



THE COST OF INACTION

The Economic and Policy Implications
of Climate-Driven Disasters and the Clean Energy Solution

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METHODOLOGY

This research report was conducted by a Masters of the Environment graduate student team at the University of Colorado Boulder (CU Boulder), in collaboration with Protect Our Winters, between January 2025 and October 2025. This document represents the culmination of extensive research by the graduate student team, including a review of over 400 secondary sources and more than 30 stakeholder interviews and email consultations. All cited secondary sources are from publicly available economic and scientific journals, technical white papers, news source articles, as well as government datasets and reports. This report will be an evergreen report living on POW's website as a resource for the outdoor state. Additions and alternations may be made as new research and data become available.



Natural disasters fueled by climate change are escalating at an alarming rate, and the resulting economic damage is staggering. Wildfires, floods, hurricanes, and other extreme weather events are disrupting communities nationwide, forcing the government to spend billions on disaster relief, infrastructure repairs, and long-term recovery - *\$182.7 billion in 2024 alone*.¹

Since 2020, damages from climate and weather disasters have averaged \$141 billion per year - a 47% increase from the prior decade and four times the cost of the 1990s.² These events have caused almost *\$1.5 trillion of economic losses between 2010 and 2019*.³

Rural communities that rely on outdoor recreation to sustain their economies are among the hardest hit by rising disaster impacts - nearly half of the 425 recreation-dependent counties in the United States face high wildfire or flood risk.⁴ When disasters strike, these communities endure not only damage to homes and infrastructure but also the loss of access to public lands that attract visitors and generate vital spending.

Given that the outdoor recreation economy contributes \$1.3 trillion in economic output and 2.4% of the national GDP, the stakes extend far beyond rural areas.⁵ Failing to act carries steep, long-term economic consequences for both vulnerable communities and the nation as a whole. Investing in clean energy is one action that proactively captures lost dollars to strengthen economic stability, specifically in rural communities that depend on outdoor recreation.

Replacing energy derived from fossil fuels with cleaner options can target the root cause of climate change by lowering greenhouse gas emissions, reducing both the economic and environmental impacts of worsening natural disasters, and also helping to support the livelihoods of rural communities, especially during post-disaster recovery. Transitioning to more resilient clean energy sources and integrating a place-based approach not only supports outdoor recreation-based communities, but also creates jobs, generates revenue, reduces long-term costs, and strengthens communities to build a sustainable future and protect the places we love.⁶

This report investigates the toll that the costs of natural disasters inflict on all levels of government and its their disproportionate effects on rural, outdoor recreation-dependent communities, while also analyzing the role that clean energy plays in solving this multifaceted financial, economic, and political challenge. This report incorporates case studies throughout the country, highlighting six key states - Nevada, Colorado, Alaska, Montana, Utah, and Maine.

FOR RURAL OUTDOOR RECREATION COMMUNITIES

The Problem:

Rising Disaster Costs + Destruction of Public Lands + Loss of Visitor Spending = Climbing Financial Losses to Local, State, and Federal Economies + Worsening Extreme Heat to Global Climate

The Solution:

Increasing Clean Energy Investment + Reducing Fossil Fuels Burned + Diversifying Economies for Outdoor Recreation Communities = Thriving Communities and Local Economies, Reliable and Affordable Energy, Reduced Climate and Environmental Harm



1.1

Climate Change as a Driver of Intensified Natural Disasters (Wildfires, Floods, Hurricanes, Extreme Weather)

The Intergovernmental Panel on Climate Change reports that climate-related extremes are becoming more frequent and severe, with increasingly intense weather events driving a growing number of billion-dollar disasters.

Warmer temperatures amplify risks:⁷

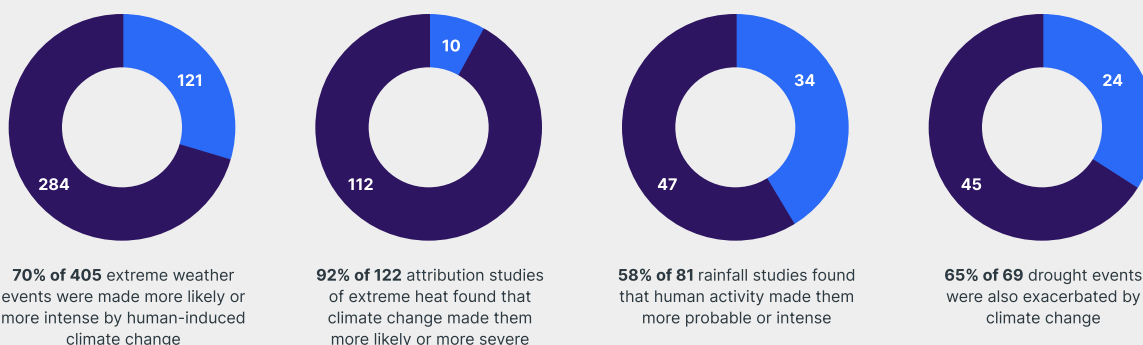
- 🔥 Hotter temperatures → Drier conditions, longer wildfire seasons
- ☁️ More heavy rainfall → Higher flood risk
- 🌊 Rising sea levels → Stronger hurricane storm surges

Science shows that climate change raises both average and extreme temperatures, increasing the risk of weather-related disasters.⁸ For every 1 degree Celsius that the earth's atmospheric temperature rises, the amount of water vapor in the atmosphere can increase by approximately 7%, thus allowing the atmosphere to hold more energy.⁹ This energy fuels intense storms, particularly over land, resulting in more extreme weather events.¹⁰



Figure 1 features data from the Columbia Climate School, displaying that **70% of 405** extreme weather events were made more likely or more intense by human-induced climate change.¹¹

FIGURE 1:
According to the Columbia Climate School:



Greenhouse gas emissions (GHG) from burning fossil fuels are the main cause of the warming climate, driving more extreme weather events. Coal, oil, and gas account for over 75% of global GHG and nearly 90% of all carbon dioxide emissions.¹² According to the EPA, in 2022, CO₂ emissions accounted for approximately 80% of total gross man-made GHG emissions in the country.¹³ Simply put, the failure to reduce fossil fuel use threatens vulnerable communities in the U.S. as they face the consequences through natural disasters and their ripple effects.



1.2

The Nexus of Extreme Weather and Spending

In addition to frequency and severity, the cost and impact of extreme weather disasters is also rising - driven by population growth, increased development in disaster-prone areas, and, most significantly, human-caused climate change.^{14, 15, 16}



Increasing natural disasters cause severe physical and economic damage, with numbers averaging **\$141 billion annually since 2020.**¹⁷



In 2024, disaster-related costs hit \$182.7 billion, part of a long-term trend of rising losses now nearly eight times higher than the 1970s.¹⁸ Billion-dollar disasters have risen from an annual average of 9 billion between 1980–2023 to 23 billion between 2020–2024 (Figure 2).¹⁹

The most expensive disasters from 1980 to 2024 include tropical cyclones, severe storms, drought, inland flooding, and wildfires (Figure 3).²⁰ The growing frequency and intensity of many of these costly extreme weather events are strongly linked to rising global temperatures.²¹

Disasters cause widespread damage, requiring local, state, and federal relief to cover losses to homes, businesses, infrastructure, and agriculture, along with significant physical and mental health costs to residents.²² Indirect impacts, such as disrupted local economies, relocation expenses, and damage to ecosystems pose further costs.^{23, 24} A less visible but critical financial strain comes from the combination of declining revenues and increasing expenditures (Figure 4).²⁵ Disasters often reduce local incomes, housing values, investment in the region, and tourism, which all contribute to lower tax revenues.²⁶ At the same time, governments face higher costs for disaster relief, healthcare, and defense spending.²⁷ Rising costs from extreme weather events will continue to strain government budgets across all levels, signifying a growing need to take action.

FIGURE 2:

1980–2024 U.S. Billion Dollar Disaster YTD Event Count

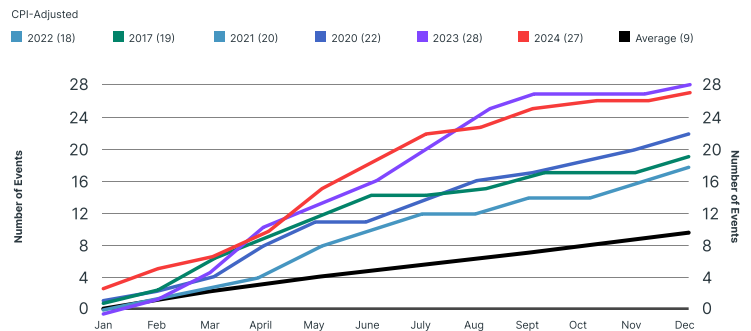
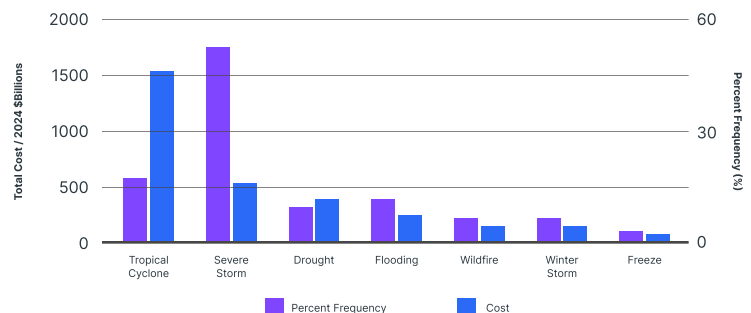


FIGURE 3:

Cost and Percent Frequency by Disaster Type 1980–2024

Data from Adapted from NOAA's Billion-Dollar Weather and Climate Disasters Report





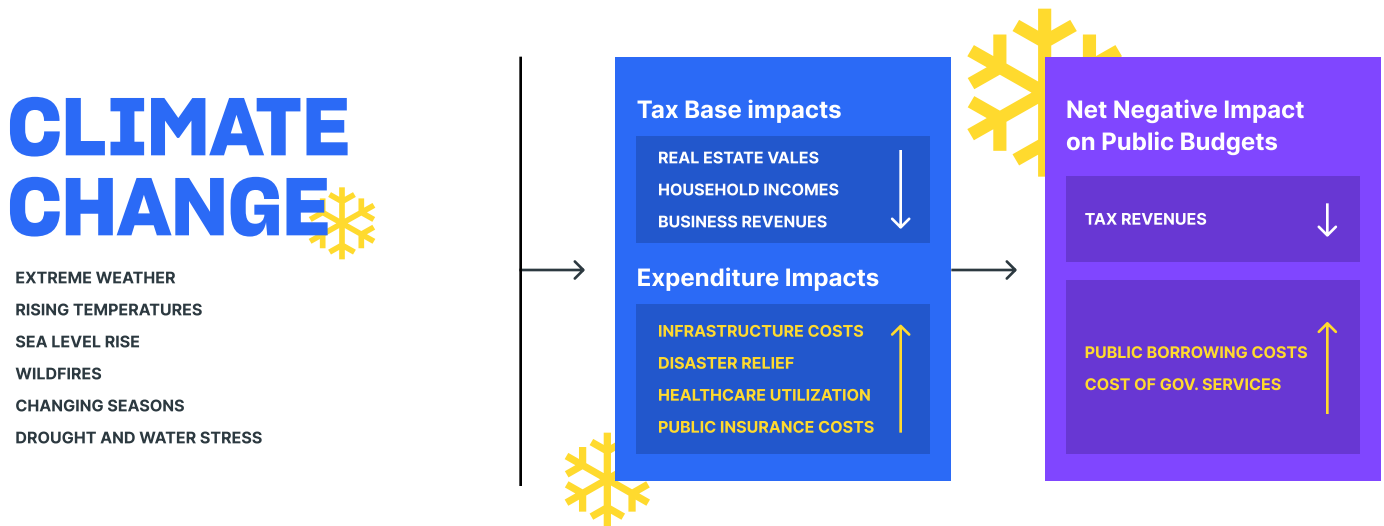
2.0

Government Spending on Disaster Relief and Rebuilding

The mounting costs of extreme weather disasters are straining government budgets at all levels as recovery spending rises and revenues decline. Additionally, the proposed fourfold increase in the state-level damage threshold for federal disaster declarations would shift more financial responsibility to states and local governments, placing the greatest strain on lower-income states and those reliant on the \$1.2 trillion outdoor recreation economy.²⁸ At the same time, the insurance industry is struggling to keep pace, raising premiums and reducing coverage in high-risk areas. This shift leaves vulnerable populations, especially in rural communities, increasingly exposed to financial risk.

FIGURE 4:

Fiscal Risks of Climate Change



2.1

Government Expenditures

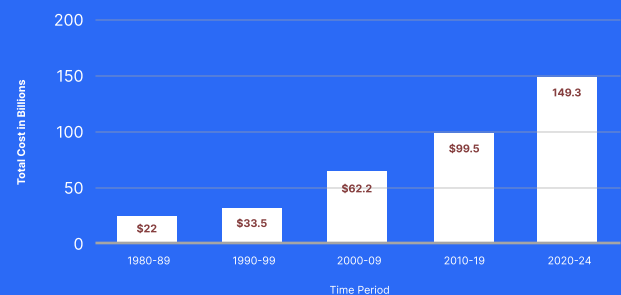
Between 1980 and 2024, the United States sustained **403** weather and climate disasters where overall damages and costs reached or **exceeded \$1 billion per event**, costing our country **\$2.915 trillion**.²⁹ Since 2020, damages from climate and weather disasters average **\$149 billion** - a **47%** increase from the previous decade and four times the cost of the 1990s (Figure 5).^{30, 31} These numbers represent more than financial losses; they illustrate how rapidly the stakes have risen and signal that society has entered a new era of climate risk.

As extreme weather events become more frequent, government spending is surging, costing trillions and accelerating at an unprecedented pace.

FIGURE 5:

Average Natural Disaster Cost Per Year in the U.S.

Data from NOAA's Billion-Dollar Weather and Climate Events



Tracing the Rise of Billion-Dollar Disasters

In the 1980s, the United States experienced, on average, one billion-dollar disaster every four months.³² Now, the US averages one every three weeks.³³ Billion-dollar wildfires alone have already more than doubled, increasing from 4.3 annually between 1984-1999 to 9.3 between 2000-2022, costing the U.S. economy an estimated \$394-893 billion annually.^{34, 35}

A Quick Recap

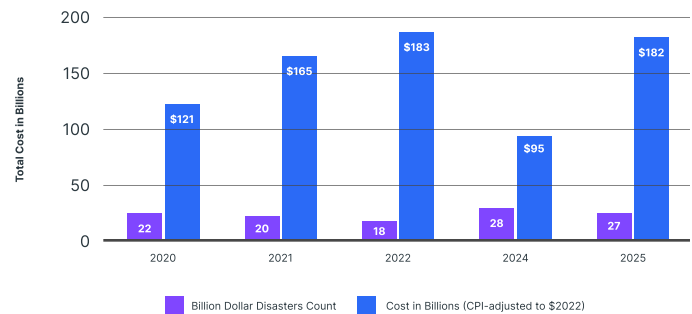
The U.S. government has spent nearly **\$3 trillion since 1980** on climate-related disasters, and the last ten years (2015-2024) alone account for **\$1.4 trillion**.³⁶

That is \$1.6 billion spent over 34 years (1980-2014), compared to \$1.4 trillion spent in almost a quarter of the time, over nine years (2015-2024).

FIGURE 6:

Billion-Dollar Disasters and Cost 1980-2024

Data from NOAA's Billion-Dollar Weather and Climate Events



Spotlight: Figure 6 displays the frequency and cost of U.S. disasters totaling over \$1 billion from 2020-2024. In 2024 alone, there were 27 billion-dollar disasters and a total cost of \$182.7 billion.³⁷

The Price of Power Outages

According to the U.S. Department of Energy (DOE), disruptions from power outages cost American businesses up to \$150 billion each year.³⁸ Severe weather is the leading cause of power outages in the United States, accounting for 80% of major outages, or \$120 billion, between 2000 and 2023, driven by severe storms (58%), winter weather (23%), and hurricanes (14%).³⁹

From 2003 to 2012, 679 major weather-related outages each affected at least 50,000 customers, closing schools and businesses, and hindering emergency services.⁴⁰ Since 2019, outages have worsened by roughly 20% per year, lasting longer, occurring more frequently, and impacting more people.⁴¹ The U.S. now experiences more electrical outages than any other developed nation, underscoring the fragility of its power grid.⁴²

Prolonged heat waves put additional strain on the grid as energy demand surges, increasing the risk of blackouts by 60% between 2014-2023 compared with 2000-2009.⁴³ Without major investments in grid resilience and clean energy to address climate warming, the U.S. will face mounting economic losses, infrastructure damage, and reliability challenges as extreme weather intensifies.

Texas 2021 / Gas

\$80-130 B loss, statewide blackout

Texas's reliance on natural gas proved disastrous during February 2021 winter storm Uri, when freezing conditions compromised the natural gas supply chain and triggered energy failures across the state's power grid. With total economic losses projected to be between \$80-130 billion, millions were without power, heat, or clean water leaving them vulnerable – and at least 246 people died as a result. A cleaner, more diversified energy mix with renewables and battery storage (see 4.2.1) could have provided greater resilience and prevented the scale of disruption Texans endured.



2.2

Projected Costs Under Continued Warming

The economic toll of natural disasters is expected to escalate sharply under continued warming, both in terms of cost and consequences. By 2050, climate-driven losses could reach up to \$191 million per county, in areas of high disaster risk, each year, underscoring the growing vulnerability of local economies across the United States.⁴⁴

Since the 1980s, the financial losses due to natural disasters are on track to increase by a factor of three, driven by expanding economic exposure, compounding inflation, and the intensifying effects of climate change.⁴⁵ Each additional degree of warming magnifies these impacts: a 2°F rise in global temperatures is projected to cause more than twice the economic damage of a 1°F increase.⁴⁶ While all projections carry uncertainty, the direction is clear - warming will continue to bring dramatic and costly consequences.

As the atmosphere and oceans warm, the frequency and scale of extreme weather events are projected to grow substantially. In the western U.S., atmospheric rivers are expected to become 25% longer and wider, leading to increased flooding, mudslides, and runoff. By 2090, these intensified storms could inflict \$2.3-3.2 billion in annual damages.⁴⁸ In Alaska, thawing permafrost alone is expected to cost between \$37 and \$51 billion from 2015 to 2064, threatening infrastructure critical to community safety and regional economies.⁴⁹

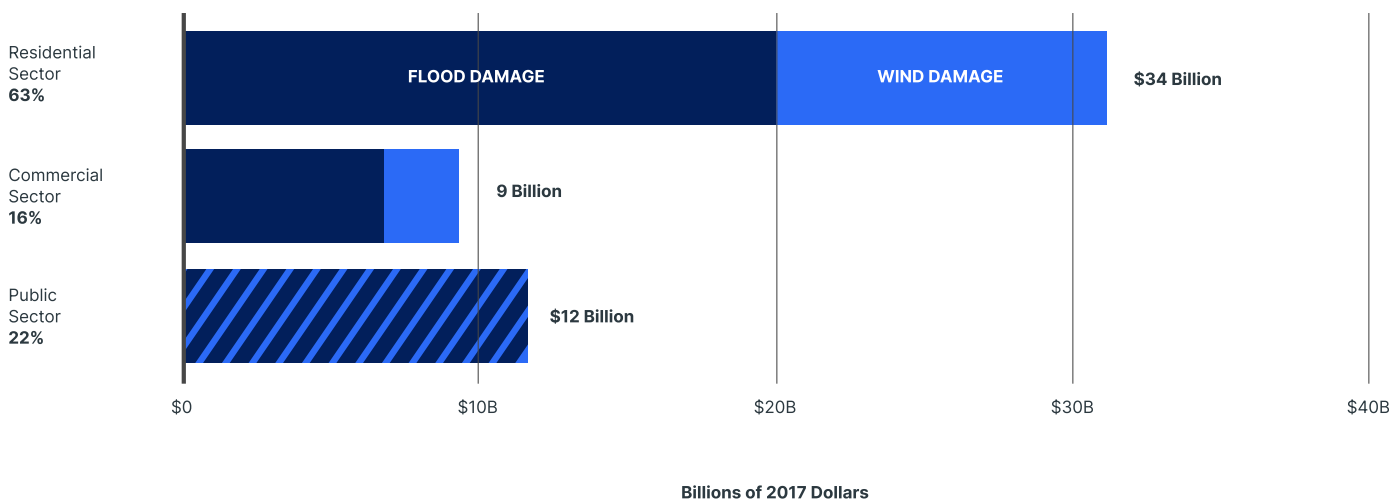
According to the Congressional Budget Office's 2019 estimates, hurricane winds and storm-related flooding are projected to cause over \$54 billion in annual losses, or about 0.3% of the U.S. GDP.⁵⁰ Of this, \$34 billion would impact the residential sector, \$9 billion commercial businesses, and \$12 billion the public sector (Figure 7).⁵¹ These figures exclude other costly disasters such as droughts, tornadoes, blizzards, and wildfires.

The impacts, damage, and cost left in the wake of these extreme weather events are on track to worsen, increasing grid failures, straining government budgets, and impacting our communities ability to adapt within a changing landscape. Proactive planning and sustained investment in clean energy can help limit future damage, reduce long-term costs, and strengthen community resilience in a changing climate. Failing to act risks not only lives and infrastructure but also the stability of rural communities, the outdoor recreation economy, and a critical opportunity to harness clean energy as a foundation for long-term economic and climate resilience.

FIGURE 7:

Expected Annual Economic Losses From Hurricane Winds and Storm-Related Flooding under Current Conditions, by Sector and Source of Damage

Data from FEMA's National Risk Index (\$2022)





2.3

Insurance Industry Role

With the increased risks of climate-fueled disasters, insurance premiums are rising, and coverage has become less affordable. In recent years, insurance payments for property damage due to extreme weather have increased 5-7% every year.⁶² Reports project that direct impacts from disasters and indirect economic ripples may result in \$5.4 billion in insurance losses by 2035.⁵³

Almost two million Americans residing in places at higher risk for disasters saw their home insurance policies canceled by insurers between 2018 and 2023.⁵⁴ Insurance premiums have surged 24% between 2021 and 2024, adding an average of \$648 per year for the typical homeowner.⁵⁵

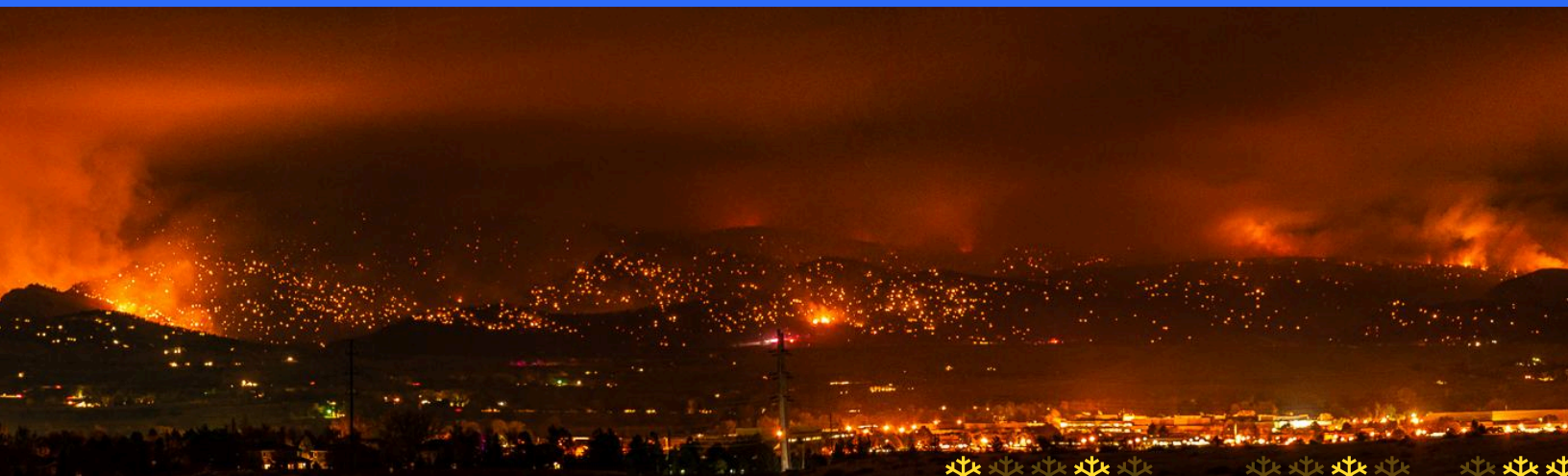
Rural communities are especially hard hit by rising insurance costs, with single-family homeowners paying \$21 billion more in 2024 than in 2021.⁵⁶ Including renters, condo and manufactured home owners, and those with alternative coverage, the total increase reaches \$27 billion.⁵⁷ Skyrocketing rates and a growing wave of insurers dropping home coverage are especially common with wind, wildfire, and flood protection, leaving millions uninsured and at risk.⁵⁸



CASE STUDY

California and the Los Angeles Wildfires

The devastation of the recent wildfires in the Los Angeles area showcases the insurance challenges that the country is facing. Recent California fire seasons have caused damages estimated at \$148.5 billion, amounting to approximately 1.5% of the state's annual GDP, a trend that is projected to continue increasing as climate change exacerbates conditions conducive to wildfires.⁵⁹ According to FEMA, California fires in 2017 and 2018 resulted in more than a 30% increase in insurance non-renewals, affecting 235,250 households.⁶⁰ Estimates of insured losses for the Los Angeles fires range from \$28 billion to \$75 billion.⁶¹ With over \$100 billion in property and capital losses and insured losses around \$45 billion, the state has had to step in to create more layered regulations to protect homeowners now and in the future.⁶² In the last three decades, the share of insured losses from wildfires has doubled in Los Angeles County.⁶³



The California fires in 2017 and 2018 resulted in more than a **30% increase in insurance non-renewals**, affecting 235,250 households.



