt, Mun Ho, and Pizer) present research about the likely impacts of carbon pricing on vulnerable industries.

One of the things Aldy remembers beyond the impact of his research is the importance of the opportunity to engage with industry leaders and policymakers around the work. “It was a great opportunity for me and, I would say, the first substantial opportunity I had to think about translating research and evidence for a business-community audience, which is not something you’re necessarily trained to do in a PhD program.”

Aldy also remembers that what made the work so well done and received was that the researchers iterated with industry leaders on what needed to be answered through research and evidence. “We had regular meetings with all the representatives from the business community, and we would take turns going through material that we had written and getting their feedback and then learning new questions to inform another batch of research and writing,” he recalls. “It was a two-way street, which was very important and very effective. We didn’t say, ‘Let’s imagine the audience and sit around in the fifth-floor conference room, make up what they need, and produce a report.’”

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We didn’t want it to end up as just another document on the shelf ... We wanted it to be a living document that government staffers refer to.

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PHOTO

JGI/Daniel Grill / Getty Images

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The idea of output-based allocation for carbon has since been embraced by states like California and by the European Union.

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He also notes that, while the policy landscape for the future was quite unknown at the time due to open primaries for both major political parties, he still felt the conversation was well contained and focused on economics.

“What was important through this process was our focus on how to get the biggest bang for the buck, and our understanding of how the details of policy, design, and practice can influence that.”

Karen Palmer, a senior fellow and director of RFF’s Electric Power Program, and Dallas Burtraw, the Darius Gaskins Senior Fellow at RFF, also worked on the 2006 forum and 2007 report. Together they authored an issue brief, titled “The Electricity Sector and Climate Policy,” which outlines the special issues surrounding greenhouse gas regulations in the electricity sector, including both market-based and traditional regulatory options.

Palmer also acknowledges that the interaction between researchers and industry was invaluable, even if a little tricky at times. She says that the interface was critical to the

integrity of the research and that the business voices weren’t pushing too far. “Kudos to Billy Pizer, primarily, who helped navigate the conversations between authors and participants.”

Burtraw noted that much of the research included in the 2007 report informed the American Clean Energy and Security Act of 2009, also known as the Waxman-Markey bill. The bill proposed a cap-and-trade system through which the federal government would set limits on total greenhouse gas emissions nationally. The House passage of the bill was the first time a house of the US Congress has approved a bill meant to curb carbon emissions. While the bill never reached the Senate and ultimately did not become law, it was a foundational movement toward climate change policies and regulations at all levels of government.

Burtraw noted that while the legislation didn’t pass in the United States, it did influence the design of climate policy subsequently. The idea of output-based allocation for carbon has since been embraced by states like California and by the European Union.

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Resources for the Future can still steer the conversation, and we can all learn together.



Kristina Gawrgy is the vice president for communications at Resources for the Future.

Convening in a New Context

Now, nearly 20 years from the last Climate Policy Forum, conversations are budding about whether the time is ripe for a new convening and research endeavor for a new slate of policy solutions, given the wildly changed context. In some ways, the current moment (including the recent repeals of massive decarbonization policies and an increasing interest in adaptation) presents a new *carte blanche*—but one informed by two decades of policy experimentation and a changed energy landscape. Now, business leaders also are dealing with unprecedented instability on a global level, with technological advances such as artificial intelligence and ongoing tariff wars with US allies and adversaries alike. Within the United States, coal use has declined, natural gas use has grown, and petroleum use could be slowing. There is a growing focus on nuclear and geothermal. Meanwhile, the landscape for policy discussions feels quite different. A new forum and its collaborative solutions-based thinking could inform future policymakers much like the first did, but in totally new ways.

“Industry is transforming,” Palmer notes. “We also know a lot more now than we did then. Everything should be on the table. A common understanding is still important, but it will be harder than ever. RFF can still steer the conversation, and we can all learn together.”

Pizer agrees. “One thing we battle against is people who say we don’t need more research and that we just need a communications strategy. I don’t think that’s right. It’s still important to have an objective understanding of what we’ve learned over the past decade, what new options look like, and whether and how new policy options affect important outcomes.”

Raney also cites the space and opportunity at hand to consider new industry voices in the conversation moving forward, such as technology companies and different types of financial actors, who have a huge stake in the future of energy and environmental economics. He also notes that many more nonprofit and philanthropic partners are in this space now than 20 years ago; considering their insights would be valuable. And while things have

changed, he still feels confident that RFF is the group to lead. “I know of no other organization in the United States that has the credibility that RFF still has,” Raney says.

For those who participated in the 2006 Climate Policy Forum and assembled the 2007 report, decarbonization and market-based tools continue to be on the table. If anything, many more policies across state and regional jurisdictions can motivate additional research questions and evidence. But they also acknowledge that the policy landscape has shifted dramatically, while the reality of climate impacts is now front and center. What could be debated in 2007 about the immediate impact of climate change seems much more present physically, with natural disasters and extreme weather affecting people’s lives and community infrastructure.

Burtraw and Aldy both note the need to understand the economics of mitigating climate change alongside the real cost of climate impacts. “Insurance markets will become a more prominent issue in the next several years,” Aldy says. “Deny climate change all you want; insurance markets are reacting to something.” Raney also noted that much still needs to be understood about the economics of all energy options, including the opportunities and challenges around renewable energy and promising hydrogen-related innovations.

Important questions should be addressed about how to frame our next generation of climate and energy policies around the things that center political conversations, such as US competitiveness with China and energy affordability. Regardless of focus, leaders have the appetite to inform future policymakers and create a lasting positive impact for people, communities, and the economy.

“When I talk to people about restarting an open conversation about future climate policy, they are drawn to it because they want to feel hope,” Pizer says. “This is an opportunity to look toward something positive. Learning from everything that has happened, and what we now know, it is energizing to think about how we can take things forward and improve our environment and economy for the future.” ■

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