2.4 Case Studies

The following graphs originate from FEMA's National Risk Index and the National Oceanic and Atmospheric Administration's (NOAA) Billion-Dollar Weather and Climate Disasters data, which has tracked billion-dollar disasters nationwide since 1980. It is important to note that to align with evolving priorities, statutory mandates, and staffing changes, NOAA's National Centers for Environmental Information (NCEI) will no longer be updating the Billion Dollar Weather and Climate Disasters product.⁶⁴ This source may become inactive with changing administration. The data for this report was recorded in August 2025.

These graphs display key information about the types of natural disasters and their associated costs across the United States, as well as for each of the key states this report focuses on: Alaska, Colorado, Montana, Utah, Nevada, and Maine.

All of the disasters and associated costs shown in the following graphs are likely to intensify as temperatures continue to rise. These examples of disaster spending underscore the growing financial burden of inaction on climate change.

Regarding the following graphs:

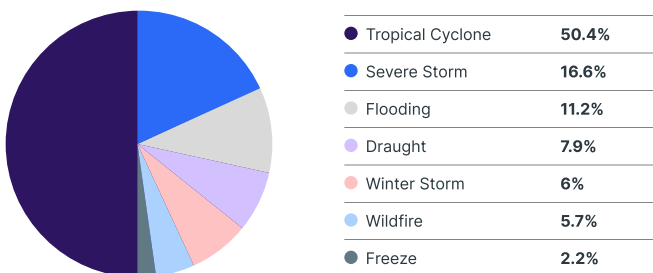
- For graphs utilizing data sourced from NOAA's Billion-Dollar Weather and Climate Disasters data, all costs are CPI-adjusted to 2018 dollars (\$2018)
- For graphs utilizing data sourced from FEMA's National Risk Index, all costs are CPI-adjusted to 2022 dollars (\$2022)
- For the graphs showing costs from 1980 to 2024, note that the 2020–2024 period represents only four years of data, while the other periods cover a full decade. As a result, most of the 2020–2024 period is already on pace to surpass those of previous decades.
- Data in the graphs uses the **average of cost estimates** when a range is present. For example, the estimated costs from Colorado droughts between 1980 and 2024 range from \$5 billion to \$10 billion; therefore, \$7.5 billion is used.

United States Natural Disaster Data

This data is sourced from 403 billion-dollar weather events in the United States from 1980 to 2024.

FIGURE 8:
Billion-Dollar Events to Affect the U.S. 1980-2024

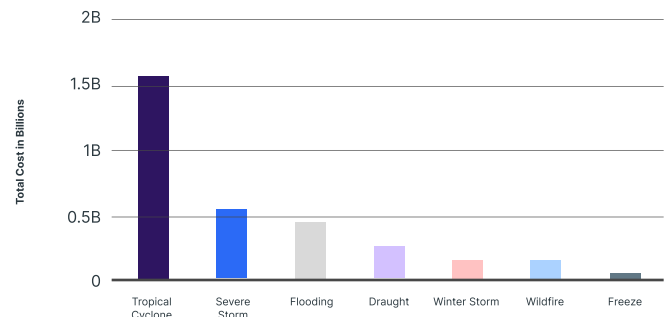
Data from NOAA's Billion-Dollar Weather and Climate Events



Over half of all storms in the U.S. cause over \$1 billion in damages. These events are classified as severe storms, a broad category that includes tornadoes, hail, high winds, and other storm types, which helps explain their disproportionate share of total events. At 2.2%, extreme freeze events account for the smallest share of billion dollar weather and climate events.⁶⁵

FIGURE 9:
Cost of Billion-Dollar Events by Disaster Type to Affect the U.S. 1980-2024

Data from NOAA's Billion-Dollar Weather and Climate Events

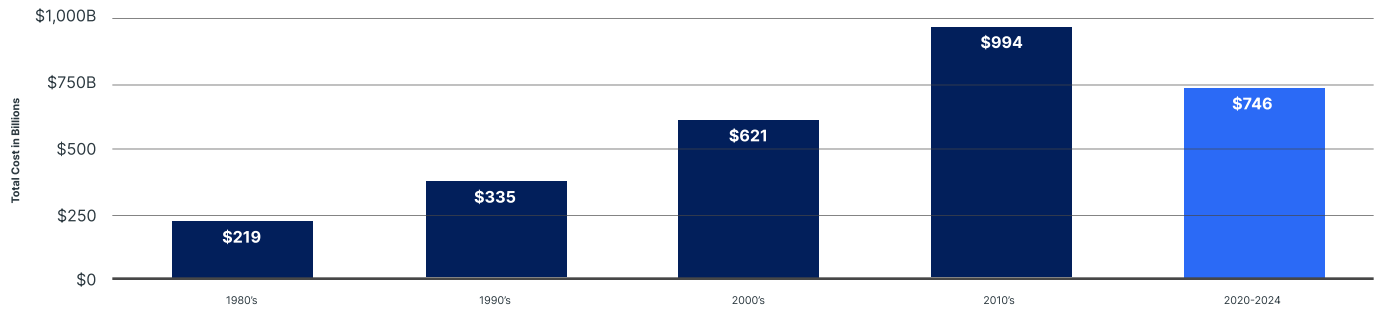


While severe storms make up the majority of billion-dollar weather events in the U.S. (Figure 8), tropical cyclones account for over half of total disaster costs. These heat-fueled storms generate some of the most destructive and expensive impacts nationwide.⁶⁶

FIGURE 10:

Cost of Billion-Dollar Events to Affect the U.S. 1980-2024

Data from NOAA's Billion-Dollar Weather and Climate Events

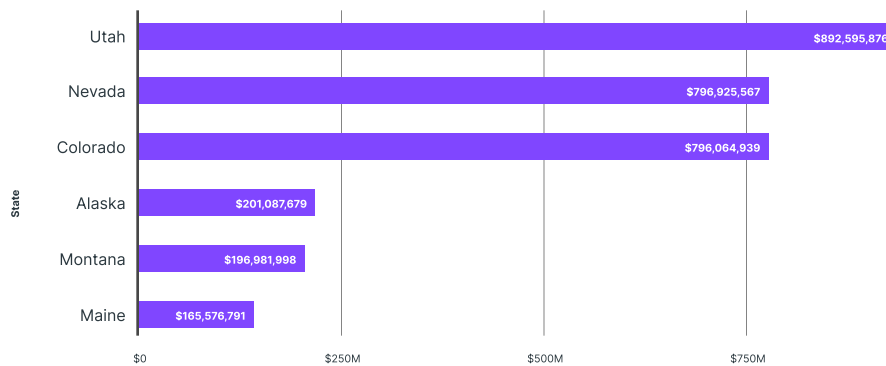


In just four years, total billion-dollar disaster costs in the U.S. for the current decade have already reached three-quarters of the total losses from the entire 2010s and are 3.4 times higher than those of the 1980s.⁶⁷

FIGURE 11:

Estimated Annual Loss

Data from NOAA's Billion-Dollar Weather and Climate Events



Expected Annual Loss (EAL) represents the average economic loss in dollars resulting from natural hazards each year. It is calculated for each hazard type and quantifies loss for relevant consequence types: buildings, people, and agriculture.

The estimated annual loss for the U.S. as a whole is \$76,718,500,084, a number that can likely rise as disasters become more destructive.⁶⁸

The estimated annual loss
for the U.S. as a whole is
\$76,718,500,084

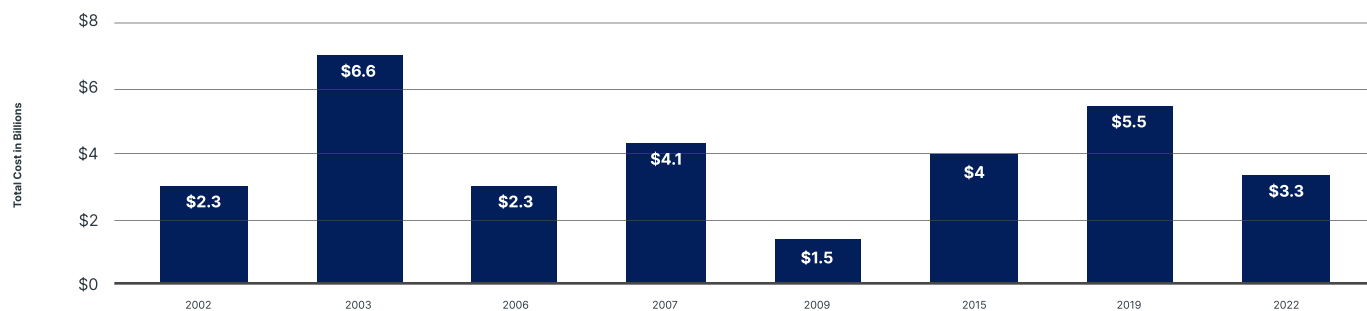


Alaska Billion-Dollar Natural Disaster Data



FIGURE 12:
Billion-Dollar Events to Affect Alaska 1980-2024

Data from NOAA's Billion-Dollar Weather and Climate Events

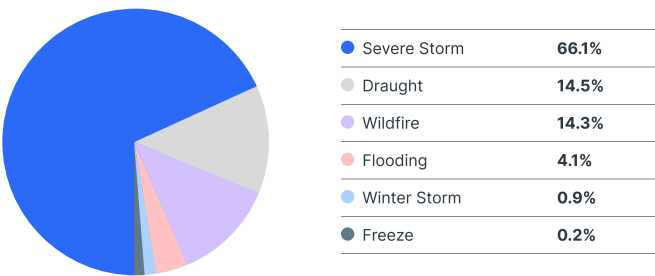


All of Alaska's billion-dollar weather events are due to wildfires, which currently cost an estimated \$2–5 billion annually. NOAA's Billion-Dollar Weather and Climate Disasters dataset includes Alaska data only for 2002–2022.⁶⁹

Colorado Billion-Dollar Natural Disaster Data

FIGURE 13:
Billion-Dollar Events by Disaster Type to Affect Colorado 1980-2024

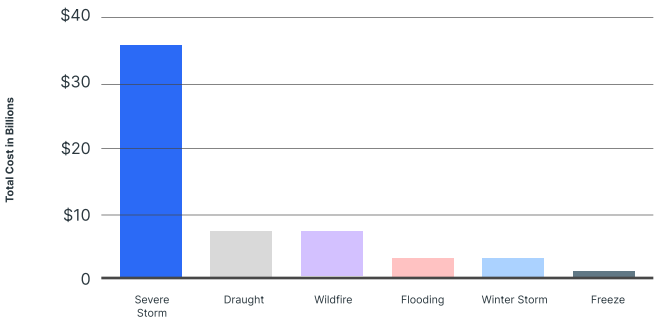
Data from NOAA's Billion-Dollar Weather and Climate Events



From 1980 to 2024, Colorado experienced 76 weather and climate disasters with losses exceeding \$1 billion each. Severe storms account for more than half of these events, followed by wildfires and droughts.⁷⁰

FIGURE 14:
Cost Breakdown of Billion-Dollar Events to Affect Colorado 1980-2024

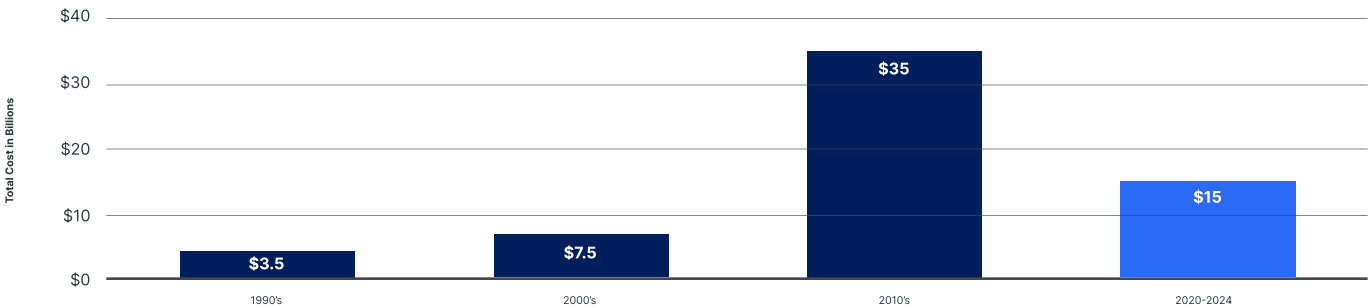
Data from NOAA's Billion-Dollar Weather and Climate Events



Colorado's natural disaster losses total between \$50 billion and \$100 billion, with severe storms responsible for over half of these costs.⁷¹

FIGURE 15:
Billion-Dollar Events to Affect Colorado 1980-2024

Data from NOAA's Billion-Dollar Weather and Climate Events



In just four years, total billion-dollar disaster costs in Colorado for the current decade have already reached 40% of the total losses from the entire 2010s and are four times higher than those of the 1980s.⁷³

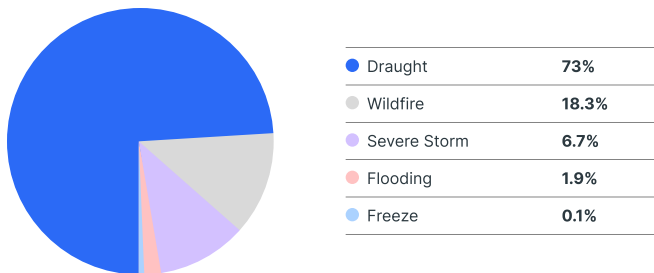


Montana Billion-Dollar Natural Disaster Data



FIGURE 16:
Billion-Dollar Events by Disaster Type to Affect Montana 1980-2024

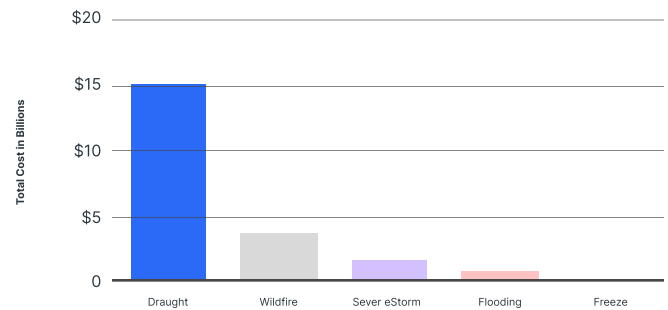
Data from NOAA's Billion-Dollar Weather and Climate Events



From 1980 to 2024, Montana experienced 37 weather and climate disasters with losses exceeding \$1 billion each. Drought events account for nearly three-quarters of these events, followed by wildfires and severe storms.⁷⁴

FIGURE 17:
Cost Breakdown of Billion-Dollar Events to Affect Montana 1980-2024

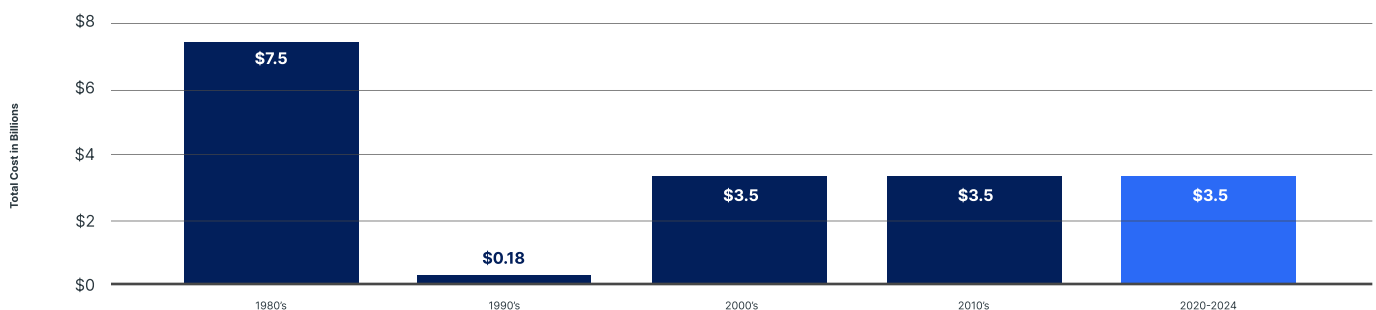
Data from NOAA's Billion-Dollar Weather and Climate Events



Montana's natural disaster losses total between \$10 billion and \$20 billion, with droughts accounting for nearly three-quarters of these costs.⁷⁵

FIGURE 18:
Billion-Dollar Events to Affect Montana 1980-2024

Data from NOAA's Billion-Dollar Weather and Climate Events

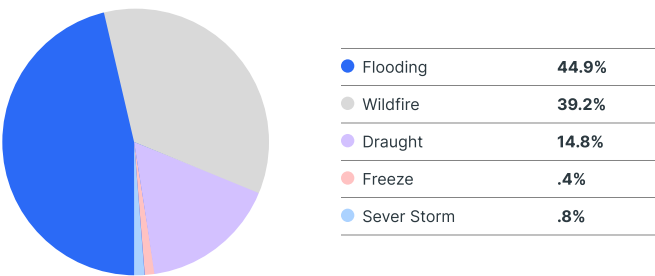


In just four years, total billion-dollar disaster costs in Montana for the current decade have already reached 100% of the total losses from the entire 2010s.⁷⁶

Utah Billion-Dollar Natural Disaster Data

FIGURE 19:
Billion-Dollar Events by Disaster Type
to Affect Utah 1980-2024

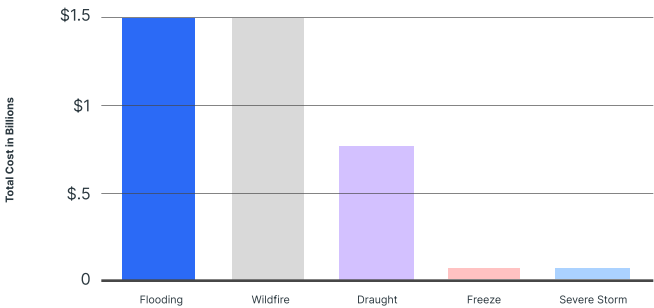
Data from NOAA's Billion-Dollar Weather and Climate Events



From 1980 to 2024, Utah experienced 25 weather and climate disasters with losses exceeding \$1 billion each. Flooding events account for nearly half of these events, followed closely by wildfires at almost 40%.⁷⁷

FIGURE 20:
Cost Breakdown of Billion-Dollar Events
to Affect Utah 1980-2024

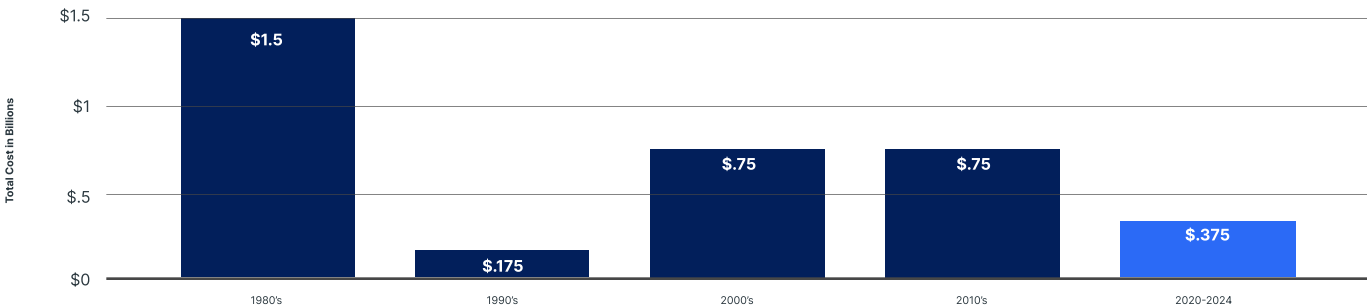
Data from NOAA's Billion-Dollar Weather and Climate Events



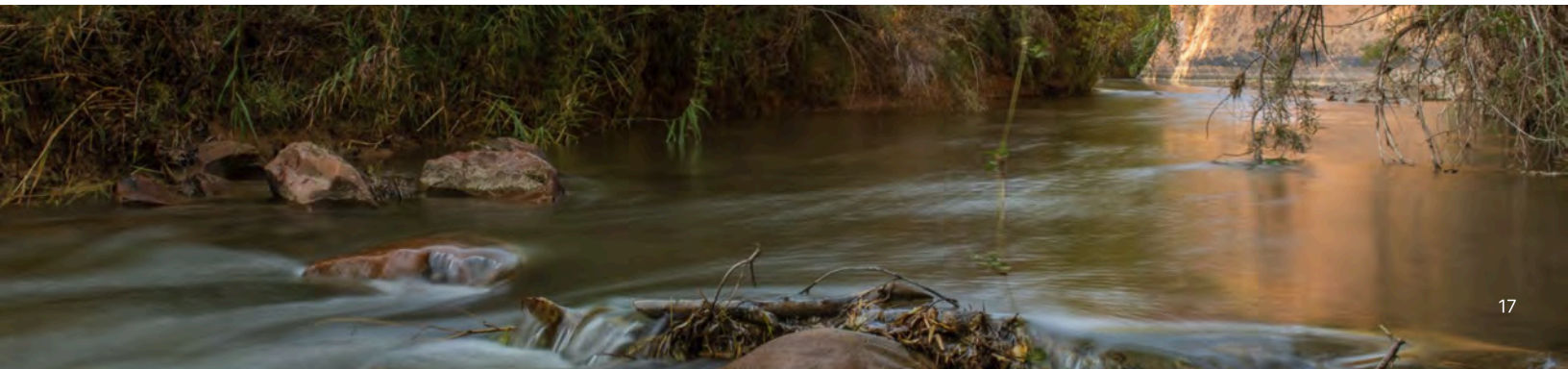
Utah's natural disaster losses total between \$2 billion and \$5 billion, with flooding and wildfires each accounting for about 40% of total costs, roughly 80% combined.⁷⁸

FIGURE 21:
Billion-Dollar Events to Affect Utah 1980-2024

Data from NOAA's Billion-Dollar Weather and Climate Events



In just four years, total billion-dollar disaster costs in Utah for the current decade have already reached 40% of the total losses from the entire 2010s.⁸⁰

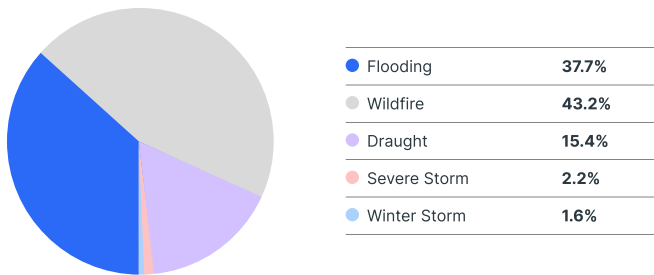


Nevada Billion-Dollar Natural Disaster Data



FIGURE 22:
Billion-Dollar Events by Disaster Type to Affect Nevada 1980-2024

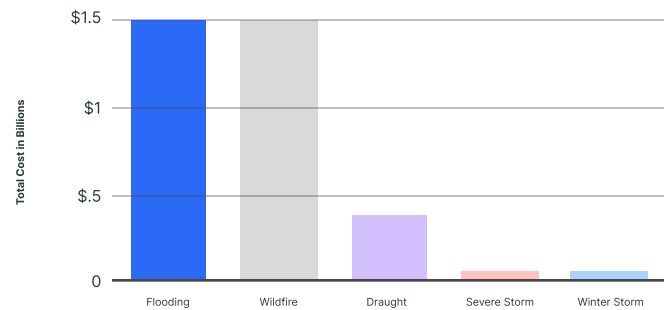
Data from NOAA's Billion-Dollar Weather and Climate Events



From 1980 to 2024, Nevada experienced 27 weather and climate disasters with losses exceeding \$1 billion each. Wildfires and flooding events combined make up over 80% of events, followed by droughts at 15%.⁸¹

FIGURE 23:
Cost Breakdown of Billion-Dollar Events to Affect Nevada 1980-2024

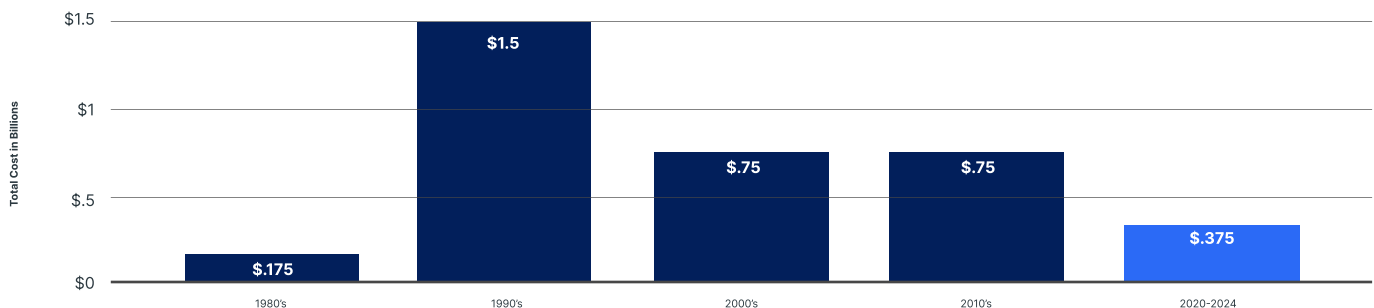
Data from NOAA's Billion-Dollar Weather and Climate Events



Nevada's natural disaster losses total between \$2 billion and \$5 billion, with flooding and wildfires each accounting for about 40% of total costs, roughly 80% combined.⁸²

FIGURE 24:
Billion-Dollar Events to Affect Nevada 1980-2024

Data from NOAA's Billion-Dollar Weather and Climate Events

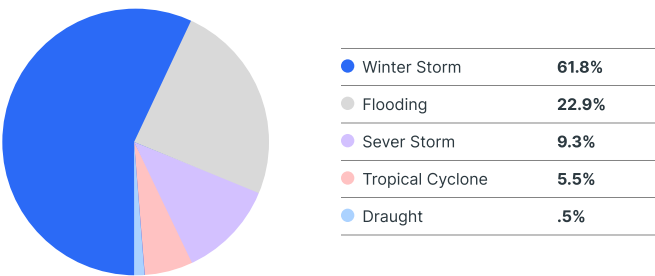


In just four years, total billion-dollar disaster costs in Nevada for the current decade have already reached half of the total losses from the entire 2010s and are 2 times higher than those of the 1980s.⁸³

Maine Billion-Dollar Natural Disaster Data

FIGURE 25:
Billion-Dollar Events by Disaster Type
to Affect Maine 1980-2024

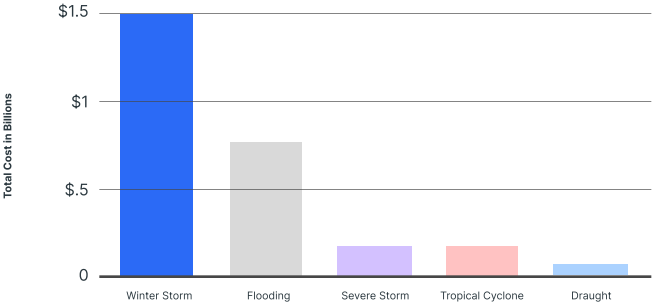
Data from NOAA's Billion-Dollar Weather and Climate Events



From 1980 to 2024, Maine experienced 19 weather and climate disasters with losses exceeding \$1 billion each. Winter storms make up over 60% of events, followed by flooding events at 22%.⁸⁵

FIGURE 26:
Cost Breakdown of Billion-Dollar Events
to Affect Maine 1980-2024

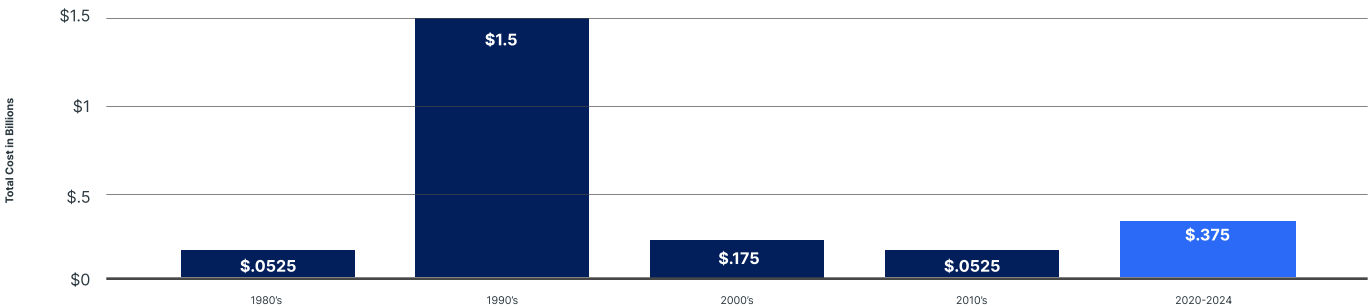
Data from NOAA's Billion-Dollar Weather and Climate Events



Maine's natural disaster losses total between \$2 billion and \$5 billion, with winter storms accounting for over 50% of total costs, and flooding events making up another 28%.⁸⁶

FIGURE 27:
Billion-Dollar Events to Affect Maine 1980-2024

Data from NOAA's Billion-Dollar Weather and Climate Events



In just four years, total billion-dollar disaster costs in Maine for the current decade are already seven times the total losses from the entire 2010s.⁸⁷





3.0

The Outdoor Recreation Economy: The Economic Asset, The Risks of Extractive Industries, and the Disproportionate Impacts of Natural Disasters

Outdoor recreation is more than hiking trails, ski slopes, and fishing spots; it is a major economic driver. The outdoor recreation economy (ORE) adds **\$1.2 trillion** to the U.S. economy each year, contributes **\$887 billion in annual consumer spending**, supports **7.6 million American jobs**, and generates **\$125 billion in federal, local, and state tax revenue**.^{88, 89} For many rural communities, outdoor recreation can serve as a tool to improve economic resilience by diversifying their streams of income and generating stable revenue.

However, the outdoor recreation sector faces growing threats. Extractive industries reduce public access and degrade the landscapes that sustain recreation, while worsening wildfires, floods, and other climate-related disasters compound these impacts. For rural communities that depend on outdoor tourism, the consequences are especially severe; damaged infrastructure and restricted access to public lands can cut off the visitors and spending that keep local economies alive.



3.1

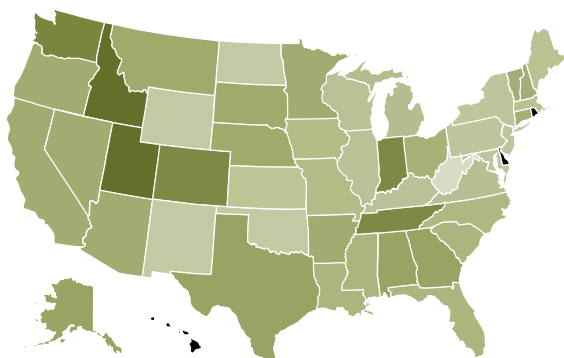
The Outdoor Recreation Economy: An Economic Engine

Outdoor recreation is a powerful economic engine driving growth across the United States. Now accounting for 2.3% of national GDP and expanding faster than the overall economy, this sector sustains jobs, supports rural communities, and strengthens local tax bases nationwide.⁹⁰

The ORE has grown 37% over the past decade, faster than the US economy as a whole, which grew by 29%.⁹¹ Today, this sector contributes more to the U.S. economy than farming (0.7%), mining (1.4% GDP), or utilities (1.5% GDP), and 49 states are experiencing a growing ORE (Figure 28).^{92, 93, 94} For small towns, nearly **\$125 billion in ORE generated tax revenue** helps fund schools, emergency services, and regional infrastructure. Access to outdoor recreation also attracts investors, businesses and workers, helping balance the booms and busts of other economic sectors.^{96, 97}

FIGURE 28:
Growth in Outdoor Recreation Economy

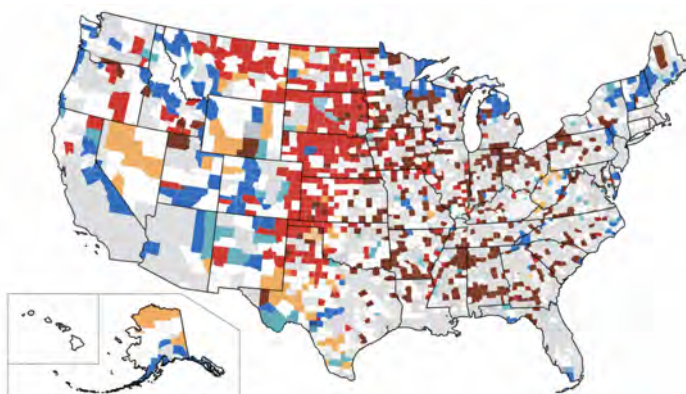
Contribution to GDP, 2012-2023



Data source: Bureau of Economic Analysis, Outdoor Recreation Satellite Account and Regional Economic Accounts.



FIGURE 29:
Nonmetropolitan County Industry Dependence

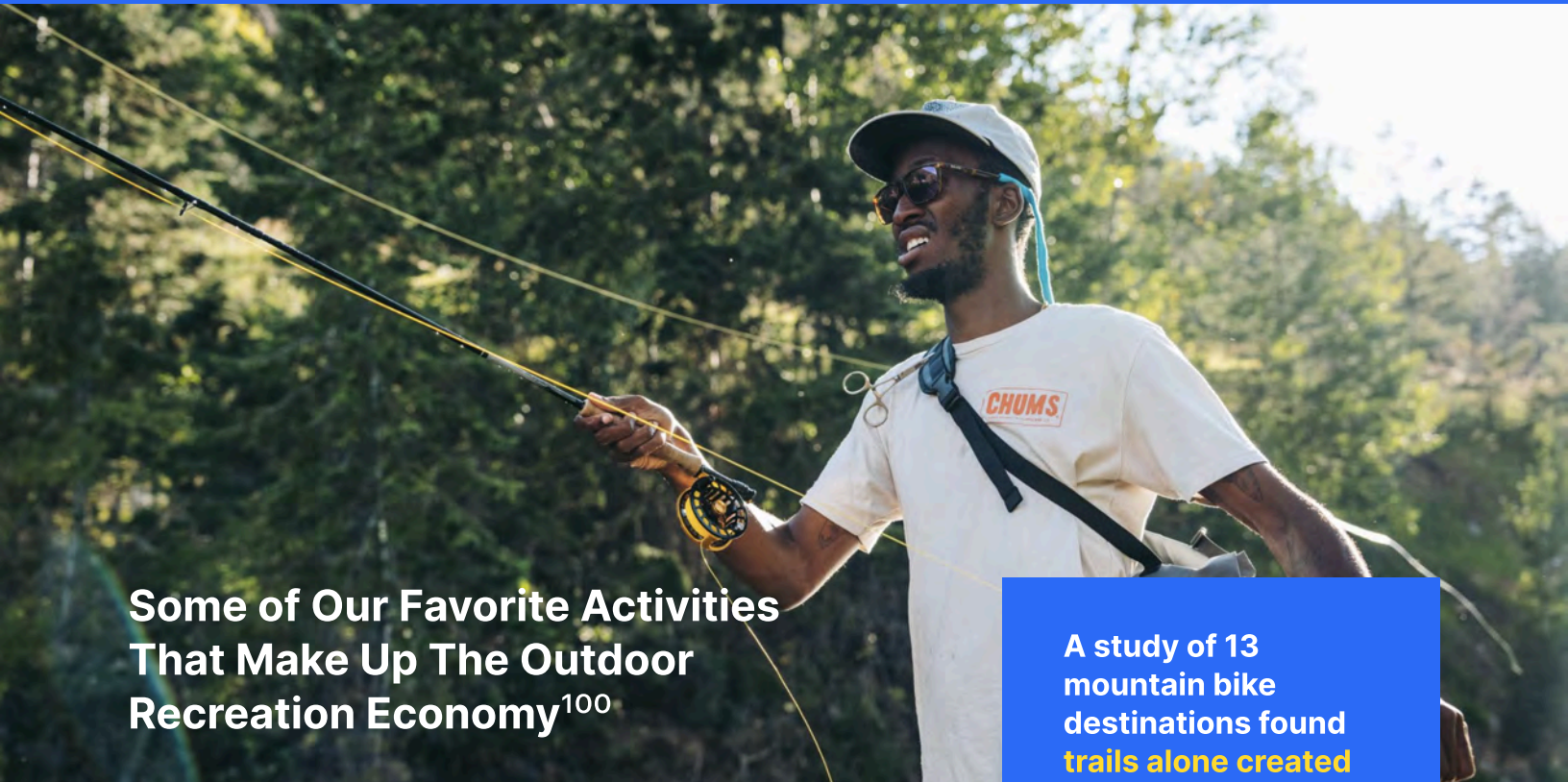


Industry Dependence of Nonmetropolitan Counties

● Farming dependent	329
● Manufacturing dependent	495
● Mining dependent	78
● Government dependent	79
● Recreation dependent	200
● Not dependent	777
● Metropolitan	

Outdoor recreation plays a vital role in strengthening rural communities by diversifying their sources of income and making them more resilient when other local industries face challenges. Recreation-related spending also provides a steady stream of revenue that helps fund essential services such as schools, infrastructure, and emergency response. Rural communities are widespread, covering roughly 72% of the United States' land area.⁹⁸ Among them, about 200 rural, nonmetro counties rely heavily on recreation-based industries (Figure 29).⁹⁹ For many of these areas, investing in outdoor recreation has become a key strategy for economic transition and long-term stability.

Hunting and fishing alone employs over 483,000 Americans - over 2x what the oil and gas industry employs.¹⁰¹

A man with a beard and sunglasses, wearing a white t-shirt with a 'CHUMS' logo and a white cap, is fly fishing in a forest. He is holding a fishing rod with a yellow line. The background is a dense green forest.

Some of Our Favorite Activities That Make Up The Outdoor Recreation Economy¹⁰⁰

CAMPING

RV campsite
Tent campsite
Rustic lodge

MOTORCYCLING

On-road
Off-road

TRAIL SPORTS

Day hiking on trail
Backpacking
Rock or ice climbing
Running 3+ miles
Horseback riding
Mountaineering

WHEEL SPORTS

Bicycling, paved road
Bicycling, off-road
Skateboarding

FISHING

Recreational fly
Recreational non-fly

OFF-ROADING

ATV
ROV
Dune buggy
4×4 and Jeep

WATER SPORTS

Kayaking
Rafting
Canoeing
Surfing
Scuba diving
Sailing
Stand-up paddling

HUNTING

Shotgun
Rifle
Bow

SNOW SPORTS

Cross-country skiing
Downhill skiing
Nordic skiing
Snowboarding
Snowmobiling
Snowshoeing
Telemark skiing

WILDLIFE VIEWING

Walking

A study of 13 mountain bike destinations found trails alone created up to 1,600 jobs and more than \$54 million in local income each year.¹⁰²

Depending on the trail, mountain bikers spent anywhere from \$100 to over \$1,000 per trip, boosting hotels, restaurants, and retail shops.¹⁰³ Additionally, bicycle tourism in Western North Carolina alone generates \$43 million each year, \$15.3 million in tax revenues, and supports 1,702 jobs.¹⁰⁴



The Power of Visitor Spending on Public Lands

Every visit to public lands fuels local economies. Visitors not only explore the outdoors but they also spend significantly in surrounding communities:

National Parks^{111, 112, 113}

- 275M visitors/year
- \$11.6B in local spending
- 205K jobs supported
- Avg. visitor: \$195.7/day
- 💡 ROI: Every \$1 invested in National Park Service (NPS) = \$10 returned

National Forests^{114, 115}

- 74M visitors/year
- \$13B in local spending
- 224K jobs supported
- Avg. visitor: \$168–\$197/day

Wildlife Refuges¹¹⁶

- 35M visitors/year
- \$1.7B to local economies
 - 27K jobs supported

Bureau of Land Management (BLM)¹¹⁷

- 80M visits/year
- Significant boost to nearby businesses

PAGE, ARIZONA

Once dependent on coal, Page is now a flourishing gateway community to outdoor recreation. For decades, the city's coal plant employed 463 full-time, high-wage workers, contributing about \$51 million a year to their economy.¹⁰⁵ When the plant shut down, Page saw their population and per capita income decrease.¹⁰⁶ However, this rural community leaned on its stunning natural surroundings and public lands and reinvented itself as a gateway to outdoor recreation.¹⁰⁷ Today, Page thrives on visitors coming to explore nearby National Parks, canyons, and Lake Powell, demonstrating how outdoor recreation can revitalize a rural economy.¹⁰⁸ The results are striking: median home prices have nearly doubled since 2018, and the city-owned Glen Canyon parking lot alone has generated nearly \$20.5 million in revenue since opening in 2019, welcoming more than 770,000 visitors last year.¹⁰⁹

Counties with 100,000 acres of protected public land have an average per capita income \$4,360 higher than those without.

FOR RURAL OUTDOOR RECREATION COMMUNITIES

National monument designations are associated with the following estimated job growth: **16% in hotels and lodging services, 24% in business services, 29% in health services, 6% in finance, insurance, and real estate services, and 17% in construction.**¹¹⁸ Additionally, national monuments are associated with the establishment of new businesses and the **staying power of existing businesses.**¹¹⁹

Cautionary Note: The ORE is not a One Size Fits All

With its potential to create jobs, attract investment, and promote conservation of natural spaces, outdoor recreation offers more than just economic development and revenue diversification, it can be a lever for community revitalization and long-term resilience. However, it is important to note that integrating the outdoor recreation economy within a community must be done thoughtfully with a holistic understanding of the assets, values, and needs of the community. A place-based approach helps preserve community integrity by ensuring that local priorities are identified through engagement, incorporated within planning and reflected in implementation (see 6.2).

MONTANA

Outdoor recreation in Montana generates \$7.1 billion in consumer spending and \$286 million in state and local taxes, drives 4.3% of Montana's gross domestic product, and supports 71,000 direct jobs across the state, or 10% of Montana's workforce.¹²⁰ With more than 80% of residents taking part in outdoor recreation, Montana's recreation industry generates \$3.61 billion in consumer spending, over half of it contributed by Montanans themselves.¹²¹

"More than 50% of outdoor recreation economy dollars are from Montana residents. It's not just about tourism. Outdoor recreation is a part of the resident economy. More than half of this money in Montana comes from residents just living our lives."

-Rachel Schmidt, Northern Rockies Dam Removal Specialist, American Rivers
(R.S. Schmidt, personal communication, July and August, 2025)

In 2024 alone, 13.7 million visitors spent \$5 billion, in which non-resident visitors generated over \$308 million in state and local taxes and reduced the average tax burden on every Montana household by \$680.¹²²

Outdoor recreation in Colorado generates \$52.1 billion in consumer spending and \$11.2 billion in local, state, and federal tax revenue, drives 12.4% of Colorado's GDP, and supports 404,000 jobs across the state, or 12% of all of Colorado's workforce.^{123, 124} In Colorado, the outdoor recreation industry employs more than six times as many people as the oil and gas industry does, or 125,244 jobs versus 19,871 jobs in 2021.¹²⁵

Take a peek at Colorado's 2.3 million acre White River National Forest. As the most heavily visited national forest in the country, White River serves 12 million recreation visits each year.¹²⁶ Eleven mountain ski resorts account for 54% of these annual visits, or 6.6 million people, while supporting 22,230 jobs and generating \$1.59 billion in annual economic impact.¹²⁷

In 2024, outdoor recreation in the Western Slope alone generated \$9.5 billion in gross domestic product value and \$2 billion in state and local tax revenue, supported 127,639 jobs, hosted 2.3 million recreation users, and is home to 241 outdoor businesses.¹²⁸

COLORADO

ALASKA

Of all 50 states, Alaska has the lowest population density, greatest acreage of wilderness areas, and highest rates of participation in many outdoor activities.¹²⁹ The outdoor recreation sector accounted for 4.6% of the state's GDP in 2023, producing \$3.1 billion in economic output.¹³⁰ Outdoor recreation employs 6% of the Alaskan workforce, accounting for 21,242 jobs in boating, fishing, snow activities, hunting, and camping, to name a few.¹³¹ In 2023, employment in Alaska's outdoor recreation industry grew at a rate of 7.5% - more than twice the national average for the sector.¹³²

Six in ten Alaskans value outdoor recreation, with half citing fishing and hunting as key reasons for living in the state.¹³³ Similarly, Alaska's outdoor recreation opportunities draw visitors and essential visitor spending directly into their rural and recreation-dependent communities.

Tongass National Forest and the ORE

At approximately 17 million acres, the Tongass National Forest is the largest forest in the United States and a cornerstone of Alaska's economy.¹³⁴ This National Forest generates over \$5 billion in annual economic output, with tourism and salmon fishing alone contributing more than \$500 million each year and supporting over 12,000 jobs.^{135, 136} Home to 32 communities and 70,000 residents, the Tongass region is defined by its primary industries: commercial fishing, tourism, and recreation jobs which are among the fastest growing job sectors in Southeast Alaska.¹³⁷ Each of these industries contributes about \$1 billion annually to Southeast Alaska's economy.¹³⁸ While the Tongass is a critical economic driver for Alaska, it also serves as one of the most powerful natural carbon sinks on the planet. With 19 designated wilderness areas, the Tongass stores over 1.5 billion metric tons of CO2 equivalent and sequesters an additional ten million metric tons each year.¹³⁹

3.2

The Oil, Gas and Coal Industries: Harms, Current Standing, and Associated Impacts on Outdoor Recreation, Public Health, and Economic Vitality

The oil and gas industry's contribution to the burning of fossil fuels is the primary driver of climate change and the subsequent worsening of climate-fueled natural disasters.¹⁴⁰ Thus, these industries are responsible for the negative consequences of burning fossil fuels, including public health, environmental, pollution, and outdoor recreation impacts.

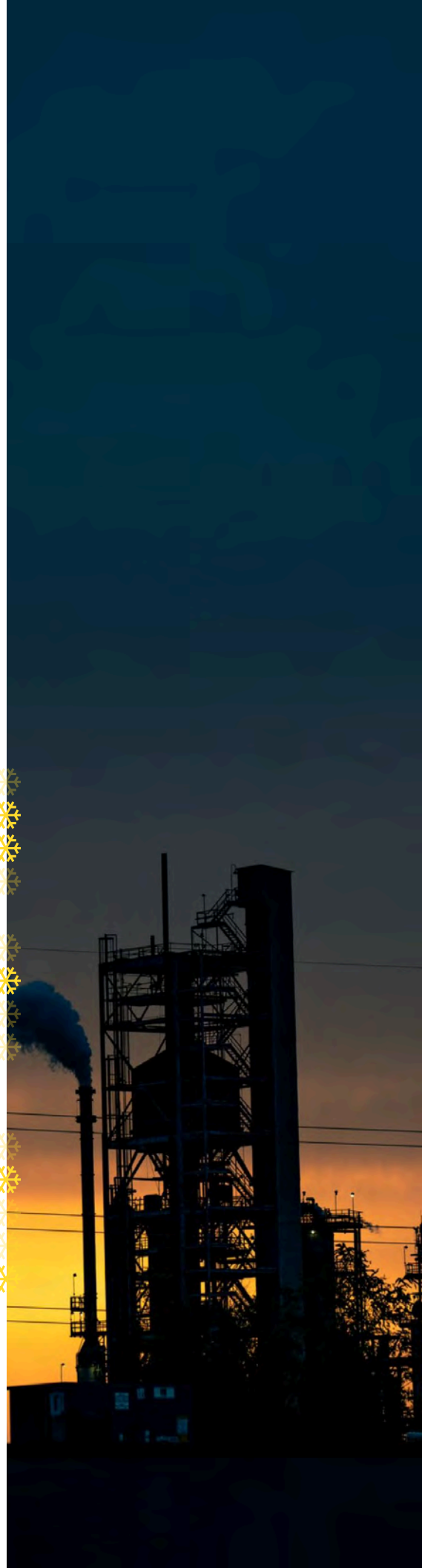
Adverse environmental impacts of fossil fuel burning include, but are not limited to, air pollution (hazardous pollutants like sulfur dioxide, nitrogen oxides, particulate matter, carbon monoxide, and mercury, and increased acid rain and eutrophication) and water pollution (hazardous pollutants like arsenic, lead, chlorine, and mercury in groundwater and drinking water supplies).^{142, 143} These cause public health implications like asthma, multiple forms of cancer, heart disease, and hundreds of thousands of premature deaths related to fossil fuel production, to name a few.¹⁴⁴ Days with higher air and water pollution could deter participation in outdoor recreation and in turn, the spending dollars the industry brings in.¹⁴⁵ Additional consequences to the outdoor industry include noise pollution, compromised views, reduced access, habitat destruction, impacts to wildlife, and broad degradation of economic opportunity (D.O. Osleger, personal communication, July and August, 2025).

Looking at these impacts and their effect on outdoor recreation, **97% of National Parks in the U.S. suffer from degraded air quality, and approximately half of the parks are at high risk from at least one or more high-impact climate change threats like extreme heat and particulate matter exposure.**¹⁴⁶ Issues such as extreme heat and air pollution affect National Parks as well as local and city park systems and outdoor recreation in general, further limiting outdoor access, visitation, and visitor spending in gateway communities.¹⁴⁷

Recent policy shifts that favor fossil fuel expansion and weaken clean energy efforts are putting public lands and vulnerable communities at greater risk from the escalating impacts of climate change. These include the rescission of Resource Management Plans (RMPs) in states like Alaska, North Dakota, and Montana, as well as the recent opening of the Alaskan wilderness to the potential of oil and gas leasing. In the west, over 81% of Bureau of Land Management-administered lands are now vulnerable to potential oil and gas leasing as of 2025.¹⁴⁸ In addition to the climate impacts resulting from oil, gas, and coal, these policy shifts also have a direct economic impact on outdoor recreation-dependent rural communities. With 57 million visitors per year, BLM lands are crucial to outdoor recreation and the rural communities dependent on the tangential spending.¹⁴⁹

These policies promote fossil fuel dependency and weaken climate resilience. In response, states and localities harmed by fossil fuel extraction and emissions are seeking compensation from the industry for damage to air, land, and water. As of 2022, 27 states, counties, and cities have sued fossil fuel companies for climate-related fraud or damages.¹⁵⁰ In 2018, Boulder and San Miguel Counties in Colorado became early leaders in holding the oil and gas industry accountable, suing ExxonMobil and Suncor Energy for climate-related damages and adaptation costs.¹⁵¹ They initially estimated over \$100 million in damages by 2050, calling the companies' actions "intentional, reckless, and negligent."¹⁵² Since then, projected costs have risen to billions due to heat waves, wildfires, droughts, heavy rains, and floods.¹⁵³

Lawsuits against fossil fuel companies can help communities seek compensation, but they often take decades with no guaranteed resolution. In order to protect these public lands and the rural communities that depend on outdoor recreation and healthy ecosystems to sustain their economies from financial strain, damaged infrastructure, and environmental degradation, the U.S. must reduce fossil fuel dependence and invest in resilient clean energy infrastructure.





Spotlight:

THE IMPACTS OF ARCTIC DRILLING IN ALASKA

The future of Alaska's outdoor recreation economy is increasingly uncertain due to the overlapping pressures of climate change and expansion of oil and gas leasing. In 2024, the BLM restricted drilling in Alaskan wilderness by requiring oil producers to prove minimal environmental impact, reducing interest from developers.^{154, 155} However, recent federal rollbacks of these protections have opened 13 million acres of the National Petroleum Reserve, creating uncertainty for outdoor recreation and local communities.¹⁵⁶

On October 23, 2025, the United States Department of the Interior announced they were opening 1.56 million acres of the Coastal Plain of the Arctic Refuge for oil and gas leasing.¹⁵⁷ Through issuing a new Record of Decision (ROD), the DOI can avoid the required National Environmental Policy Act (NEPA) review or Supplemental Environmental Impact Statement (EIS) usually required for actions like these.

These lands are one of the most powerful natural carbon sinks on the planet. Arctic drilling would worsen climate impacts that directly threaten snowpack, untouched ecosystems, outdoor recreation access, and accelerate Arctic warming, which is already four times faster than the global average.¹⁵⁸ It would also endanger Indigenous sovereignty and cultural preservation of many Native Alaskan tribes. Due to the remote coastal geography, harsh winters, the environmental requirement to maintain the permafrost layer, and the logistics required to develop here, Arctic drilling can cost more than drilling in the lower-48.¹⁵⁹

Previous efforts to drill here along with projected profit estimates show that gas and oil development in the Arctic Refuge is not economically sound. According to an in-depth analysis of Arctic drilling, projections of future federal revenues from Arctic Refuge lease sales estimate between \$3 million and \$30 million. Furthermore, the highest projected revenue in an unlikely scenario represents less than 0.001% of an offset to the \$4.5 trillion in proposed tax cuts from the budget reconciliation package.¹⁶⁰ In January 2021, lease sales authorized by the Tax Cuts and Jobs Act (TCJA) created only \$16.5 million in revenue and subsequent withdrawals and lease cancellations lead to taxpayers essentially receiving no new dollars from the sale. A second lease in January of 2025 received zero industry bids, but were originally projected to create \$1 billion in federal revenue.¹⁶¹

When it comes to job creation, in 2017, oil and gas jobs accounted for 4% of Alaska's employment rate, compared to only 2.5% in 2025.^{162, 163} When looking at employment of Arctic drilling of oil and gas compared to renewable energy, recent data shows that the number of renewable energy and energy efficiency jobs exceeds those employed by oil and gas. Today, the number of Alaskans employed in renewable energy is 5,000 people, energy efficiency is 4,400, and oil and gas is 7,400.¹⁶⁴ The expansion of extractive industries in the Arctic Refuge will pose a severe detriment to Alaska's \$3.1 billion ORE by threatening its primary industries: commercial fishing, tourism and recreation.^{165, 166}



3.3

Disproportionate Impacts of Natural Disasters on Rural Communities That Rely on Outdoor Recreation

Outdoor recreation is a vital economic driver for many rural communities, yet this asset is increasingly vulnerable to climate-related disasters. Nearly half of recreation-dependent communities face high risks of wildfires and floods (Figure 30).¹⁶⁷ When disasters close trails, parks, and other outdoor areas, local businesses and communities lose critical visitor spending.

Because rural recreation economies are closely tied to natural assets, like forests, rivers, lakes, and coastlines, they experience severe short-and long-term consequences when disasters strike. Immediate impacts include infrastructure damage, power disruptions, and environmental degradation, while longer-term effects include business closures, lost tourism revenue, and costly rebuilding efforts.

These challenges are compounded by limited local tax bases, slower disaster response and power restoration, higher energy costs, and less resilient housing.¹⁶⁸ Furthermore, in rural tourism economies, lost visitor spending hits much harder than in diversified regions, making climate disasters especially destructive.¹⁶⁹

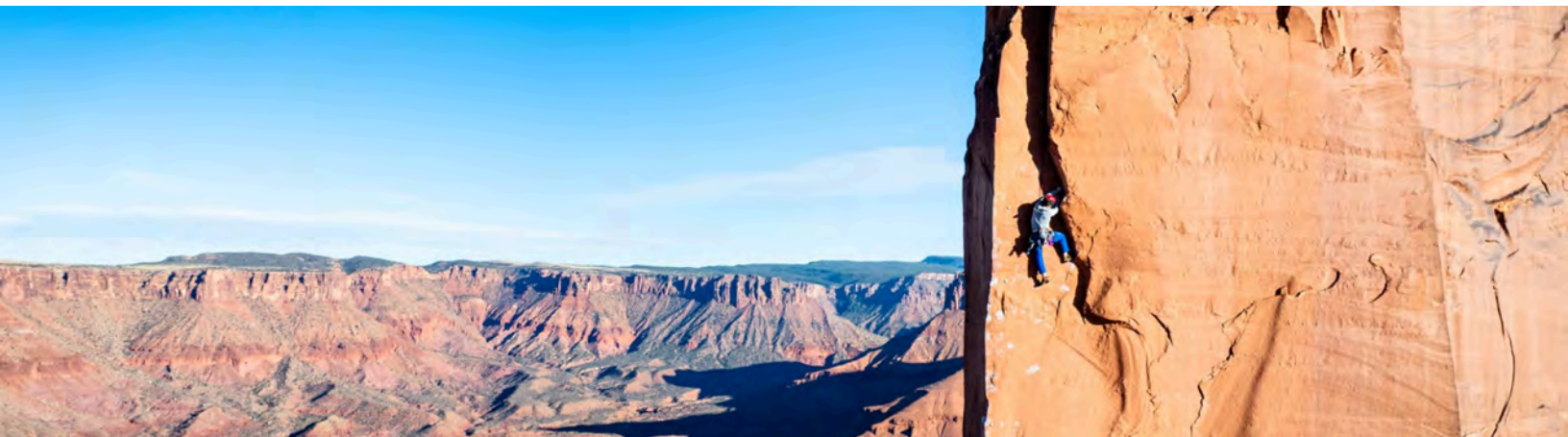
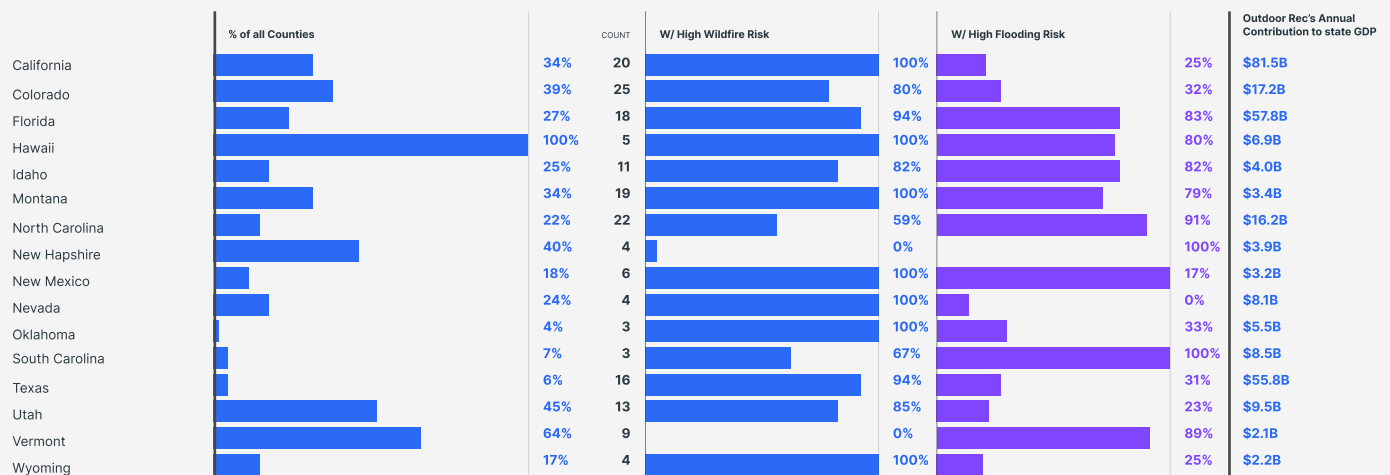


FIGURE 30:
Outdoor Recreation Economies Most Threatened by Natural Hazards



Data sources: USDA Economic Research Service, County Typology Codes; USDA Forest Service, Wildfire Risk to Communities; First Street Foundation, Risk Factor; Headwaters Economics, Rural Capacity Index; Bureau of Economic Analysis, Outdoor Recreation Satellite Account.

45% of recreation-dependent counties face high or very high wildfire risk and 46% face high or very high flood risk, compared to 28% and 27% of non-recreation-dependent counties, respectively. This underscores how climate change threatens not just natural landscapes, but the economic stability of communities built around them.

MONTANA

Of the 19 at-risk counties (34% of all their counties), **100% have high wildfire risk** and 79% have high flooding risk; ORE contributes \$3.4 billion to the state's GDP¹⁷⁰

UTAH

Of the 13 at-risk counties (45% of all their counties), **85% have high wildfire risk** and 23% have high flooding risk; ORE contributes \$9.5 billion to the state's GDP¹⁷¹



NEVADA

Of the 4 at-risk counties (24% of all their counties), **100% have high wildfire risk** and 0% have high flooding risk; ORE contributes \$8.1 billion to the state's GDP¹⁷²

COLORADO

Of the 25 at-risk counties (39% of all their counties), **80% have high wildfire risk** and 32% have high flooding risk; ORE contributes \$17.2 billion to the state's GDP¹⁷³



3.4

Case Studies:

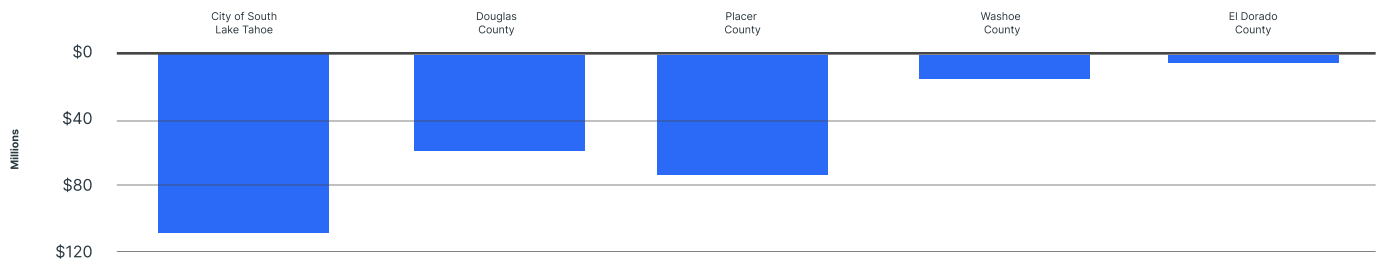
When Natural Disasters Impact Outdoor Recreation in Rural Communities

The 2021 Caldor Fire devastated the rural economies of Nevada's Lake Tahoe gateway communities, where recreation and adjacent hospitality businesses dominate local revenue streams – the entire Lake Tahoe basin's annual economy is estimated at \$5 billion, with visitor services making up almost 62%, or nearly \$3.1 billion.¹⁷⁶ Nevada's stateline casinos, which rely heavily on visitors from Northern California drawn to Tahoe's natural beauty, saw casino **gaming revenues plummet 69%** in September 2021 to just \$5.6 million, the lowest in modern history outside of pandemic closures, while retail and hospitality losses in the South Shore area totaled over \$40 million in a four-week period.^{177, 178} Because these casinos pay property taxes on revenue, these losses were further passed along to the state of Nevada.¹⁷⁹ Additionally, the fire and smoke led to widespread cancellations of hotel bookings, weddings, and outdoor recreation, resulting in an estimated **\$268 million loss in direct visitor spending** (Figure 31).¹⁸⁰ The widespread Caldor Fire resulted in hundreds of job losses, millions in lost wages, and reduced local tax receipts, emphasizing how wildfires can threaten rural economies heavily dependent on tourism and recreation.¹⁸¹



FIGURE 31:

Visitor Spending Losses by Location



“We are a state that heavily depends on the recreation and tourism economy. **It's 98% of the economic value** in the state. Tourists didn't want to come to Tahoe when there's smoke sitting in the basin, and it was hugely impactful for us. Those things really shift our economy.”

—KACEY KC, NEVADA STATE FORESTER & FIREWARDEN, NEVADA DIVISION OF FORESTRY (K.K. KC, PERSONAL COMMUNICATION, JULY AND AUGUST, 2025)

MAINE 2024 ACADIA NATIONAL PARK WINTER STORM

In January 2024, the midcoast of Maine saw two sets of back-to-back winter storms that destroyed local infrastructure and compromised visitor use and spending at Acadia National Park and surrounding communities. This disaster was especially hurtful given Acadia's major reliance on outdoor recreation. In 2023, the park saw 3.88 million visitors to the National Park with \$475 million spent in communities near Acadia. In turn, those dollars supported 6,600 jobs in the Bar Harbor region and had a cumulative impact of \$685 million to the local economy.¹⁸²

Rebuilding from the storms means something different with these impending climate impacts – and the estimated cost of repairs far exceeds the park's annual \$10 million budget.¹⁸³ In less populated states like Maine, storms like this one show just how devastating impacts can be not only on infrastructure, but the local economies that depend on tourism to places like Acadia for their livelihoods and well-being.



WYOMING 2022 YELLOWSTONE FLOODING

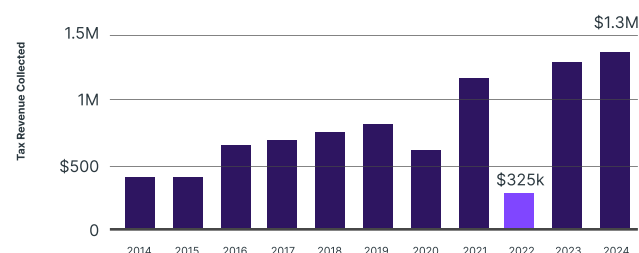
Yellowstone National Park sustains over four million visitors annually, generating 8,736 jobs and \$834 million of benefits to the surrounding region's economy.¹⁸⁴ In June 2022, a severe flooding event forced Yellowstone National Park to close all five entrances for over a week during peak tourist season, leading to a 1.5 million drop in visitation.¹⁸⁵ This generated a total loss of \$156 million in visitor spending in gateway areas and economic output losses totaled \$193 million, all of which exceed the losses from the 2020 COVID-19 pandemic.¹⁸⁶

Gardiner, the northern gateway, and Cooke City, the northeastern gateway, reported average revenue losses of 75% during the summer months.¹⁸⁷ Gardiner's revenue stream via their bed tax declined by over 70% in 2022 (Figure 32).¹⁸⁸ Overall, revenue losses across all gateway towns averaged nearly 50%, with businesses citing decreased visitation and negative media coverage as more damaging than physical infrastructure losses.¹⁸⁹ Though visitation rebounded in 2023, the flood highlighted the economic vulnerability of outdoor recreation communities to climate-driven natural disasters.

\$193 million in lost output

FIGURE 32:
Resort Tax Revenue Collected in Gardiner, MT Per Year

Adapted from gardinerresorttax.com



2020 EAST TROUBLESOME AND CAMERON PEAK WILDFIRES



In 2020, Rocky Mountain National Park, Arapaho and Roosevelt National Forests, as well the surrounding area, saw the first full park closure in its history. **The Cameron Peak fire burned 208,913 acres and the East Troublesome fire burned 193,812 acres, resulting in over \$200 million of state spending on fire fighting alone in 2020.**¹⁹⁰

The East Troublesome fire's combination of high winds, dry foliage, and beetle-killed and downed pine trees led to unprecedented fire behavior and spread.¹⁹¹ Nearby communities ordered over 35,000 people to evacuate and over 7,000 structures were at risk.¹⁹² Luckily, a winter storm in late October reduced the fire spread on both sides of the Continental Divide.¹⁹³ At the time, it was the most expensive fire in Colorado's history – with approximately \$543 million in insured losses and 580 demolished structures.¹⁹⁴

The fire also caused infrastructure damages and subsequent mudslides resulting in extensive road closures, as well as a compromised water supply for almost half a million people.¹⁹⁵ Watershed restoration alone for both the East Troublesome and Cameron Peak fires was estimated to be as high as \$136 million.¹⁹⁶

The resulting impact on the nature and tourism recreation industries was equally devastating. Rocky Mountain National Park sees an average of 4.5 million visitors annually – these visitors contribute around \$306 million a year in gateway communities, and support over 4,300 jobs with a total economic contribution of \$464 million yearly for the region.¹⁹⁷ Another source reports that Grand County, which saw the most damages from the East Troublesome fire, attracted more than two million visitors and generated \$590 million in local spending in 2019 alone with 80% of jobs in the county completely reliant on the tourism sector.¹⁹⁸



One of the most destructive fires on the Western Slope of Colorado was the 416 Fire in 2018 in the Durango area. Encompassing the San Juan National Forest, this fire burned around 54,000 acres.¹⁹⁹ Local tourism economies were hard-hit, with outfitters in the fishing, rafting, and railroad industries forced to close for weeks. Both REI and the Durango Herald reported that the almost month-long closure totaled \$33 million in losses to tourism income in Durango and Silverton.^{200, 201}

The fire was ignited by embers from a coal-burning steam locomotive operated by the Durango and Silverton Narrow Gauge Railroad, and the subsequent litigation saw the United States and the railroad companies reaching a settlement of \$15 million within 45 days and additional \$5 million plus interest over a ten-year period.²⁰² Located on federal lands, the 416 fire also closed down BLM lands in southwestern Colorado, causing even more economic and ecological impact to surrounding areas and outdoor recreators.²⁰³

COLORADO - SAN JUAN NATIONAL FOREST

416 FIRE 2018



The Grizzly Creek Fire, located in the highly visited Glenwood Canyon region in the western part of the state of Colorado burned over 32,000 acres around Interstate 70 between Glenwood Springs and Gypsum in August 2020.²⁰⁴ Primarily occurring in the White River National Forest area, which is one of the most visited National Forests in the country, the fire cut off access to local communities and businesses, rafting companies, and all recreation.²⁰⁵

This area specifically has very limited alternative route options and the transportation issues were extended into the next year as monsoon rains led to multiple mudslides and debris flows on the state's most important corridor for outdoor recreation.²⁰⁶ Occurring amid the COVID-19 pandemic, the disaster's impacts on local economies were severe – affecting local and regional supply chains and the businesses that rely on them. Estimated losses for restaurants sales were around 25%, lodging revenue was almost cut in half, and sales tax revenues were almost 20% decreased during the fire event.²⁰⁷ Recreation outfitters were also impacted, with one rafting outfitter reporting over \$200,000 in losses.²⁰⁸

Furthermore, the Department of Transportation approximated initial repair cost at \$116 million, without accounting for interstate repairs and removal of debris. Natural resources were also affected, including one of the most popular hiking trails in the state – Hanging Lake.²⁰⁹ The trail was closed for eight months, resulting in the loss of thousands of visitors and the endless economic benefits they bring to nearby towns.²¹⁰



DENALI NATIONAL PARK, ALASKA

2021 & 2022 FLOODING & PERMAFROST THAW

\$100 million in construction

Home to Mt. Denali, the tallest peak in North America, Wonder Lake, and six million acres of wilderness land, Denali National Park is one of Alaska's top tourist destinations.^{211, 212} With 23 National Parks, Alaska ranks fourth among U.S. states in economic benefits from National Parks, including visitor spending, job creation, labor income, and overall economic output.²¹³ **In 2022, Denali welcomed 427,562 visitors, producing \$475 million in visitor spending, supporting 6,640 jobs, and generating \$714 million in economic output.**²¹⁴

For decades, visitors have accessed the park via shuttle buses along its single 92-mile road. At mile marker 43, Pretty Rocks Landslide has been slowly degrading and threatening this critical piece of road infrastructure since the 1960s.²¹⁵ In 2021 and 2022 extreme flooding and thawing permafrost destroyed this access road at mile marker 43 altogether which forced closure of Denali National Park past Pretty Rocks Landslide, which remains closed today with reopening planned for 2026.²¹⁶

Climate data from 1950 to 2010 show Denali National Park has experienced the highest temperature increase of any National Park.²¹⁷ Combined with heavy rainfall and permafrost thaw, this has worsened landslides, making short-term road repairs insufficient to restore access past Pretty Rocks Landslide.²¹⁸ As the landslide accelerates, the road has shifted 72 feet from its original position. The park is addressing this with retaining walls and a 475-foot steel truss bridge, a three-summer project costing over \$100 million.²¹⁹ According to Brooke Merrell, the Denali National Park's superintendent, "the Pretty Rocks Landslide is a really dramatic and highly visible example of the connection between climate change and the new geologic equilibrium we're trying to maintain the road with. The effects of warmer temperatures and thawing permafrost in Denali are a signal for wider changes to come, and we're kind of a window into the future for the rest of the country."²²⁰



Bryce Canyon National Park, located in southern Utah, attracts over two million visitors annually, supporting more than 3,000 local jobs and generating over \$256 million in economic output to nearby communities, particularly Garfield and Kane counties.^{221, 222}

Increasing wildfire activity near Bryce Canyon, driven by climate change, prolonged drought, and higher temperatures, has disrupted the park's operations and its surrounding recreation-based economy.^{223, 224} During wildfire events, Bryce Canyon experiences the highest visitation losses among Utah's five National Parks. Since visitors spend more in this park, it accounts for \$1.64 million – or 56% – of all wildfire-related tourism losses across Utah parks.²²⁵

Wildfires in 2020 and 2022, including the Left Fork and Pine Hollow Fires led to trail and road closures, recreation area evacuations, and heavy smoke, indirectly impacting Bryce Canyon by reducing visitation and revenue in gateway communities.^{226, 227} These wildfires severely impacted local businesses, lodging, food services, and the tourism-based economies of Garfield and Kane counties – where tourism accounts for 50% and 40% of jobs, respectively – resulting in **\$1.4 million in lost visitor spending** to the communities.²²⁸



BRYCE CANYON NATIONAL PARK, UTAH

LEFT FORK FIRE & PINE HOLLOW FIRE 2020 & 2022

\$1.4 million in lost value-added



NORTH CAROLINA

HURRICANE HELENE 2024

\$584 million in tourism losses

Bringing in 16.7 million visitors in 2023 – more than the Grand Canyon, Yellowstone, and Yosemite combined – the Blue Ridge Parkway is the **most visited unit** in our National Park System, generating **\$1.4 billion** in visitor spending and **\$197.5 million** in country-level tax revenue.^{229, 230, 231} In September 2025, Hurricane Helene swept through Western North Carolina, causing severe damage across extensive public lands and waterways, including the Blue Ridge region, encompassing Pisgah National Forest and significant stretches of the Appalachian National Scenic Trail.²³² With **\$59.6 billion** in damage recovery needs, Pisgah National Forest saw impacts to over 190,000 acres, 50% of roads and 882 miles of trails, and many Blue Ridge Parkway trails and roads are closed for the foreseeable future due to extensive reconstruction.^{233, 234, 235}

In wider Western North Carolina, Hurricane Helene forced closure of key trails, campgrounds, and outfitters across Western North Carolina for weeks, threatening their \$4.9 billion outdoor recreation industry.²³⁸ Asheville, a popular tourist destination, heavily relies on seasonal tourism, particularly in the fall, when visitors flock to the mountains for all things outdoor recreation, especially leaf-peeping. Following the hurricane, Asheville reported **\$584 million in lost tourism revenues**, reflecting a 70% decline in fourth-quarter spending.²³⁹

The closure of Chestnut Mountain Nature Park in Haywood County after Hurricane Helene highlights how natural disasters disrupt outdoor recreation and local economies. Since opening in 2022, the 450-acre park has drawn over 13,000 mountain bikers annually, generating \$1.93 million in environmental value.²⁴⁰ During the ten-month closure following Hurricane Helene, Haywood County lost an estimated **\$1.3 million** in economic benefits from the park alone.²⁴¹



Investing in Resilience:

Clean Energy, Microgrids, Rural Communities, and the Economics of Disaster Prevention

In response to rising costs from more extreme and frequent climate-fueled disasters, this report offers clean energy as a solution and tool for resiliency that can protect rural communities and safeguard the outdoor recreation economy. Clean energy investment and development is rapidly expanding, playing critical, multifaceted roles in addressing the escalating impacts of climate change. Simultaneously tackling the root cause - greenhouse gas emissions driving the increasing frequency and severity of natural disasters - and delivering broad environmental and economic benefits, clean energy delivers economic growth, stable and affordable power, 3.5 million U.S. jobs, and as much as \$77 billion in annual health cost savings by mitigating the impacts of fossil fuel pollution.^{242, 243}

When paired with innovative technologies like microgrids, clean energy strengthens the resilience of rural communities by diversifying power sources, ensuring reliable access to electricity and essential services during disasters, and supporting faster recovery to reduce economic losses. While the advantages of clean energy and microgrid development, specifically solar microgrids, extend well beyond disaster resilience, realizing their full potential will require targeted investment, supportive government policies, and place-based implementation strategies tailored to local needs.

4.1



Introduction to Clean Energy

Clean energy refers to energy sources that produce no climate-warming greenhouse gas emissions during operation.²⁴⁴ Systems like hydropower, geothermal, solar, wind, nuclear, and bioenergy are considered renewable because wind, sun, and heat from the earth generate indefinitely.²⁴⁵ It's important to note that this report focuses specifically on solar, wind, and geothermal power because they are more accessible for rural communities and align with POW's campaign efforts. As a result, the findings in this report may help organizations better understand and incorporate these technologies into their own work.²⁴⁶

While there is no one-size-fits-all solution to meeting the energy demands of the future, it is clear that the United States needs greater capacity in energy production, transmission, and storage - and clean energy offers the most economically, socially, and environmentally resilient path forward.





4.1.1

Overarching Need for More Energy Production - Clean Energy is Ready

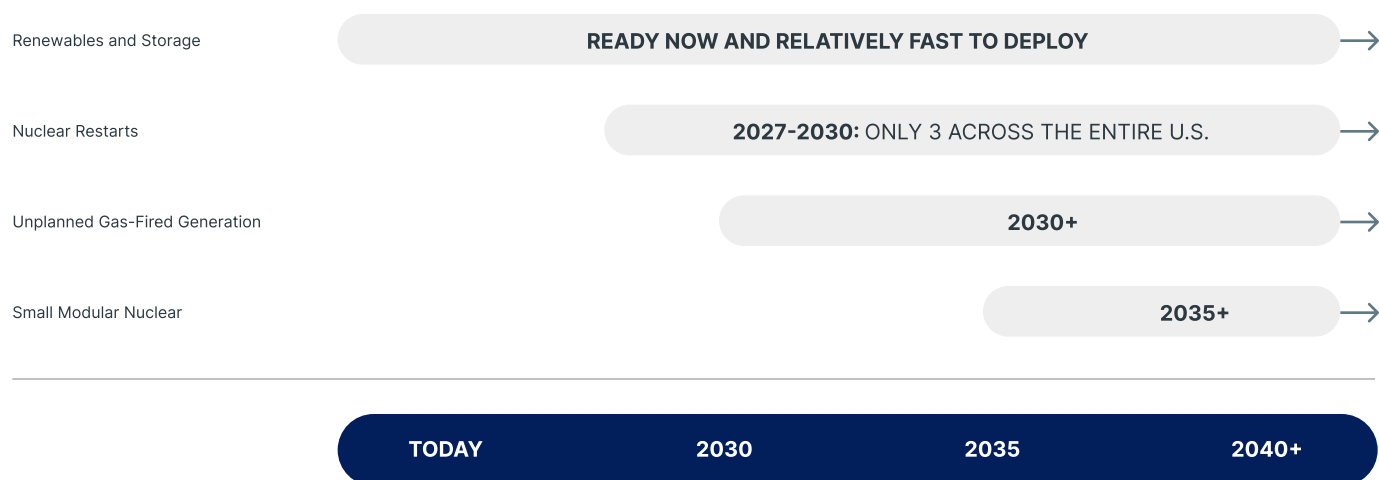
Estimates reveal that, by 2035, the U.S. will need 50% more annual electric energy production than today.²⁴⁷ This increase in demand is largely driven by the rapid growth of artificial intelligence, data center deployment, reindustrialization, onshoring and electrification.²⁴⁸ While a combination of energy sources will be needed to meet the growing demand, clean energy options are ready now at the lowest cost.²⁴⁹

Unlike fossil fuel plants that take years, or in the case of nuclear, decades, to come online, solar and onshore wind can be built in under two years (Figure 33).^{250, 251} This positions clean energy to meet rising demand. As of February 2025, nearly 2,000 gigawatts (GW) of clean energy projects, or enough electricity to power **194,932 homes for one year**, are waiting to be connected to the power grid.^{252, 253} While natural gas is a flexible backup, there is currently fewer GW in development and with a 4-5 year development cycle, it is unlikely that upcoming demand requirements are met.²⁵⁴

Although some clean energy sources like solar and wind only generate power intermittently, they can be paired with expanding battery storage or combined with other clean energy and existing generation options to reliably meet overall demand. Pairing renewable energy with battery storage is essential because it allows excess power to be stored for use on cloudy or windless days, or during periods of high energy demand. Beyond their reliability, these technologies also deliver substantial economic and environmental benefits, which make the case for clean energy adoption even stronger.

FIGURE 33:

Expected Deployment Timelines by Generation Type



Data Source: Brattle Economic Analysis of Clean Energy Tax Credits — Prepared for ConservAmerica



“Expanding transmission infrastructure is critical to connect these projects to the grid: It’s hard to increase the amount of clean energy if we’re not also increasing transmission.”

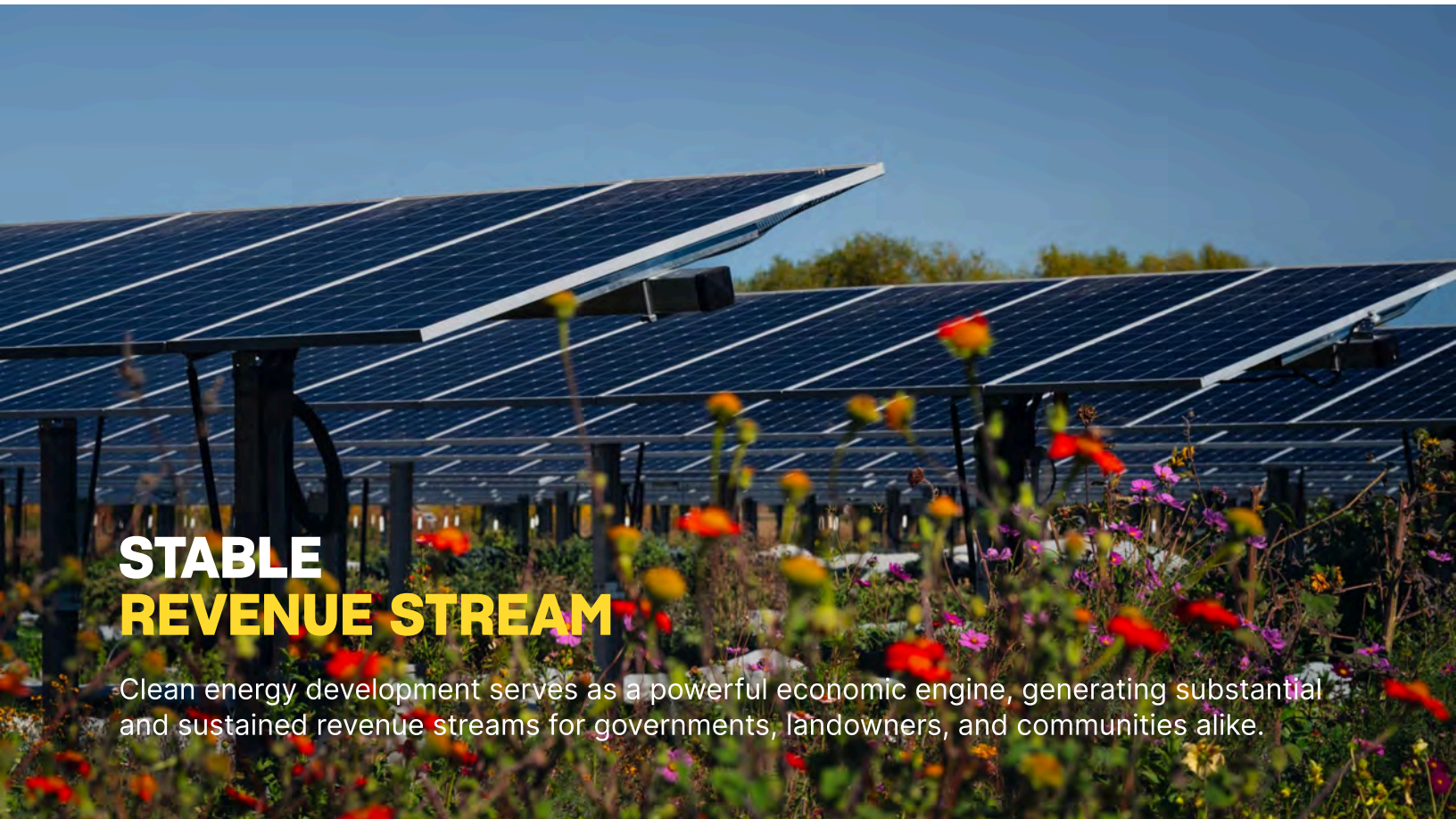
—GREG NEMET, POW SCIENCE ALLIANCE, PROFESSOR, UNIVERSITY OF WISCONSIN-MADISON (G.N. NEMET, PERSONAL COMMUNICATION, JULY, 2025)



4.1.2

Economic and Environmental Benefits of Clean Energy Investment

Renewable energy projects generate lasting value by providing stable revenue streams, creating jobs, diversifying local economies, lowering energy costs, and delivering critical environmental and public health benefits.



STABLE REVENUE STREAM

Clean energy development serves as a powerful economic engine, generating substantial and sustained revenue streams for governments, landowners, and communities alike.

Clean energy projects on federal land generate a steady revenue stream for local, state, and federal parties through rent, royalties, and fees paid by project developers. These payments cover the use of public land and its resources. For example, developers pay rent for the acreage their solar or wind facilities occupy, royalties based on the value or amount of electricity produced and sold, and administrative fees for permits and rights-of-way. Since 1982, clean energy development on federal lands has generated:

- Over **\$660 million** (\$2019) in rent and royalties for federal, state, and local governments²⁵⁵
- An average of **\$700 - \$2,000 per acre per year** on 25–40 year solar lease contracts^{256, 257}
- Between **\$4,000 and \$8,000 annually to farmers and ranchers** for each wind turbine, while allowing agricultural operations to continue alongside energy generation^{258, 259}
- **Thousands of jobs** (over 12,000 construction jobs and over 1,700 operations and maintenance jobs)²⁶⁰
- Business development opportunities²⁶¹
- Economic diversification and transformation of fossil fuel-dependent communities²⁶²
- Energy independence in rural communities²⁶³

*In FY2023, oil and natural gas leases on onshore federal lands generated \$8.5 billion—accounting for 93% of all federal revenue from onshore energy and mineral leasing. This stark contrast with the \$660 million generated from renewables highlights how much more extensive oil and gas production remains on federal lands compared to clean energy development.²⁶⁴

Job Creation & Rural Revitalization

In addition to generating considerable economic benefits at all levels, the clean energy sector has also become a major driver of employment and local economic growth, **creating 848,728 well-paying jobs annually.**²⁷³

The clean energy sector supports about **3.5 million jobs in the U.S.** and is growing more than twice as fast as the broader labor market.^{274, 275} For example, by 2023, solar alone employed more than 300,000 workers, compared to roughly 43,000 in coal mining.²⁷⁶ Jobs within the clean energy sector require a diverse workforce with varying skill levels, providing numerous job opportunities for local communities. Essential roles ranging from engineers and technicians to manufacturing and support staff offer long-term employment opportunities and help diversify and build local economies.²⁷⁸ Research from the Brookings Institution shows clean energy jobs also pay above-average wages, with mean **hourly earnings 8–19% higher** than the national average.²⁷⁹

"I think most people in renewables are more concerned about having enough employees to work on all of those projects – to wire up houses to the rooftop solar, to complete the construction on the large projects, and to do the grid maintenance and transmission build out. It's a lot of jobs. I don't think losing jobs because the construction ended is going to be a problem."

—GREG NEMET, POW SCIENCE ALLIANCE, PROFESSOR, UNIVERSITY OF WISCONSIN-MADISON (G.N. NEMET, PERSONAL COMMUNICATION, JULY, 2025)

Many of these opportunities are concentrated in **rural communities**, providing new economic livelihoods as coal and other extractive industries decline. Skills from fossil energy sectors often transfer directly into clean energy construction, transmission, and maintenance, making the transition feasible for displaced workers.²⁸⁰ Beyond direct employment, projects stimulate local economies by creating demand for electricians, plumbers, hotels, restaurants, and trucking companies.²⁸¹ For many rural areas, clean energy development functions as a tool to diversify economies and provide long-term stability.²⁸²

State Spotlight

NEVADA

Nevada's abundant lithium resources and skilled workforce uniquely position the state to lead in clean energy innovation.²⁸³ **Already a hub for solar and battery development, Nevada employed more than 62,600 clean energy workers in 2023**, with energy-sector job growth occurring at twice the national rate.^{284, 285} The transition away from fossil fuels is also reshaping rural economies: the state's last coal plant, the North Valmy Generating Station in Humboldt County, is set to close in 2025 due to rising costs.²⁸⁶ While longtime employees will be affected, NV Energy's plans for two new solar-plus-storage facilities at the site will create hundreds of construction jobs, sustain union positions, and generate long-term local tax revenue.²⁸⁷

"What if we said no to boom and bust cycle economies – to oil, gas, and other extractives? What if we said there's a new economy, which isn't just recreation and it's not just solar and wind, but it's a little bit of both? A multi-faceted economy that is mutually beneficial from a long-term job perspective."

—PAUL HENDRICKS, EXECUTIVE DIRECTOR, THE CONSERVATION ALLIANCE (P.H. HENDRICKS, PERSONAL COMMUNICATION, JULY, 2025)

Nevada's Dry Lake Solar Energy Zone is a major solar development that has successfully developed a total of over 400 megawatts (MW) of solar across six sites. These projects have brought about the major economic and environmental benefits of:

- \$6,298,431 in 2019 dollars to the BLM through competitive upfront bids made by winning bidders to secure rights to submit a formal plan of development to build on the land
- \$200,851,357 in total solar and wind energy revenue through 2019, in 2019 dollars
- Generation capacity of 179 MW to power ~46,000 homes in the southern Nevada region and displace 265,000 metric tons of carbon dioxide

Counties also benefit from stable revenue through property taxes, sales taxes, and permitting fees, which fund schools, roads, and other essential infrastructure.^{265, 266} Some communities have even allocated solar-related tax revenues to upgrade educational facilities, hire more teachers, and enhance classroom resources.²⁶⁷

Additionally, commercial solar projects yield an average Return on Investment (ROI) of 13.5%, with payback periods of roughly ten years and lifespans of thirty years, after which all electricity savings flow directly to profit.²⁶⁸ The ROI for wind projects varies depending on upfront costs, energy output, and maintenance expenses, but utility-scale wind farms generally achieve payback within 1 to 12 years, while commercial-scale projects typically recover costs within 6 to 20 years.²⁶⁹

Furthermore, expanding clean energy transmission enables more low-cost renewable power to reach the grid, reducing the need to rely on more expensive fossil fuel plants to meet energy demand. By transmitting renewable electricity to regions with high demand, utilities can replace higher-cost generation and avoid fuel expenses which lowers overall electricity costs. These efficiency gains and fuel savings are projected to generate **an estimated \$270–490 billion in electricity savings by 2050.**²⁷⁰ In parallel, evaluations from the U.S. Department of Energy have shown an exceptional ROI, with \$14 billion in R&D yielding up to \$624 billion in net economic benefits – over forty times the initial cost.²⁷¹

Similar to how outdoor recreation can be a tool to help communities previously dependent on extraction industries (see **3.1**), clean energy development can help to diversify and strengthen local economies.²⁷²

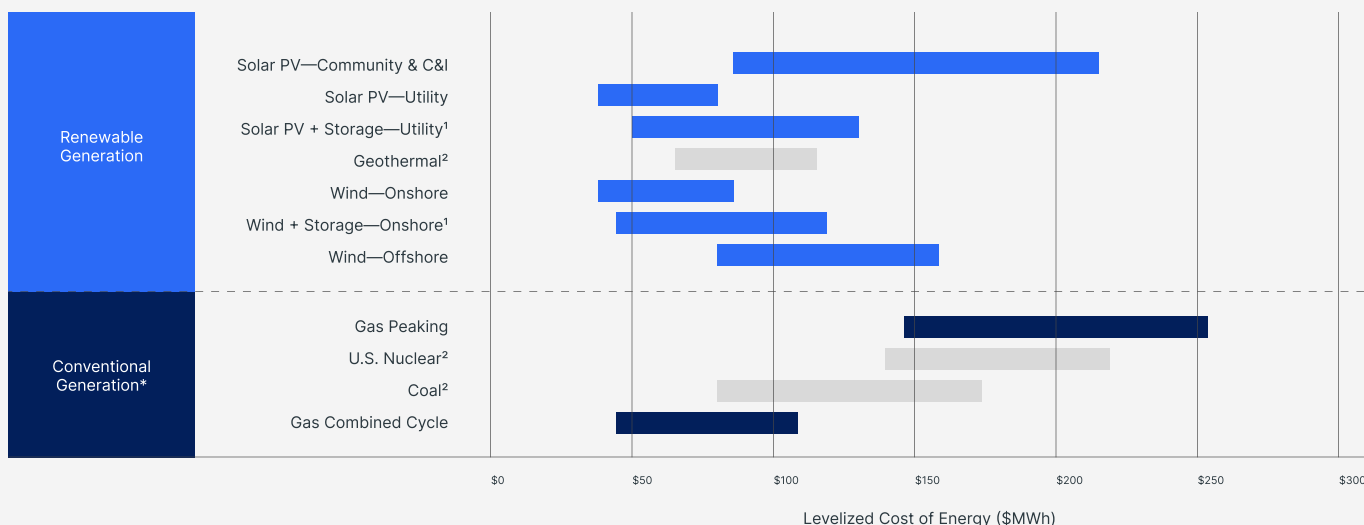
POWERS COUNTY AND LAMAR, COLORADO

In 2010, Lamar, Colorado, located in southeastern Prowers County, invested in the Colorado Green Wind Power Project, the largest wind energy project at the time. This wind farm spans 12,000 acres and features 108 1.5 MW turbines that power 52,000 homes.²⁸⁸ The land was leased from local landowners in an agreement with Xcel Energy. The county received \$800,000 in first-year tax revenues and generated 15 permanent full-time jobs and 400 local jobs at the height of construction.²⁸⁹ Additional economic benefits came from contracts with local businesses for construction work, improvements to roads and infrastructure, and increased spending at local businesses by incoming workers.²⁹⁰

In 2021, 500,000 U.S. households with residential solar found that the median adopting customer saw total electricity bill savings of \$2,230 annually.²⁹⁶ This translates to over \$1 billion in savings that can translate into over \$1 billion in disposable income for U.S. households.

FIGURE 34:
Levelized Cost of Energy Comparison - Version 18.0

Selected renewable energy generation technologies remain cost-competitive with conventional generation technologies under certain circumstances.



Cost Reduction and Stability

Today, clean energy offers some of the cheapest and most stable energy prices on the market. The most recent Levelized Cost of Energy comparison, a metric used to compare the cost-effectiveness of different electricity generation technologies, estimates solar at \$38–\$78 per megawatt hour (MWh), wind at \$37–\$86 per MWh, and natural gas – once considered the most cost-competitive option – at \$48–\$109 per MWh (Figure 34).²⁹¹

In recent years, oil and gas prices have swung between historic lows and highs, while the cost of wind and solar power has steadily declined.²⁹² This is because natural disasters like Hurricane Katrina have taken out oil infrastructure resulting in periods of unstable oil supply and prices.²⁹³ Also, clean energy can be produced locally, reducing vulnerability to geopolitical tensions and foreign oil supply disruptions.²⁹⁴ Finally, because renewable energy is essentially limitless, supply does not cause price fluctuations.²⁹⁵

"It's not just the cost of the fossil fuels now that renewables are cheaper, but it's also the volatility of them. Coal, gas, oil – they all go up and down in price. And it's often for reasons that none of us have control over. That's one of the strongest economic motives for shifting to clean energy – to not be vulnerable to that uncertainty and expense when it happens."

-GREG NEMET, POW SCIENCE ALLIANCE, PROFESSOR, UNIVERSITY OF WISCONSIN-MADISON (G.N. NEMET, PERSONAL COMMUNICATION, JULY AND AUGUST, 2025)

Resilience = Savings

Clean energy also delivers significant cost savings for all levels of government during extreme weather events by helping communities keep essential services and businesses operating. When hospitals, emergency response centers, grocery stores, and local businesses can continue functioning thanks to distributed solar, battery storage, or microgrids, communities avoid the enormous economic losses associated with prolonged outages.²⁹⁷ In addition, clean energy can facilitate faster recovery times and open areas back up to visitors and essential visitor spending quicker.²⁹⁸ In this way, the resilience benefits of clean energy translate directly into both avoided losses and long-term financial savings.

*"...If something goes wrong, often you're having to **replace equipment**. You might have a couple of weeks of downtime [at a gas plant] while you're making repairs. That's a significant amount of energy loss as well versus what happens at a renewable project, you can still have a portion of your project generated or it might be a little bit quicker to come back online than it would take to repair an entire gas plant. You just have that concentrated risk with a natural disaster from a gas plant."*

-ANNA BUONGIORNO, ASSOCIATE DIRECTOR OF GOVERNMENT AND REGULATORY AFFAIRS, SCOUT CLEAN ENERGY (A.B. BUONGIORNO, PERSONAL COMMUNICATION, AUGUST, 2025)

As of 2019, solar projects on public lands are responsible for 11.39 million metric tons of avoided CO2 emissions. This is the same as removing 2.4 million passenger vehicles from the road for one year.³⁰⁷ Using the EPA's social benefits estimate, these carbon savings translate into nearly \$3 billion in health-related cost reductions.³⁰⁸

Environment & Human Health Implications

Clean energy also delivers health and climate benefits. A study by the National Renewable Energy Laboratory determined that if 35% of the western US electricity is generated through wind and solar, CO2 emissions would reduce by 25-45%.³⁰³ The EPA estimates that each ton of CO₂ avoided provides about \$255 in social benefits, including reduced health impacts, lower property damage, improved labor productivity, and savings on energy and agricultural costs-amounting to \$84-150 billion per year if implemented at scale.³⁰⁴ Additionally, limiting CO2 emissions helps address the threat of climate change and the financial implications, like the rising cost of severe natural disasters (see **2.1**).³⁰⁵ When renewable energy replaces fossil fuel energy on the grid, the air and water become cleaner, and the cascading health outcomes that would **save up to \$77 billion per year** in total health costs.³⁰⁶



4.1.3

Clean Energy Investment Landscape

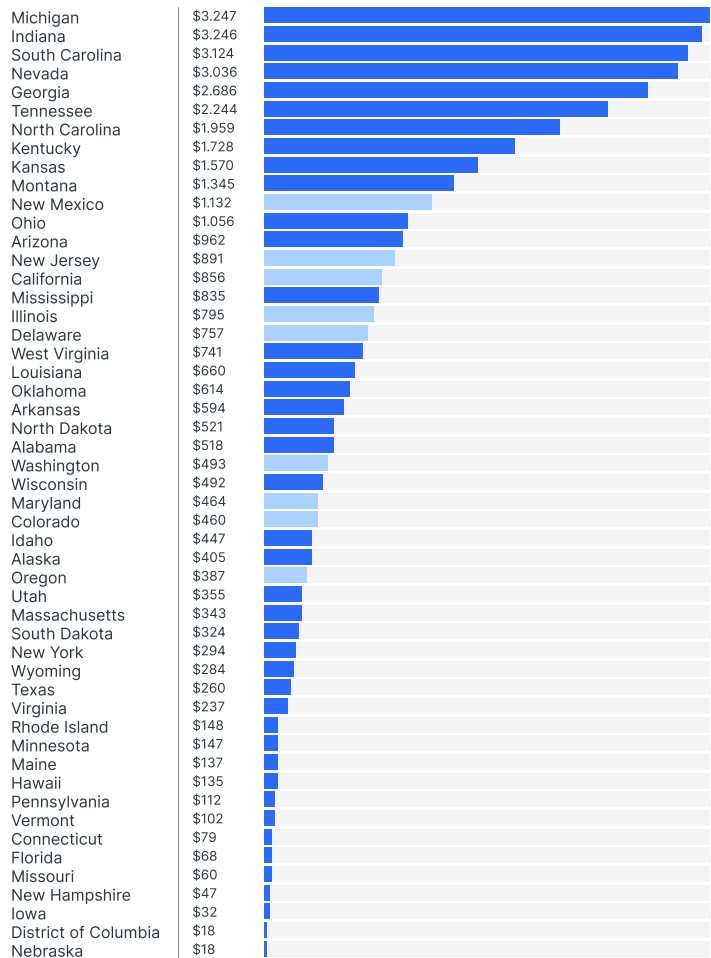
Investment in clean energy is rapidly evolving, fueled by technological advancements, increased regulatory support, and a growing demand for cost-competitive, sustainable solutions. As state and local governments set ambitious climate targets, corporations and communities are working to meet their emissions reductions goals, channeling unprecedented levels of capital into renewables, energy storage, and green infrastructure. Investing in clean energy transmission delivers strong returns: each dollar spent generates about **\$1.60 to \$1.80 in savings** by reducing the need for fuel, power generation, and energy storage.³⁰⁹

The 2022 Inflation Reduction Act (IRA) was one of the largest levers for scaling the transition to clean energy. This poured \$369 billion into clean energy investment and climate resiliency efforts.³¹⁰ When former President Joe Biden left office, the DOE was overseeing more than \$300 billion in public and private investments in clean energy under the IRA. Nearly three-quarters of these investments were slated to flow to states that voted for President Donald Trump in the 2024 election (Figure 35).^{311, 312}

FIGURE 35:

States that voted for Trump have benefited most from clean energy investment

Clean energy funding from the Inflation Reduction Act per capita



RETURN ON INVESTMENT

Every \$1 invested in resilience via proactive strategies like microgrids yields ~ **\$6 in future savings.**³¹³

Investing \$1 in resilient infrastructure can save up to **\$4 in future recovery costs.**³¹⁴

"All of our infrastructure that is non renewable was built with subsidization from the United States in the late 1800s and early 1900s", so from an investment perspective, "if you have transmission for natural gas and for coal based electricity being built by U.S. Government subsidies, why would you not build those same infrastructure for renewables through loans or other capacities?"

-DILLON OSLEGER, POW ATHLETE ALLIANCE, EXECUTIVE DIRECTOR - SAGE TRAIL ALLIANCE, SOIL SEARCHING GLOBAL AMBASSADOR - SPECIALIZED BICYCLE COMPONENTS, (D.O. OSLEGER, PERSONAL COMMUNICATION, JULY AND AUGUST, 2025)

STRIPPED FUNDS = STRIPPED BENEFITS

With IRA funding stripped, clean energy credits may be eliminated, which would raise customer energy rates and prevent numerous wind and solar projects. These credits help lower the cost of building renewable energy by offering tax incentives to developers. Without them, the total market impact loss could reach **\$820 billion** (Figure 36).³¹⁵ On top of that, average residential electric bills would increase from \$83 to as much as \$152 per year, as the reduction of clean energy competition and volatile fossil fuel prices lead to higher energy generation costs, which are ultimately passed on to consumers through increased electricity bills.^{316, 317} Lost IRA funding and eliminating tax credits not only makes renewable projects more expensive, forcing utilities to rely on costlier, less efficient sources, but it slows the transition away from fossil fuels.

The IRA was projected to save \$5.6 trillion in globally avoided climate impacts from 2023 to 2050, with cleaner air alone preventing nearly 86,000 asthma attacks, 3,700 heart attacks, and 1,700 hospital admissions.³¹⁹ Between now and 2030, the benefits attributed to cleaner air and improved public health were projected to save the United States economy between \$118 and \$200 billion, due to reductions in illnesses and deaths caused by air pollution from power plants, vehicles, and buildings. Furthermore, the Inflation Reduction Act spurred the creation of one million U.S. jobs by 2030, primarily in manufacturing, construction, services, and trade. Figure 37 highlights the states most severely impacted by employment losses as a result of this stripped funding.³²⁰ As tax credits motivated companies to invest in modernizing energy, such as upgrading power plants and building new factories, a majority of this economic growth was projected to occur within the private sector.³²¹

FIGURE 36:

Economic Impacts of Removing Clean Energy Credits

2025-2035, Cumulative Billions in 2024 dollars

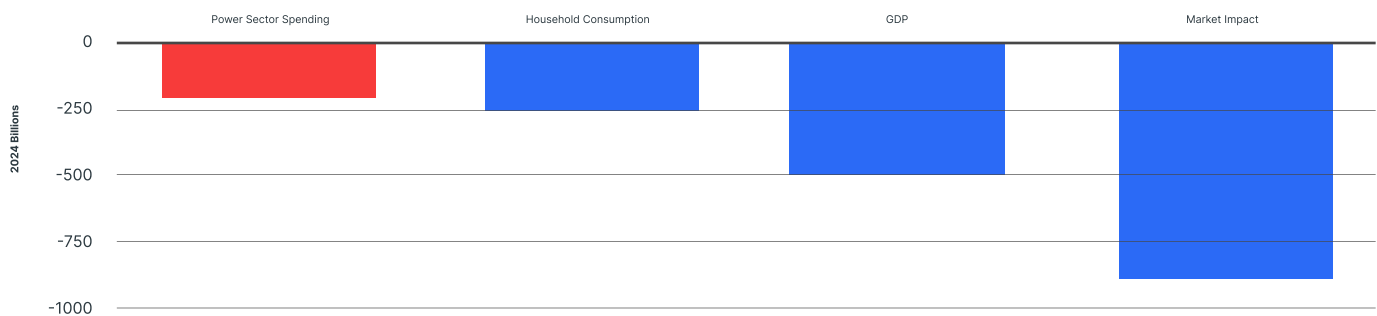
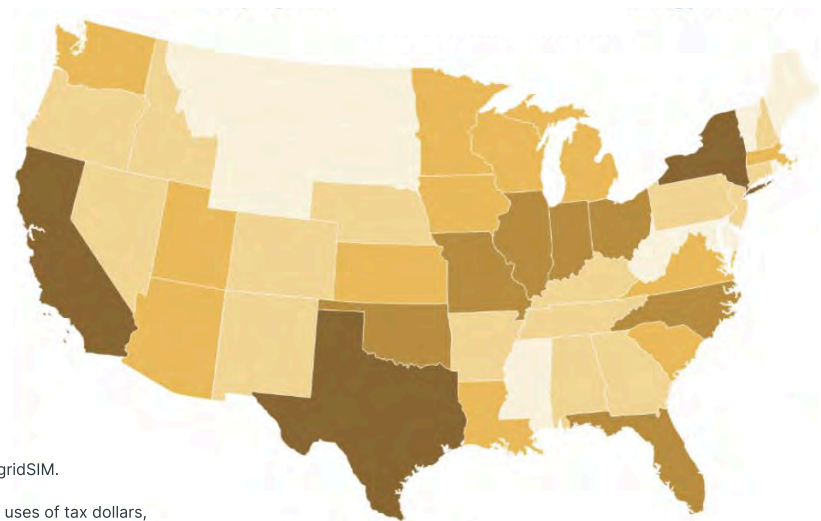
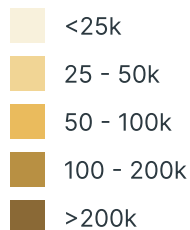


FIGURE 37:

Employment Impacts from Loss of Clean Energy Credits By State

2025-2035, Cumulative Job Years



Source: Brattle's BEYOND model of the US economy, given outputs from gridSIM.

Notes: This analysis does not account for economic effects of alternative uses of tax dollars, deficit reduction, or taxpayer savings in the event that clean energy credits are removed.



State Clean Energy Investment Call-Out Case Examples:

As the clean energy transition accelerates, states across the Mountain West are investing in economic and energy diversification to build resilient communities. The data below spotlights how Colorado, Nevada, Montana, and Utah are contributing to this switch, fostering employment growth within the energy sector, investing in large-scale clean power generation and storage, and expanding solar, wind, and battery capacity. With projected long-term cost reductions for renewable energy coupled with billions of dollars in new infrastructure, these states’ economies are positioned to benefit from energy resilience, job growth, and clean power.

	Employment in the Energy Sector (2023)	Investment in Large-Scale Clean Power Generation & Storage (2023-2030)	Solar, Storage & Wind Capacity (2023)	Planned Additional CE Capacity In Progress	Projected Cost Reduction of Solar and Wind Power by 2055 (respectively)
Colorado	157,200	\$13.2 Billion	8.4 GW	1.2 GW	22% and 34% ³²²
Nevada	62,600	\$2.7 Billion	6.5 GW	3.3 GW	22% and 35% ³²³
Montana	32,500	\$7 Billion	2 GW	1 GW	23% and 33% ³²⁴
Utah	91,700	\$1 Billion	2.6 GW	1.8 GW	22% and 35% ³²⁵



THE KEY TAKEAWAYS

- All four states are projected to reap significant benefits** in terms of cost reductions for solar and wind over the next 30 years, showcasing that clean energy is an increasingly affordable option.
- Colorado is a leader in clean energy investment and workforce development** with over 157,000 jobs in the energy sector and \$13.2 billion in planned investments through 2030.
- Nevada has made major strides in expanding its clean energy footprint**, with 3.3 GW of new capacity already underway. Its unique geography provides several advantages: exceptionally strong solar irradiance that boosts solar efficiency; high interconnection potential that makes it easier to distribute generated power; and the ability to leverage BLM lands for clean energy development, where leasing and permitting processes move significantly faster (see [4.1.2, Nevada’s Dry Lake Solar Energy Zone](#)).^{326, 327}
- With \$7 billion in planned investment, Montana stands out in their efforts** especially because they have the smallest energy workforce among the listed states.



4.1.4

Cost Comparison of Clean Energy to Natural Disaster Spending

Scaling up the clean energy transition is essential to unlocking its full economic value, improving public health, and preparing communities for increasingly severe climate-driven disasters. While clean energy investment and natural disaster costs do not have a direct cost and effect relationship, they closely impact each other.

Disaster costs are unavoidable and likely to rise as climate goals go unmet. Disaster relief drains trillions from state and federal budgets without generating any return. Clean energy, by contrast, is an investment that does produce returns. It lowers energy costs, generates state and federal revenue, improves streams of income, reduces emissions, and stimulates broader economic growth. Over time, the savings and revenue generated from clean energy can also help **offset the growing long-term costs associated with natural disasters.**

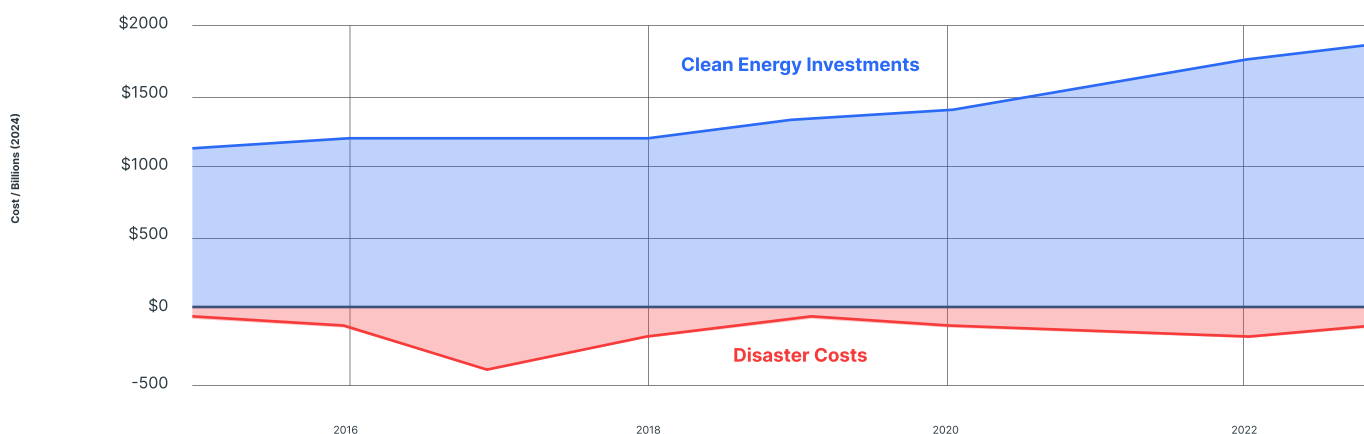
The following graphs analyze natural disaster spending data and clean energy investment data were sourced from NOAA's National Centers for Environmental Information (NCEI)'s "Billion-Dollar Weather and Climate Disasters," and the International Energy Agency's "Global energy investment in clean energy and in fossil fuels, 2015-2023."^{328, 329}



FIGURE 38:

Clean Energy Investment vs Natural Disaster Cost in the U.S. 2015 - 2023

Data from NOAA's Billion-Dollar Weather and Climate Events and the IEA's Global Energy Investment in Clean Energy and Fossil Fuels



Blue area: The blue shaded area represents clean energy investment, trillions of dollars the U.S. government is directing toward clean energy development. These investments support long-term economic prosperity by creating jobs, generating tax revenues, increasing consumer spending, and preserving productive land for future growth.

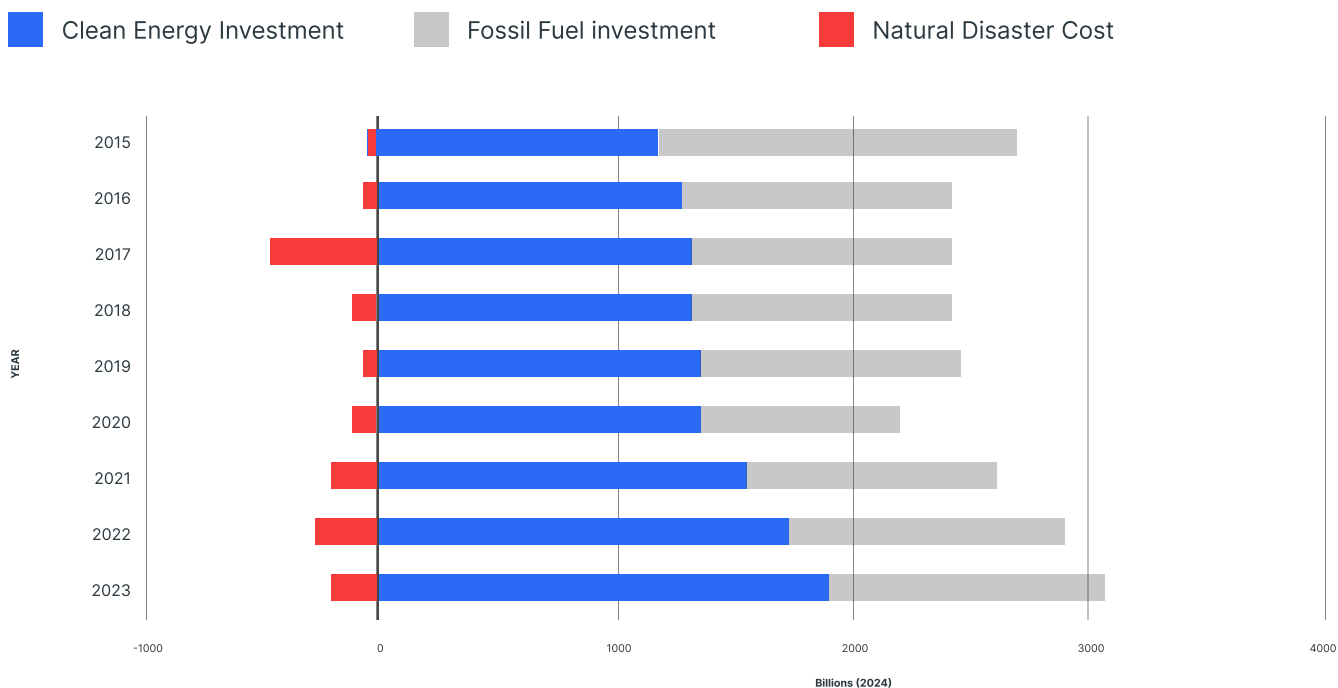
Red area: The red shaded area represents natural disaster costs, trillions of dollars spent with no economic return. Unlike clean energy investments that grow the economy, disaster spending is essentially lost capital that yields no productive benefits.

Recent policy changes could reduce the blue area and expand the red area, as the loss of IRA incentives (see **4.1.3**) may slow clean energy development, leaving the underlying causes of intensifying natural disasters unaddressed. This could result in billions in wasted spending that might otherwise support economic growth.

FIGURE 39:

Energy Investment vs. natural Disaster Cost in the U.S. 2015 - 2023

Data from NOAA's Billion-Dollar Weather and Climate Events and the IEA's Global Energy investment in Clean Energy and in Fossil Fuels

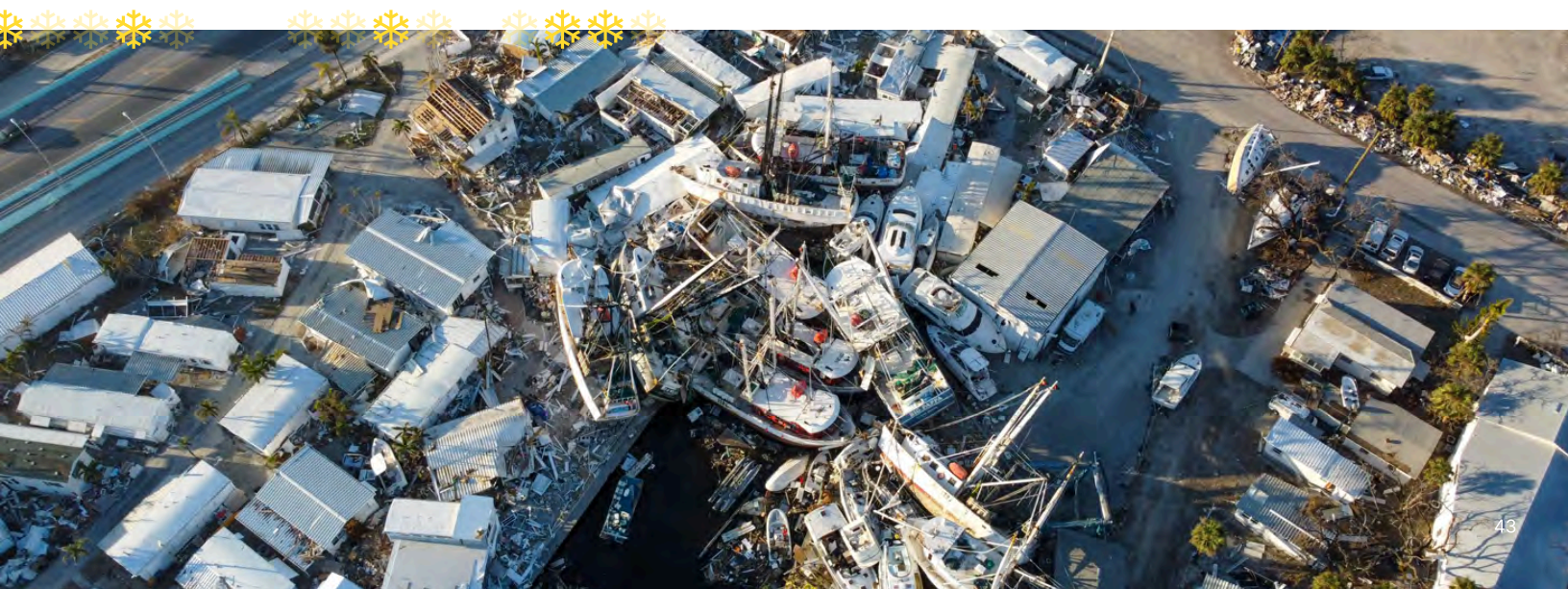


Blue area: The blue area represents clean energy investment, trillions of dollars the U.S. government is directing toward clean energy development. These investments support long-term economic prosperity by creating jobs, generating tax revenues, increasing consumer spending, and preserving productive land for future growth.

Grey area: The grey area represents fossil fuel investment, trillions of dollars the U.S. government is directing toward fossil fuel development. While these investments once supported long-term prosperity, many of these projects are no longer profitable. Moreover, the environmental and health impacts of fossil fuel use result in billions in lost capital and contribute to intensifying disaster spending, as fossil fuels are the primary source of the CO₂ emissions driving warmer temperatures and more severe natural disasters (see **Chapter 1** and **3.2**).

Red area: The red area represents natural disaster costs, trillions of dollars spent with no economic return. Unlike clean energy investments that grow the economy, disaster spending is essentially lost capital that yields no productive benefits.

Recent policy changes could reduce the blue area and expand the red area, as the loss of IRA incentives (see **4.1.3**) may slow clean energy development, leaving the underlying causes of intensifying natural disasters unaddressed. This could result in billions in wasted spending that might otherwise support economic growth.





4.2

Tools for Success:

Clean Energy, Microgrids and Protection From Natural Disasters

Although clean energy development is not a one-size-fits-all solution, it can serve as a resiliency tool, especially for rural communities that may face higher risks around natural disasters and energy security. By diversifying energy infrastructure and resources, investing in natural disaster protections like battery storage and microgrids, and strategically planning for the future, rural communities can become more adaptive while also claiming more independence through energy security.



4.2.1

The Power of Microgrids, Types of Clean Energy, and Benefits for Rural Communities

Clean energy sources like off and onshore wind, geothermal, and solar have been successfully implemented across the country to produce a multitude of benefits discussed in this report. These renewable systems have the power to revitalize economies, create jobs, provide cost savings, support local communities, create energy security, and of course, help the environment (see **4.1.2**).³³⁰ The forward trajectory of this movement was solidified with the IRA's \$369 billion investment, but now the future of clean energy transmission remains unclear.^{331, 332}

In addition to the clean energy sources mentioned, the utilization of microgrids, specifically with solar, is pivotal to keeping rural communities online during extreme weather events and expediting the recovery process. When looking at natural disaster spending from all levels of governments (see **2.1**) and the economic benefits and assets of the outdoor recreation economy (see **3.1**), it is imperative to invest in tools that make rural and recreation-dependent communities better able to protect themselves, their infrastructure, and their economies, especially when disaster strikes.

WIND

Rural communities in the U.S. specifically have seen a strong correlation between wind power projects and economic growth, shown by an increase in personal income, wages, employment, and municipal finance.³³³ According to NREL, wind energy can help offset carbon emissions and deliver renewable power to remote or rural areas. In some rural or remote communities, wind may be the best renewable option available.³³⁴

Wind energy uses turbines to capture the wind's kinetic energy, which the blades convert into electricity through a generator.³³⁵ Wind energy capacity in the U.S. has increased from approximately 6 billion kilowatthours (kWh) in 2000 to approximately 434 billion kWh in 2022, contributing 10.3% of total utility-scale electricity generation capacity in the country.³³⁶

³³⁷

Offshore wind, in particular, is projected to have even lower costs per kilowatt hour of electricity due to the possibility of larger scale projects.³³⁸ Offshore wind uses similar technology but harnesses winds over oceans and other large bodies of water.³³⁹ The coastal waters of the U.S. have great potential for energy generation – and as of 2023, hosted two major projects – Block Island wind farm on the waters of Rhode Island (30-megawatt capacity) and the Coastal Virginia Offshore Wind pilot project (12 MW capacity).³⁴⁰

GEOTHERMAL

Geothermal energy uses pump-system or well technology to turn the earth's heat into heating and cooling systems to provide energy to buildings and communities.³⁵⁰ Geothermal power plants can consistently generate energy around the clock regardless of weather conditions.³⁵¹ As of 2023, the U.S. has geothermal projects in seven states, providing 0.4% (17 billion kWh) of total utility-scale electricity generation in the country.³⁵² For rural communities especially, this power source can serve as a way to provide stable and consistent power without the need to be connected to the main power grid.³⁵³ Benefits of geothermal energy include a low carbon footprint 20 times lower than natural gas.³⁵⁴

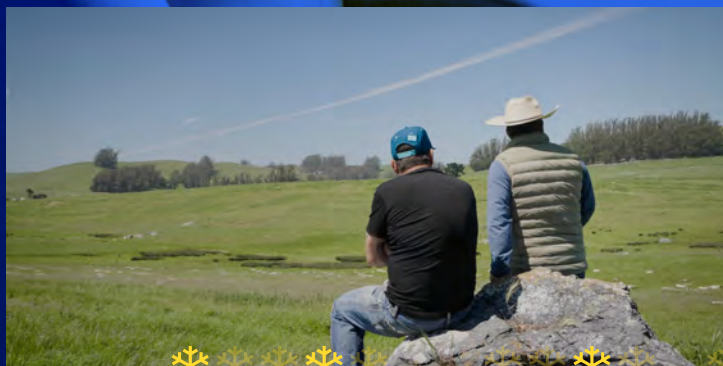
Revenue from geothermal projects between 2006 and 2019 included over \$79 million to counties, \$158 million to states and \$79 million to the federal government (\$2019).³⁵⁵ This had a lot to do with amendments made to the Geothermal Steam Act by the 2005 Energy Policy Act.³⁵⁶



Wind Farms in Alaska Provide Energy Security and Massive Cost Savings

In Alaska, **37 remote communities now integrate wind power to reduce reliance on costly diesel fuel.**³⁴¹ Alaskans face the highest energy burden in the U.S., with low- and moderate-income households spending over 40% of their income on energy.³⁴³ When oil prices spiked to over \$140 per barrel in 2008, communities accelerated investment in renewables and diversified their energy sources. In this high-cost environment, even modest displacement of imported diesel with wind energy yields significant savings, making renewable integration feasible without subsidies.³⁴⁴

Communities like St. Mary's, Pitka's Point, Mountain Village, and Kongiganak have integrated renewable wind sources into their electrical microgrids, stabilizing prices and providing community resiliency.^{345, 346, 347} In St. Mary's, a single 900-kilowatt turbine installed in 2019 now supplies half of the town's power and offsets about \$350,000 annually.³⁴⁸ Because of freezing temperatures and diesel shipments challenges, wind energy now helps bring a more stable and reliable power source to support the region's 800 residents.³⁴⁹



Geothermal at Colorado Mesa University in Grand Junction, Colorado

On the western slope of Colorado, **geothermal energy has saved Grand Mesa University almost \$16 million since 2008** when they installed a geothermal heat pump system. Located 500-feet under the athletic field at the university, this geothermal heat pump system heats and cools 1.2 million square feet of buildings and saves the university \$1.5 million in energy costs annually.³⁵⁷

SOLAR

Solar energy uses available technologies to convert sunlight to electricity – helping to diversify energy profiles, improve efficiency, and boost economic value for communities.³⁵⁸ The most common types of solar energy systems include photovoltaics (PV), which use solar panels, and concentrating solar-thermal power (CSP) systems which utilize mirrors to reflect and concentrate sunlight onto centralized receivers.³⁵⁹

Solar Battery Storage

It is important to note that one of the most important parts of successfully using solar energy is having a way to store it for later use. Batteries are used to store solar energy, regulate the energy flow to accommodate demand, and they can also provide energy security during electrical disruptions.³⁶⁰ With round-trip efficiencies of 85-90%, proper battery storage is a crucial piece of clean energy resiliency.³⁶¹

While cost was historically an obstacle, battery storage has seen significant price drops in recent years, from nearly \$600/MWh in 2015 to about \$150/MWh in the first half of 2020.³⁶² Because of its growing cost competitiveness, the use of battery energy for lithium-ion systems particularly, has increased drastically.

Battery storage is critical for areas more vulnerable to outages or climate disruptions, and especially for communities serving vulnerable populations that depend on electricity for medical equipment, or those with elderly or children that require more electricity for heating and cooling during periods of extreme heat or cold.^{363, 364}

Solar Microgrids and Natural Disasters

For rural communities, reliable energy infrastructure is essential, but remoteness from central grids makes achieving energy security far more difficult. Microgrids are localized electricity grids that are able to operate independently from the main grid – improving overall grid resiliency, support during grid disturbances, and be used as a backup during response and recovery efforts.³⁶⁵ While microgrids can use multiple forms of energy, solar microgrids are increasingly popular to backup energy sources and help with disaster relief and recovery, especially in rural communities.^{366, 367} Solar microgrids produce reliable electricity, and in some cases, create cost savings of up to 60%.³⁶⁸

Solar deems particularly useful in emergency situations such as natural disasters. With proper battery storage, solar can serve as a reliable source of energy and, unlike oil and gas, remains unaffected by fuel shortages or transportation disruptions.³⁶⁹ The decentralized nature of solar energy reduces vulnerability to centralized power failures, providing resilience against prolonged outages caused by natural disasters or infrastructure damage.³⁷⁰ Solar microgrids in disaster situations create the ability for communication to stay online via WiFi and phone service, emergency services to be deployed, access to electricity and water, and relief organizations to operate.³⁷¹

When it comes to disaster recovery, solar microgrids have the ability to prevent economic losses for all communities, especially for crucial services like health centers and hospitals.³⁷² This immediate relief of energy in times of emergency can swiftly support communities in times of crisis without relying on fuel transportation or infrastructure issues.³⁷³ Energy security is necessary for remote communities with less access to electricity – solar microgrids can not only aid in preparing for worsening disasters, but can improve quality of life and help with climate adaptation as weather conditions worsen.³⁷⁴



Solar Battery and Disaster Resiliency in Babcock Ranch, Florida

In an exceptional case of climate and energy resiliency Babcock Ranch, Florida, experienced minimal damage and maintained power in the wake of 2022's Hurricane Ian.³⁷⁵ Home to the largest solar-plus-storage system operating in the U.S. today, their climate-resilient design used solar power to help the town survive and stay online during and after the hurricane. Since 2006, the town had channeled integrated resiliency planning within their development strategies and pooled investments into renewable energy, leaving them relatively unscathed by the category-4 storm.³⁷⁷ A key to Babcock's energy resiliency is their 10 MW battery system, which along with underground power lines and smart grid technology, helps keep the lights on during power outages. In addition, their power infrastructure is integrated with other utility services; wastewater, and reclaimed water pipes co-located with conduit for electricity and data utilities, reducing risk of damage from storms.³⁷⁸





4.2.2

Clean Energy Transition and Rural Communities

Clean energy is a vital tool for rural communities to reduce energy dependency, improve resilience, and strengthen local economies. While some stakeholders express concern about clean energy projects on public lands, careful planning and collaboration between developers, communities, and land managers can balance energy needs with outdoor recreation, wildlife protection, and rural economic development.

Reducing Energy Burdens

Rural households consume more energy and pay higher electricity costs than their urban counterparts (Figure 40).³⁷⁹ Many rural census tracts are also disproportionately identified as high energy-burdened households (Figure 41).³⁸⁰ Because many rural communities depend on imported fuels such as coal, petroleum, and natural gas transported from outside the region, they are especially vulnerable to energy price volatility and resulting economic stress.³⁸¹

FIGURE 40:

Fuel Consumption and Prices by Urban/Rural Designation.

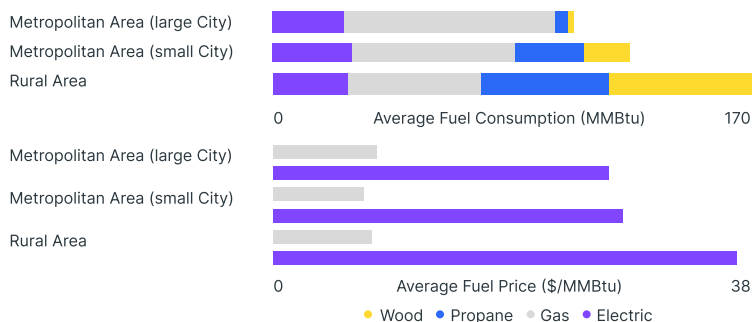
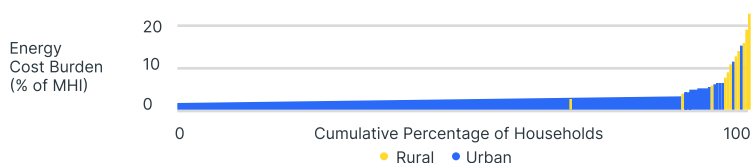


FIGURE 41:

Distribution of Energy Cost Burden by Census Tract and Percent of Households.



SOURCE: Pathways to Energy Affordability in Colorado from PSE Health Energy & Institute for Energy and Environmental Research

“[In terms of] energy independence... swings in gas prices can have a way larger impact on rural economies than most people would think.”

-DILLON OSLEGER, POW ATHLETE ALLIANCE, EXECUTIVE DIRECTOR - SAGE TRAIL ALLIANCE, SOIL SEARCHING GLOBAL AMBASSADOR - SPECIALIZED BICYCLE COMPONENTS, (D.O. OSLEGER, PERSONAL COMMUNICATION, JULY AND AUGUST, 2025)

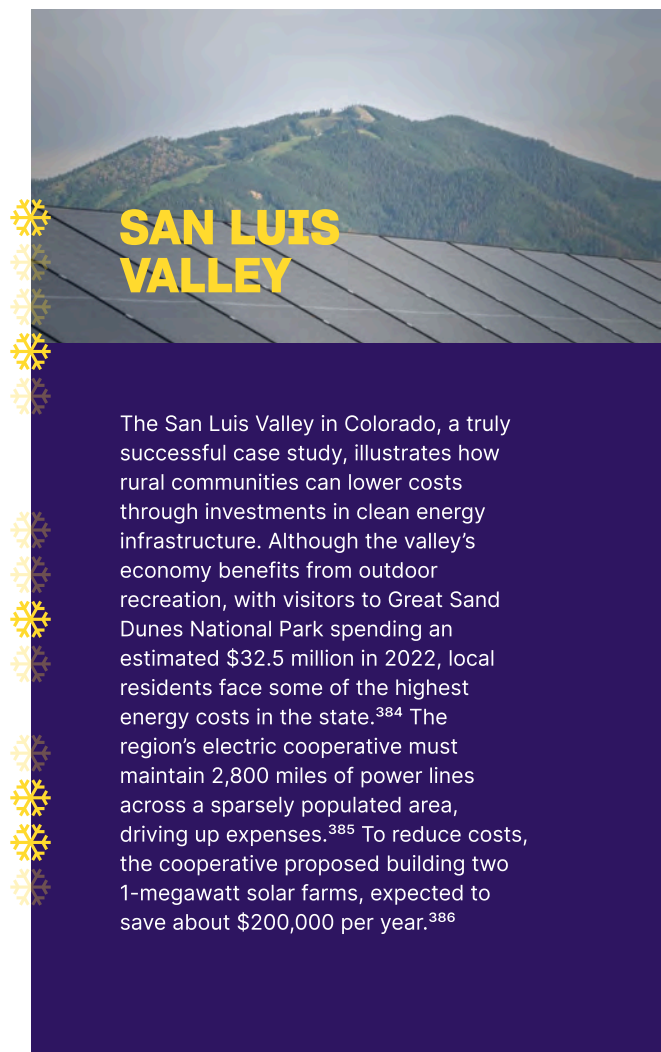
Clean energy offers a solution. For example, solar microgrids can cut rural energy costs by up to 60%.³⁸² With a return on investment of 6–8%, a payback period of just 3–5 years, and operating costs 40% lower than diesel alternatives, distributed clean energy provides both financial relief and long-term resilience.³⁸³

Resilience Through Decentralization

Unlike centralized fossil fuel plants, decentralized clean energy technologies such as microgrids and rooftop solar are less vulnerable to disruption. If a single gas or coal plant is taken offline by wildfire, earthquake, or severe weather, entire regions can lose power. In contrast, dispersed renewable projects reduce concentrated risk, losing one site may only impact a fraction of total generation (A.B. Buongiorno, personal communication, August, 2025). Communities with microgrids can even maintain power during planned outages or climate-related disruptions, helping sustain local businesses and attracting visitors when neighboring towns are offline (J.A. Asher, personal communication, July, 2025).

Supporting Outdoor Recreation Economies

Many rural economies depend on outdoor recreation (see 3.2), which itself depends on a stable climate - consistent snowpack for skiing, healthy rivers for rafting, and thriving landscapes that support tourism-based businesses. Clean energy plays a critical role in reducing greenhouse gas emissions, supporting climate stability, and protecting the long-term vitality of outdoor recreation industries. In addition, renewable energy development creates jobs, increases tax revenue, diversifies local economies, and drives new investment, strengthening the economic foundation of resilient rural communities (see 4.1.2).



The San Luis Valley in Colorado, a truly successful case study, illustrates how rural communities can lower costs through investments in clean energy infrastructure. Although the valley's economy benefits from outdoor recreation, with visitors to Great Sand Dunes National Park spending an estimated \$32.5 million in 2022, local residents face some of the highest energy costs in the state.³⁸⁴ The region's electric cooperative must maintain 2,800 miles of power lines across a sparsely populated area, driving up expenses.³⁸⁵ To reduce costs, the cooperative proposed building two 1-megawatt solar farms, expected to save about \$200,000 per year.³⁸⁶



ADDRESSING CLEAN ENERGY DEVELOPMENT CHALLENGES ON PUBLIC LANDS

Challenge 1: Protecting Recreation and Scenic Values

Critics argue that energy projects can disrupt outdoor recreation and degrade scenic landscapes.

Response: A place-based approach ensures projects are sited where impacts are minimized, such as along highways or in less-trafficked areas, while protecting iconic recreation sites. Clean energy infrastructure can also serve as a visible reminder of climate action, reinforcing the link between renewable energy and healthy air, water, and landscapes.



"I believe there's a way to decarbonize our energy sector without deteriorating the public lands that provide us all the freedom to experience and enjoy nature. Every renewables project that happens on public lands and waters must take a 'smart from the start' approach that cites renewable energy projects in places that have high energy potential and low impact on recreation, wildlands, wildlife and cultural resources.

That's a result of two things: thoughtful collaboration between all impacted communities and stakeholders, including tribes, and careful consideration of the cultural, community and climate resilience values of our public lands—ensuring these places remain healthy and accessible for generations to come."

-TAYLOR LUNEAU, COLORADO CONSERVATION MANAGER, THE WILDERNESS SOCIETY (T.L. LUNEAU, PERSONAL COMMUNICATION, AUGUST, 2025)

"Projects could also be placed adjacent to roads or highways where there's already infrastructure, which usually makes it an easier project to build and the aesthetic impact is also lower. There's also this aspect of it where people see the clean energy infrastructure and they associate it with healthier air and a more stable climate. And in that case they see it and it's a reminder that we're doing something about this problem."

-GREG NEMET, POW SCIENCE ALLIANCE, PROFESSOR, UNIVERSITY OF WISCONSIN-MADISON (G.N. NEMET, PERSONAL COMMUNICATION, JULY, 2025)

"A lot of our public lands that we protect are used by recreationists, trails or climbers or rafters, but a lot of it isn't. Coexistence of these uses [renewable energy and recreation] can definitely happen, as long as they're not getting in each other's way."

-PAUL HENDRICKS, EXECUTIVE DIRECTOR, THE CONSERVATION ALLIANCE (P.H. HENDRICKS, PERSONAL COMMUNICATION, JULY, 2025)

Challenge 2: Concerns About “Single-Use” Land

Some worry solar projects lock land into a single use, reducing opportunities for wildlife migration, grazing, or recreation.

Response: Thoughtful planning can integrate multiple uses. For example:

California’s Chuckwalla National Monument shows how clean energy, conservation, and recreation can coexist. Spanning 600,000 acres, it protects wildlife and cultural resources, supports outdoor recreation (OHV, rock climbing, hiking, etc.), and hosts solar and wind projects.³⁸⁷ Collaborative planning ensured boundaries balanced conservation with responsible renewable energy development.³⁸⁸

“[Chuckwalla National Monument is] a good example of when there was real thoughtfulness in terms of boundary establishment to make sure that we met land and water conservation, tribal, and renewable energy needs as well.”

-Paul Hendricks, Executive Director, The Conservation Alliance (P.H. Hendricks, personal communication, July, 2025)



Challenge 3: Overall threat to place integrity

Opponents warn that energy projects may harm ecosystems and threaten an area’s integrity.

Response: Using a place-based approach (section 5.2), project developers can work with local communities to minimize harmful impacts while maximizing benefits to local communities.

“The urgency of the climate crisis for both people and wildlife has only increased, which is why we need to ensure that the renewable energy buildout on public lands is fast, fair, and focused in the right places. Even if we were to put solar panels on top of every house in the country, it wouldn’t be enough to meet our energy needs. We need large-scale renewable energy projects to achieve a stable, fair, clean energy economy, but that work must be grounded in community support and meaningful engagement for the public early in the development process. This community-driven approach is essential to minimize impacts and ensure the benefits of the project are shared equitably.”

-TAYLOR LUNEAU, COLORADO CONSERVATION MANAGER, THE WILDERNESS SOCIETY (T.L. LUNEAU, PERSONAL COMMUNICATION, AUGUST, 2025)

“It’s also important to remember that public lands play a larger role in the climate fight beyond just their renewable energy potential. Keeping our mature and old forests and integral landscapes intact provides critical habitat and wildlife to adapt and mitigate to a changing climate, and healthy public lands keep our air and water clean. We need public lands for all these reasons and managing them for these values is fundamental to protecting our freedom to explore, conserving the wild places that sustain us, and ensuring future generations inherit a thriving planet.”

-TAYLOR LUNEAU, COLORADO CONSERVATION MANAGER, THE WILDERNESS SOCIETY (T.L. LUNEAU, PERSONAL COMMUNICATION, AUGUST, 2025)

“There’s a lot more opportunity with clean energy. There is potential to execute small, medium or large projects – you can build a few turbines or massive arrays, you can install a few solar panels or hundreds of thousands of them. I think that gives people a lot more flexibility about making it work for what the community needs.”

-GREG NEMET, POW SCIENCE ALLIANCE, PROFESSOR, UNIVERSITY OF WISCONSIN-MADISON (G.N. NEMET, PERSONAL COMMUNICATION, JULY, 2025)

In summary, clean energy and outdoor recreation are not competing priorities but complementary strategies to enhance rural resilience and prosperity. Both depend on healthy landscapes, stable climates, and thriving local economies. While clean energy is not a one-size-fits-all option for every rural community, with thoughtful planning and collaboration, clean energy development can reduce emissions, support rural communities, protect outdoor recreation, and help secure a sustainable future (see **5.2**).

“We [clean energy and outdoor recreation] can’t get in the way of each other...We’re all working for a similar, new vision for the future and we have to figure something out because we’re stepping on each other’s toes.”

-PAUL HENDRICKS, EXECUTIVE DIRECTOR, THE CONSERVATION ALLIANCE (P.H. HENDRICKS, PERSONAL COMMUNICATION, JULY, 2025)



4.2.3

Case Studies

Repeated blackouts in mountain towns like Silverton, Rico, and Ophir highlight the urgent need for solar-powered microgrids in rural communities like these. With electricity delivered by a single fragile line, storms and avalanches can cut power for hours, shutting down gas pumps, grocery stores, medical rescue operations, and even emergency communications.³⁸⁹ In 2023,

Silverton endured half a dozen back-to-back blizzards and six power outages, leaving the town vulnerable as water and sewer systems failed, gas furnaces went cold, and outside assistance was cut off by unnavigable mountain passes.³⁹⁰

For recreation-based economies that rely on steady visitor access and resilient local services, these disruptions threaten both safety and livelihoods.³⁹¹ As a response, local utility company, San Miguel Power Association (SMPA), is promoting the use of community-scale solar microgrids, backed by batteries, to offer a way to keep the lights on through extreme weather, reduce dependence on distant utilities, and strengthen the long-term sustainability of these isolated towns.³⁹² Silverton, along with Parachute, Basalt, Granby, and the Ute Mountain Ute Reservation, each received \$100,000 in funding from the DOE's Energizing Rural Communities program to fund its microgrid plans.³⁹³

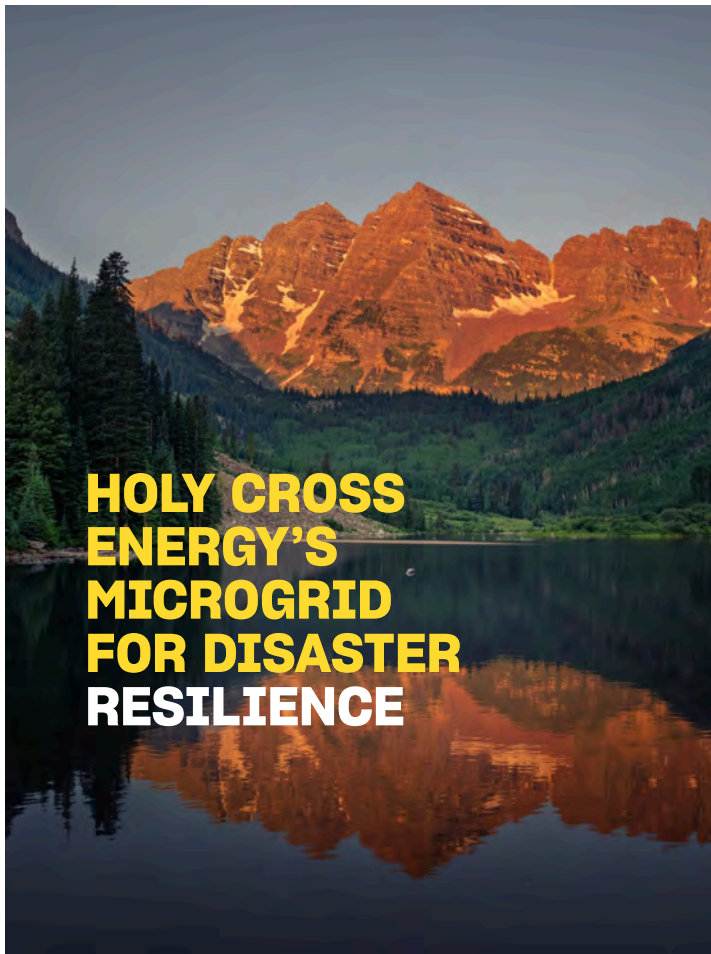
As a further example, a collaborative effort between SMPA and the Town of Ridgway developed the area's first Microgrid for Community Project.³⁹⁴ This system will provide backup solar power, as well as the necessary battery storage for a community Resilience Hub for Ridgway.³⁹⁵ This will be a place where people can gather during weather-related outages to stay warm, charge devices, and have access to the internet. Alternative Power Enterprises designed and installed the system, which includes a 4.8 kW solar array and battery storage capable of powering the Decker Room for up to 1.5 days.³⁹⁶

"The solar/storage microgrid is the first of six microgrids to be installed using funding from the Colorado Department of Local Affairs Microgrids for Community Resilience program in our service territory. Two other similar projects will provide large community scale storage systems capable of four to six hours of backup power for the entire towns of Ridgway and Rico, Colorado. The security and electrical resilience that is the backbone of the new Resilience Hub microgrid provides the building residents and the town a valuable and safe space to gather during any emergency that causes power outages, further uniting an already close community."

-TERRY SCHUYLER, TOWN COUNCILMAN, AND FORMER KEY ACCOUNT EXECUTIVE AT SMPA



SAN MIGUEL POWER ASSOCIATION'S PUSH FOR MICROGRIDS ON THE WESTERN SLOPE OF COLORADO



HOLY CROSS ENERGY'S MICROGRID FOR DISASTER RESILIENCE

The experiences of Pitkin County, home of Aspen, Colorado, highlight how solar microgrids can be lifesaving in rural recreation-based communities vulnerable to natural disasters. In Aspen, the 2018 Lake Christine Fire wildfire nearly destroyed transmission lines that power the upper Roaring Fork Valley, sparking plans for a large-scale solar microgrid to keep critical services, like the airport, public works, and bus facilities, running during emergencies.³⁹⁷ The county's utility, Holy Cross Energy, now operates a five-MW solar farm that supplies the microgrid and charges its battery, strengthening the community's overall resilience.³⁹⁸

As G.R. Fielding, Pitkin County's construction and asset director, explained, "If we do have an event, where we need to activate our microgrid, we can just power these facilities being the airport, public works and the RFTA bus facility with the batteries."³⁹⁹ County Commissioner Greg Poschman added, "Having that battery on the grid allows for more renewable energy...it takes power in when there's an excess and releases it when there's a need. It's a win. It's fantastic."⁴⁰⁰

When Hurricane Fiona ripped through the island of Puerto Rico in 2022, the isolated town of Castaner was able to stay powered with solar microgrids, despite the broader country experiencing the complete collapse of the country's power grid.⁴⁰¹ Castaner relied on batteries charged by approximately 120 rooftop solar panels, which activated after the grid went down to keep five businesses, including food shops, and two homes powered.⁴⁰² This resilience was made possible by Project Adjuntas, supported by the Honnold Foundation, which continues to expand microgrid access across the region to strengthen disaster preparedness and reduce energy costs for local residents.⁴⁰³



PROJECT ADJUNTAS, PUERTO RICO



5.

Political and Structural Challenges and Opportunities to Scaling Clean Energy

Policy and structural challenges – such as outdated grid infrastructure, slow permitting processes, and elimination of clean energy tax credits – continue to hinder the rapid deployment of clean energy across the United States. To overcome these obstacles and protect rural and outdoor recreation-dependent communities from the worsening impacts of climate-driven disasters, robust incentives on all government levels and streamlined regulatory frameworks are essential for accelerating clean energy adoption.

“Our policies are working. We are now starting to see the job impacts of investments made through the infrastructure and inflation reduction laws – first in construction and as America builds more of these factories, we’ll see hundreds of thousands more... The data clearly show that clean energy means jobs – good jobs, union jobs, and jobs retained – in communities across the country as we race to dominate the global clean energy economy.”

–JENNIFER M. GRANHOLM, U.S. SECRETARY OF ENERGY





5.1

Policies and Programs Spotlight: Federal, State, and Local Incentives to Accelerate Clean Energy and Safeguard Economies

Federal, state, and local programs are working to protect economies, safeguard the environment, and address the climate crisis. The following section highlights the most prominent of these initiatives.

Federal



National Environmental Policy Act (NEPA)

As a cornerstone of environmental protections and safeguarding the health and well-being of American citizens, upholding the provisions of NEPA is crucial to the economic and environmental livelihood of the country. Signed into law by President Richard Nixon in 1970, NEPA ensures that federal agencies adequately assess the environmental impacts of proposed actions during the decision making process.⁴⁰⁵ Establishing a national policy for the environment, NEPA created the Council on Environmental Quality (CEQ), and requires agencies to create environmental assessments that include detailed statements on (1) the environmental impact of the proposed action; (2) any adverse effects that cannot be avoided; (3) alternatives to the proposed action; (4) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity; and (5) any irreversible and irretrievable commitments of resources that would be involved in the proposed action.⁴⁰⁶

With Executive Order 14154, "Unleashing American Energy," President Trump directed the CEQ to rescind its NEPA regulations, leaving agencies to develop their own NEPA implementation guidelines that place speed and efficiency over comprehensive environmental reviews.⁴⁰⁷ Furthermore, the recent Supreme Court decision in *Seven County Infrastructure Coalition v. Eagle County, Colorado*, found that under NEPA, the environmental impact statement identifying environmental implications are "purely procedural," handing over extreme deference to federal agencies.⁴⁰⁸ Currently, there are also several bills being considered by Congress to amend NEPA in an effort to reduce the timeline for NEPA analysis and to expedite the permitting process, especially for energy-related projects.



In Colorado, just over \$10 billion in funding from both the IIJA and the IRA has led to improvements across the states to modernize infrastructure, build community resilience, transition to cleaner energy, and drive equity. Figure 42 shows the itemized funds received from these programs and how they contributed to significant improvements for projects like airports, public transportation, and road infrastructure. Without financing from the federal government via these two highly beneficial laws, the state of Colorado would not have been able to make these massive investments for their future.

Inflation Reduction Act (IRA)

Briefly mentioned in Chapter 4, the IRA was the largest incentivization bill ever passed by the federal government to bolster private and public investments in clean energy to support supply chains, job creation, and energy reduction costs.⁴⁰⁹ Passed into law in August of 2022, the IRA was intended to support the Biden administration's climate goals to achieve 100% carbon pollution-free electricity by 2035, a 50-52% reduction of economy-wide net greenhouse gas pollution from 2005 levels in 2030, and net-zero emissions economy-wide by 2050.⁴¹⁰

The IRA was on track to invest \$300 billion into deficit reduction and \$369 billion into energy security, climate related programs, and clean energy infrastructure investment – with the 1,400 GW of existing clean energy generation and storage capacity ready to be connected to the current grid system.⁴¹¹ With the passing of the One Big Beautiful Bill Act (OBBBA), many programs and the majority of funding for the IRA has been paused, canceled, or left uncertain (see 5.1.2).

The IRA's Empowering Rural America (ERA) Program

In 2023, the USDA created the ERA program with a historic \$29 billion investment in rural clean energy, made possible by the IRA.⁴¹² Rural electric cooperatives can use this funding to deploy solar, wind, and battery storage projects, expanding renewable capacity by 35% nationwide.⁴¹³ The USDA estimates these projects will avoid over 43 million metric tons of greenhouse gas emissions annually, while creating 16,000 short-term and 4,500 long-term jobs.⁴¹⁴



Infrastructure Investment and Jobs Act (IIJA)

Also known as the Bipartisan Infrastructure Law (BIL), the IIJA was signed into law by President Biden on November 15, 2021. This legislation authorized \$1.2 trillion in investments towards transportation and infrastructure spending. Of this money, \$550 billion would support “new” investments and programs.⁴¹⁵ The BIL aimed to provide the largest investment in transportation infrastructure since the creation of the interstate highway system. It sought to modernize the power grid by building and upgrading thousands of miles of transmission lines to reduce both power outages and energy costs, as well as help facilitate the expansion of clean energy.⁴¹⁶

By investing in energy efficiency and security for communities, homes, schools, and businesses, the country could support the development, demonstration, and deployment of cutting-edge clean technologies to promote a zero-emission economy, while also creating jobs and bolstering the U.S. manufacturing industry.⁴¹⁷ With an expansive reach and key focuses on transportation, infrastructure, energy, and environment, the IIJA offers massive opportunities to drastically increase economic longevity at the local level throughout the entire country.⁴¹⁸

The EPA's Climate Pollution Reduction Grants Under the IRA

Part of Section 60114 under the IRA, the Climate Pollution Reduction Grants, hosted by the EPA, provides almost \$5 billion of grants to state and local governments, as well as to tribes and territories. This two-phase program gives \$250 million for noncompetitive planning grants and around \$4.6 billion for competitive implementation grants. This allows the EPA to direct much-needed funding and technical assistance to communities in need to increase renewable energy generation and stimulate environmental and economic benefits.⁴²¹

Energizing Our Communities Act (EOCA)

Originally introduced to the House of Representatives on April 26, 2024 to the Subcommittee on Energy, Climate and Grid Security, the EOCA (H.R.8047) intends to “support communities that host transmission lines and to promote conservation and recreation, and for other purposes”.⁴²² Co-sponsored by Representative Annie Kuster (D-NH) and Senator Peter Welch (D-VT), this bill aims to reinvest federal funds generated from clean energy development federal loan programs back into the communities hosting these projects.⁴²³

These funds would support essential services like roads, schools, libraries, hospitals, and, of course, outdoor recreation.⁴²⁴ Additionally, The EOCA accelerates energy infrastructure development by involving communities in the process and building support through the benefits they receive from hosting these essential projects. The EOCA was reintroduced in the 119th Congress on September 17, 2025, and has two tandem bills in the Senate and [as S. 2835 by sponsor Senator Peter Welch (D-VT) and cosponsor Senator John Hickenlooper (D-CO)]⁴²⁵, and in the House on the same date as H.R. 5424, sponsored by Representative Sean Casten (D-IL)]⁴²⁶, (see **6.1**).⁴²⁷ The Energizing Our Communities Act is endorsed by Grid Action, National Association of Counties (NACo), National League of Cities (NLC), Pathway Power, Protect Our Winters, Vermont Electric Power Company (VELCO), and the Vermont League of Cities and Towns (VLCT).⁴²⁸

The EPA's Technical Assistance to Energy Communities

This EPA-headed program helps local communities work towards their clean energy goals with projects such as coal mine and power plant reuse and redevelopment and revitalization and workforce transition. The eligible community receives a two-day workshop to form an implementation plan of action to promote economic and environmental development.⁴²⁹

The EPA's RE-Powering America's Land

RE-Powering America's Land Initiative, spearheaded by the EPA, supports renewable energy development on current and formerly contaminated lands, landfills, and mine sites when such development is aligned with the community's vision for the site. Many of these “unusable” properties offer unique value to developers, including leveraging existing infrastructure, reducing project cycle times through more efficient permitting and zoning, improving project economics with lower land costs and added tax incentives, protecting open space, and garnering community backing through land revitalization.⁴²⁹

The BLM's Renewable Energy Rule

The Renewable Energy Rule, finalized by the Biden administration program in May 2024, updated regulations to promote better solar and wind projects on public lands. The rule reduced acreage rents and capacity fees, streamlined the BLM's application process, and delivered better rules for future project authorizations. The rule followed initiatives of the Biden administration to create more incentives for these types of projects to be made with American parts and materials constructed using union labor. However, in a recent DOI press release, the agency has announced a proposed rescission of this rule to align with the directives of EO 14154 and Secretary's Order 3418.⁴³³

State & Local



Another way to scale the clean energy transition is to create incentives and channel investments into clean energy at the state and local levels. Private and public collaboration through state and local governments can help create incentives for all communities, especially ones that rely on tourism and outdoor recreation. Policies can accelerate the clean energy transition through financial incentives – including personal, corporate, sales, and property tax credits – and regulations promoting renewables in building design and construction.

California & Washington State

California and Washington State launched “cap-and-invest” programs in 2012 and 2021, respectively. These programs target the largest emitting sources and industries, set declining limits or “caps” on greenhouse gas emissions for those entities, require that they to purchase “allowances” for the pollution they are causing, and the revenue generated through these allowances is reinvested in clean energy projects, climate resiliency, clean transportation, and addressing communities most severely impacted by air pollution.⁴³⁵

Colorado

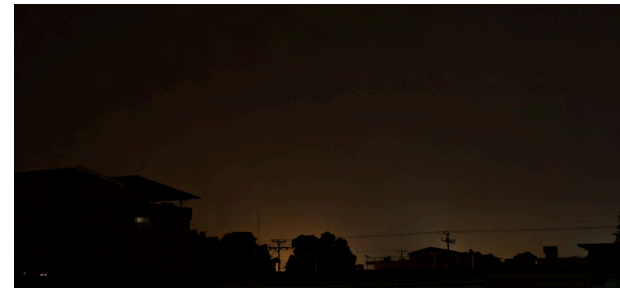
Colorado has similarly taken large strides in decarbonization and transformation of their energy system. In 2010, Colorado passed House Bill 10-1342, or The Community Solar Gardens Act, which increased solar energy investment, improved community access to installing solar, and reduced electricity costs by 5-50% for low-income households.⁴³⁶ Passing bi-partisan House Bill 25-1165 in May 2025, Colorado focused on management of underground energy resources in the state, updated legislation surrounding geothermal resources and provided regulatory clarity for geothermal and water projects.⁴³⁷ This bill establishes the state as a leader in the future of geothermal energy, while also saving money for residents and providing an alternative energy source.⁴³⁸

Nevada

Through the Inflation Reduction Act, the Nevada Clean Energy Fund was awarded a \$156 million grant in April 2024 to finance community solar projects that benefit low-income households under the Solar for All program.⁴³⁹ Relying on unspent money appropriated under the IRA, this program offsets the costs of installing solar panels on homes and businesses.⁴⁴⁰ In addition, Nevada received a \$7.7 million grant in January 2024 which they are using to deploy 25 electric school buses across Nevada as a part of the EPA’s Clean School Bus program. The Clean School Bus program provides \$5 billion over five years (FY 2022-2026) to replace existing school buses with zero-emission and clean school buses.⁴⁴¹ This program significantly lowers fuel and maintenance costs, supports local grid resilience, reduces emissions in communities where they are deployed, provides health benefits to children, and ensures no upfront cost to schools. This is particularly impactful in that every Nevada school district, especially rural remote areas, have access to electric school bus opportunities.⁴⁴² However, the current administration has canceled the Solar for All program and also paused the Clean Bus Program so the future of both programs’ funding remains unclear.

New Mexico

New Mexico became a national leader in energy transition policy with the passage of Senate Bill 358 in 2019, or the Energy Transition Act (ETA). The ETA establishes renewable portfolio standards, including 100% renewable power by 2050.⁴⁴³ The goals outlined in this bill include pursuing non-oil-and gas-related commercial development, promoting outdoor recreation and diversifying revenue beyond recreation permit sales, and monetizing conservation on state trust lands.⁴⁴⁴ In addition, New Mexico’s Land Grant Permanent Fund (LGPF) is a large investment fund that was established in 1912. Using revenue from oil and gas companies, this fund channels investments into communities that benefit public schools and other beneficiaries. The State Land Office has successfully built up the LGPF over \$23 billion.⁴⁴⁵ While transitioning from oil and gas may still be decades away because of the leases currently in production, New Mexico is exhibiting forward-thinking, anticipating eventual slowdown in royalties.⁴⁴⁶



Rural Texas - San Angelo and Water Valley

In many rural towns of Texas, new wind and renewable energy projects on farmland have contributed a significant amount through both local tax dollars and new job development.

Rural communities have become dependent on the growth of new clean energy projects for their livelihood – the current state of these projects and their storage is estimated to pay almost \$50 billion in payments to landowners and local taxes in their lifespan.⁴⁴⁷

Furthermore, more than 75% of counties in the Lone Star State are on track to receive tax revenues from wind, solar, or energy storage operations.⁴⁴⁸ For example, in northwest Texas towns of San Angelo and Water Valley, revenue from wind power has increased money for a tax-free bond election that was improvised to the town of Water Valley’s K-12 school.⁴⁴⁹ The wind farm alone is supposed to produce \$123 million in taxes over the 30-year life of the cooperation, in addition to \$100 million directly to landowners who are leasing their properties.⁴⁵⁰ However, with the passing of the “OBBA” has been set to halt or cancel many of these projects.⁴⁵¹

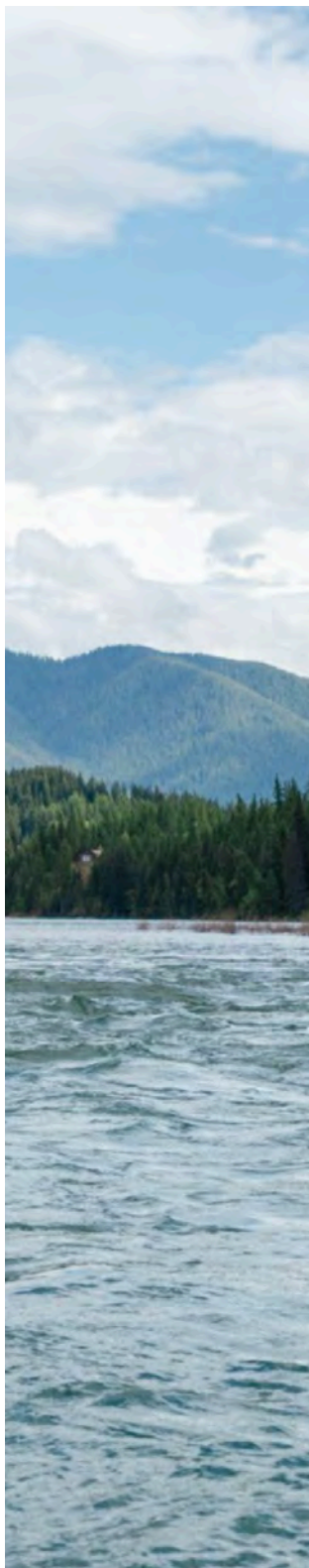




5.2

Policies and Programs Spotlight: Current Policies That Hinder Clean Energy Acceleration

Federal, state, and local initiatives can also make strides to hinder clean energy development, which can further contribute to climate change, worsen negative environmental impacts, and slow the building of more resilient communities nationwide. The following section highlights the most prominent of these initiatives.



The One Big Beautiful Bill Act (OBBBA) and IRA Funding Cuts

With a “drill, baby, drill” agenda, the Trump administration has done everything in its power to roll back any initiatives or incentives around the improvement of energy infrastructure or the lessening of fossil-fuel driven carbon emissions. As of October 2024, Republicans have voted 53 times in the House and once in the Senate to repeal certain parts of the IRA, and the House has passed 20 bills that attempt to repeal or restrain the IRA’s power.⁴⁵² Most attempts to stifle the IRA focus on the prevention of funding and implementation processes outlined in Executive Order 14082 – the others target the Greenhouse Gas Reduction Fund, the Methane Emissions Reduction Program, energy efficiency rebates, electric vehicles tax credit, and the DOE loan program.⁴⁵³

As of May 2025, the DOE had axed almost \$4 billion in clean energy grants. Some of those grants included decarbonization efforts in the cement and food and beverage industries, as well as an Exxon Mobil hydrogen energy initiative in Texas.⁴⁵⁴ OBBBA, passed just after July 4, 2025, dramatically curtailed IRA funding, primarily through the termination of clean energy tax credits, and speeding up the phase out for projects that begin construction after July 4th, 2026. Permitting delays, funding freezes, and uncertainty around the implementation of IRA projects and their current status have caused companies to cancel or downsize these projects, contributing to almost \$8 billion in lost investments and thousands of lost jobs.⁴⁵⁵ In October 2025 and administration officials cut another \$7.56 billion in economic awards to 223 energy projects, all in states that voted for former Vice President Kamala Harris in the 2024 election.⁴⁵⁶

Removal of the Endangerment Finding

In July of 2025, the EPA announced the possible removal of the 2009 Greenhouse Gas Endangerment Finding. Found in Section 202 of the Clean Air Act, this rule serves as the legal foundation for all federal climate regulation, including fuel economy standards, vehicle emissions rules, and power plant regulations.⁴⁵⁷ This finding prescribes the standards for greenhouse gas emissions, and the possible rescission of this finding sets to completely remove emission standards and greenhouse gas regulations.⁴⁵⁸ Without the Endangerment Finding, the country stands to lose the authority of the EPA to regulate climate pollution, protect public health, and address the climate crisis. This is particularly important for those communities who are more affected by wildfire smoke, urban smog, extreme heat, and degraded air quality.⁴⁵⁹

Cancellation of Offshore Wind Project Permits

Since the onset of President Trump’s administration, the White House has taken multiple steps to slow or completely stop the development of offshore wind projects. Because the majority of offshore wind projects are located more than three miles from the coast, they are in waters managed by the federal government. Dozens of projects off of the New England coast, in various stages of development or permitting, are now left in uncertain waters. For example, the Revolution Wind project off of Rhode Island would help power 2.5% of the entire New England region and the project’s cancellation could threaten the reliability of the region’s power grid according to ISO New England (the region’s grid operator).^{460, 461}

The Congressional Review Act and Rescission of Resource Management Plans

By passing Congressional Review Act (CRA) resolutions, Congress has made strides against multiple BLM Resource Management Plans (RMP). Enacted as a piece of the Small Business Regulatory Enforcement Fairness Act in 1996, the CRA is a tool that Congress can use to overturn the actions of federal agencies. If both houses and the President approve joint resolutions of disapproval, or through a Congressional override of a Presidential veto, the rule at issue cannot go into effect or continue in effect.⁴⁶²

Thus far, Congress has voted to pass multiple resolutions that affect the management of millions of acres of public lands in states like Montana, North Dakota, Alaska, Nevada, and more to come. Possible impacts of these rescissions include voided energy leases, grazing permits withdrawn, restoration projects canceled, and affected public land access.⁴⁶³

THE AMBLER ROAD PROJECT APPEAL IN ALASKA



In June 2024, the BLM denied a permit for construction of a 211-mile road that would allow industrial access for mining in the Alaskan wilderness of Brooks Range, stating the development would have many impacts, primarily the risk of harm to permafrost habitat and the migration lands of the Western Arctic Caribou Herd.⁴⁶⁴ The decision by the BLM and U.S. DOI, with support from the NPS, stated that the development would cut through massive portions of public lands, including the Gates of the Arctic National Park and Preserve, and regions managed and owned by the BLM, the State of Alaska, and Native Alaskan tribes.⁴⁶⁵



The construction would impact vegetation, wildlife, outdoor recreation, and the 66 communities that rely on harvesting subsistence resources within or around the project's scope.^{466, 467} The disruption to this minimally developed area over the project's proposed 30-year timespan poses threats to air and water quality – with the added risks of spills, unforeseen accidents, and negative health impacts.^{468, 469} Public comments in the Ambler Road Environmental Impact Statements (EIS) showed that citizens value the area for the subsistence opportunities, the untouched land and waters, its ancestral ties and significance, and the recreation and tourism-based opportunities it provides.⁴⁷⁰

As of October 2025, the Senate passed a resolution (H.J. Res. 106/S.J. Res 63) to overturn the BLM's Central Yukon RMP using the power of the CRA. This BLM management plan was finalized during the Biden administration and would have completely blocked the Ambler Road Project.⁴⁷¹ The reversal of this decision via executive order allows the Ambler Road Project to happen in order to promote the mining of copper, cobalt, gold, and other minerals. The White House also announced its 10% equity in and partnership with Trilogy Metals, one of the international companies financing the project.⁴⁷²



5.3

Political and Structural Challenges: Regulatory Lag, Permitting Delays, and Environmental Reviews

The transition to clean energy faces numerous challenges that shape economic development at the local, state, and national levels. Regulatory delays and long permitting and environmental review processes all slow progress toward energy independence and stronger environmental protections, particularly in regions that depend on outdoor recreation or are most vulnerable to worsening climate disasters. Building and expanding grid infrastructure can take many years to hop through the many bureaucratic hurdles, including permitting, siting, and mandated regulatory measures. This becomes even more difficult when crossing state lines and sprawling regions at the same time.

Environmental Assessments (EA), Permitting Expedition, and the Federal Powers Act

While the demand for better energy infrastructure and safeguards from extreme weather, power outages, and lack of energy infrastructure is urgent, expanding electric transmission must undergo years of permitting, siting, and regulatory processes to begin construction.⁴⁷³ While environmental assessments and the resulting document, EIS, are crucial to protect lands, water, air, and communities from unsafe and hazardous conditions, the current processes for both of these assessments need to be expedited. Mandated under NEPA, these reports can take an average of years to complete, and a reduction in completion time is necessary to get clean energy projects on the grid sooner. A part of these assessments include the very crucial public comment period, which the current administration has attempted to shorten or remove altogether. This public comment period is key in allowing citizens, organizations, and key stakeholders an opportunity to voice their concerns and opinions in the rule making process.

In efforts to streamline this process, there is the Federal Powers Act (FPA), which gives the Federal Energy Regulatory Commission (FERC) and the Secretary of Energy the authority to regulate wholesale electricity, transmission development, and energy sales.⁴⁷⁴ According to the DOE, energy consumers are routinely harmed by a lack of transmission infrastructure, which can result in higher electricity prices, more power outages in extreme weather events, and longer outages due to a lower ability to get grids back online.⁴⁷⁵ Under the FPA, the Secretary of Energy can designate any region in the country as a National Interest Transmission Corridor (NITC) if it is found that consumers are harmed by lack of transmission and would benefit from new transmission to increase reliability and reduce consumer costs.⁴⁷⁶

Most recently, the DOE has announced it is moving forward with three potential NITCs and is currently in the Phase 3 public engagement state of the initiative. Focusing on areas where they believe this designation holds the most value to unlock federal tools to quicken transmission development, the DOE states they will “evaluate the impacts of any such proposed action on human health or the environment, as required by NEPA”.⁴⁷⁷

Shown in Figure 43, the three proposed corridors are:

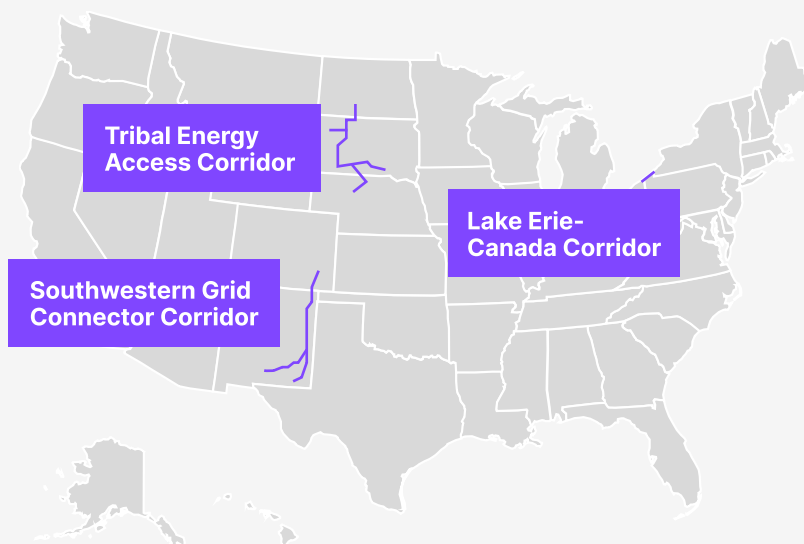
1. Tribal Energy Access Corridor in parts of Lake Erie and Pennsylvania
2. Southwestern Grid Connector Corridor in parts of Colorado, New Mexico, and Oklahoma
3. Lake Erie-Canada Corridor in parts of North Dakota, South Dakota, Nebraska, and five Tribal Reservations

The future of these NITC designations is looming as the phase 3 public engagement period comes to a close, and the DOE then makes a decision of the level of NEPA review required for each corridor. Phase 4 (NITCs Designated) will then follow, with necessary environmental reviews conducted, as well as any other relevant federal statutes followed, before the DOE will release drafts of the designation reports and environmental documents, before both will be open to public comment.⁴⁷⁸

FIGURE 43:

Potential National Interest Electric Transmission Corridors

December 2024





6.

Recommendations and Next Steps for Other Organizations to Use This Report

Climate-driven disasters are escalating in cost, frequency, and severity, placing heavy economic burdens on communities. Rural communities that rely on outdoor recreation feel these impacts profoundly as disasters can disrupt access to public lands, reduce visitor spending, and strain local economies. At the same time, widespread dependence on fossil fuels for energy production is not only linked to worsening natural disasters but also leaves communities vulnerable, as seen during Texas's 2021 winter storm.

Outdoor recreation and clean energy are not competing interests. They are complementary tools for community resilience. Recreation economies rely on stable climates and reliable infrastructure, while clean energy reduces emissions, sustains landscapes, and protects the very communities that recreation depends on. Case studies, from Aspen's microgrid resilience planning to the collaboration of solar projects at Chuckwalla National Monument, demonstrate how this intersection works in practice.

The need for action is urgent. By investing in clean energy, utilizing a place-based approach, protecting public lands, and developing rural disaster resilience plans, the U.S. can cut disaster costs, safeguard outdoor recreation, protect rural economies, and build a more sustainable future. The following are POW's recommendations to create a more resilient and economically vibrant future for rural, recreation-dependent communities and beyond.

THIS REPORT WAS MADE FOR EVERYONE

Local, State, and Federal Governments

Clean Energy Organizations

Nonprofits

Public Lands and Conservation Organizations

National and State Developers

The Outdoor State



6.1

Clean Energy Investment in Rural Communities

Investments in clean energy infrastructure can reduce fossil fuel dependency, revitalize local economies, strengthen resilience, and give rural communities more control over their energy future. Clean energy can act as a secondary means of allocating resources to communities that also rely on **outdoor recreation**. This is where the previously mentioned Energizing Our Communities Act comes in (see 5.1).⁴⁷⁹

The EOCA would enable rural communities to strengthen their economies and infrastructure and to build resilience, while supporting the critical energy infrastructure that's needed to meet growing energy demand. Developing this infrastructure is key to achieving the country's clean energy and climate goals, but it cannot happen without the involvement and support of the communities involved in these projects.⁴⁸⁰

Put simply, the EOCA invests funds derived from the interest collected on several DOE programs to make sure counties receive compensation for transmission lines and other energy infrastructure. The interest rates from certain programs are paid back to the Treasury for certain programs that are awarded to the communities hosting clean energy infrastructure projects. These funds remain 80% unrestricted for jurisdictions to use as necessary for critical needs such as roads, schools, hospitals, libraries, first responders, and more. The remaining 20% is allocated to outdoor recreation access, conservation, stewardship, and natural climate solutions.⁴⁸¹ "The transition to clean, affordable, and reliable energy represents one of the greatest economic opportunities of our time," said Rep. Sean Casten. "The Energizing Our Communities Act seizes that opportunity by investing in the communities that will host the power lines that take cheap electricity from where it's generated to where it's needed, spurring economic growth along the way. It's a win for our planet and for the people at the heart of the clean energy transition."⁴⁸²



"Expanding transmission lines is key to achieving a clean energy future and ensuring long-term welfare of communities in Vermont, New England, and across the country. But building a comprehensive and reliable transmission grid that connects communities to renewable energy won't happen overnight. That's why it's crucial to support community buy-in programs that work to increase transmission build out at the ground level."⁴⁸³

-SENATOR PETER WELCH (D-VT), MEMBER OF THE SENATE AGRICULTURE COMMITTEE AND CHAIR OF THE SUBCOMMITTEE ON RURAL DEVELOPMENT AND ENERGY, SPONSOR OF EOCA



6.2

Utilizing a Place-Based Approach

When developing in communities, whether that is outdoor recreation, clean energy infrastructure, or any other alteration, it is imperative to take a place-based approach. Every community is unique and with that comes unique challenges and opportunities. It is important to call out that climate impacts vary regionally, from flash flooding to extreme heat to hurricanes, based on local industries and geography.⁴⁸⁵ Thus, while outdoor recreation and renewable energy offer development opportunities, a place-based approach recognizes that community needs are not uniform, and solutions must reflect each community's unique needs, geography, and culture.⁴⁸⁶

Developing place-based clean energy solutions and leveraging outdoor recreation within communities must be uniquely tailored to meet the needs of the host communities. While microgrids and community solar or wind projects may be viable options for rural areas with limited access to traditional transmission lines, these solutions need to reflect local values: aesthetics, views, land conservation, and economic drivers like agriculture or tourism. Since energy policy is fundamentally local, clean energy offers rural communities a chance to regain control, promote sustainable transitions, strengthen engagement, minimize environmental harms, and enhance local energy security.^{487, 488, 489}

EFFECTIVE PLACE-BASED STRATEGIES INCLUDE:

- Engaging community members, local elected officials, and rural stakeholders in project planning (provide project planning examples)
 - Clean energy
 - Outdoor recreation
 - Transportation
- Developing integrated solutions addressing economic development and housing
- Implementing community benefit agreements
- Using financing mechanisms that share costs with visitors (e.g., diverting tourism revenue to offset impacts on roads, water systems, and emergency services)
- Scenario planning to overcome infrastructure under-investment⁴⁹⁰



6.3

Protecting Public Lands

Public lands play a multifaceted role in supporting both environmental and economic resilience. They provide vital ecosystem services, such as carbon storage, watershed protection, and habitat conservation, that help reduce the severity of climate impacts.⁴⁹¹ Public lands also generate financial benefits for rural communities by attracting visitors and generating revenue through permits and other land-use activities. Additionally, they offer space for renewable energy projects that typically have far lower environmental impacts than fossil fuel development, creating opportunities for sustainable growth and climate mitigation.

Clean energy development on public lands is already underway. The BLM has permitted 71 geothermal, 66 solar, 43 wind, and 43 transmission line projects, with a combined capacity of ~37 GW - enough to power 16.6 million homes.⁴⁹² The solar projects alone have already avoided 11.39 million metric tons of CO₂ emissions.⁴⁹³ Currently, BLM is reviewing 58 additional projects in the western U.S. that could add another 25,669 MW of renewable energy to the grid.⁴⁹⁴

Protecting public lands while advancing clean energy is not contradictory - it can strengthen both ecosystems and economies.



6.4

Develop Rural Disaster Plans with the Outdoor Recreation Economy in Mind

Rural communities should integrate natural hazard resilience directly into their community and economic development strategies. Resilience plans should be integrated into all existing community plans and developed with input from tourism-related businesses, recreation groups, utilities, and destination management organizations. Plans should also prioritize renewable energy for disaster response and sustainable relief operations.⁴⁹⁵

This could look like:

- Implementing zoning/building codes that enhance disaster resilience.
- Designing parks and trails for stormwater mitigation, fire breaks, and firefighting access.
- Managing watersheds to support both recreation and risk mitigation.
- Promoting shoulder-season recreation when climate risks are lowest.
- Using tourism-related revenue (e.g., lodging taxes) to fund community-scale solutions like solar microgrids.



POW'S CALL TO ACTION

The economic case is undeniable: disasters are draining public coffers while fossil fuel dependence leaves communities exposed. Protect Our Winters and the Outdoor State are showing up on Capitol Hill, in districts, and across the country, to hold Congress accountable for its inaction on climate. As climate disasters escalate, the cost to communities and taxpayers is skyrocketing. In 2024 alone, climate-fueled disasters cost the U.S. \$182.7 billion, with damages averaging \$141 billion per year since 2020, a 47% increase from the previous decade.

Rural, recreation-based economies are taking a hit. Wildfires, floods, and extreme weather are disrupting tourism and destroying the public lands that drive a \$1.2 trillion outdoor recreation economy supporting over 7.6 million American jobs. Yet Congress continues to advance measures that roll back clean energy investments, weaken environmental protections, and open public lands to reckless development.

POW's message is clear: progress, not paralysis, must define our climate policy. We show up in D.C. to advocate for pragmatic, bipartisan solutions that reduce emissions, protect communities, and modernize our energy system. The Cost of Inaction report makes the case: investing in clean energy and resilient infrastructure isn't just good climate policy, it's sound economics. Clean energy investment is a triple win: reducing long-term disaster costs, strengthening rural and recreation economies, and building a more sustainable and resilient future.

Lawmakers have a choice: continue subsidizing pollution and risk our communities, or work with the Outdoor State to build a future powered by clean energy, strong local economies, and protected public lands.

The cost of inaction is rising.

The time to act, through bipartisan, forward-looking legislation, is now.



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appendix and
additional resources.





