Resilient Energy Economies

A Research Agenda for Economic Resilience in Fossil Fuel–Dependent Communities

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About

The Resilient Energy Economies initiative operates at the intersection of rigorous economic research and actionable policy development. Leveraging the combined expertise of scholars from across the country, our approach is grounded in a deep understanding of the economic dynamics that underpin energy transitions. Our objective is to ensure that the transition toward net-zero emissions is both economically viable and socially equitable, laying the foundation for a future where all communities can thrive.

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Summary

World leaders have committed to a transition away from fossil fuels in the energy system. Yet local communities across the United States depend on fossil fuel industries for high-paying jobs and essential public services. Building economic resilience in these communities will increase the likelihood of a successful response to climate threats and help ensure that the benefits and burdens of an energy transition are broadly shared.

Policy support for fossil fuel–dependent local economies in the United States is growing but remains limited. Only a scant body of rigorous evidence exists on how to effectively and equitably increase economic resilience in these communities. This article describes the critical need for additional scholarship to help policymakers design, implement, and evaluate strategies for supporting the economies of fossil fuel–dependent regions. It also highlights key research questions that can inform decisionmakers in the years ahead.

Introduction

In December 2023, world leaders convened in Dubai and pledged to transition the energy system away from fossil fuels in response to the threats of climate change (United Nations Framework Convention on Climate Change 2023). To understand how the unprecedented economic transformations required to achieve this goal may alter the world's energy markets and physical energy infrastructure, decisionmakers can look to thousands of publications from hundreds of energy system models that depict the trade-offs on critical issues, such as the speed and depth of emissions reductions, their costs, and the effects on global energy access.

In Dubai, world leaders also committed to a "just, orderly, and equitable" transition, a charge that includes all of society, with special attention to those who are most vulnerable to climate change and the economic changes required for decarbonization. However, compared to the literature on the physical energy system, only a scant body of evidence exists on how to increase economic resilience[1] in fossil fuel–dependent communities as the world transitions away from fossil fuels. Most research on this topic has focused on characterizing the scope of the challenge (Graham and Knittel 2024; Hanson 2023; Lawrence 2024) and providing broad principles for addressing it (Cha et al. 2019; Holt Segall 2021; BlueGreen Alliance 2021), rather than proposing and evaluating specific policy interventions.

This article discusses the critical need for additional scholarship to help policymakers design, implement, and evaluate strategies for supporting the economies of fossil fuel–dependent regions. Our focus is on the United States, although the challenge applies to regions and nations around the world (Foster et al. 2024).

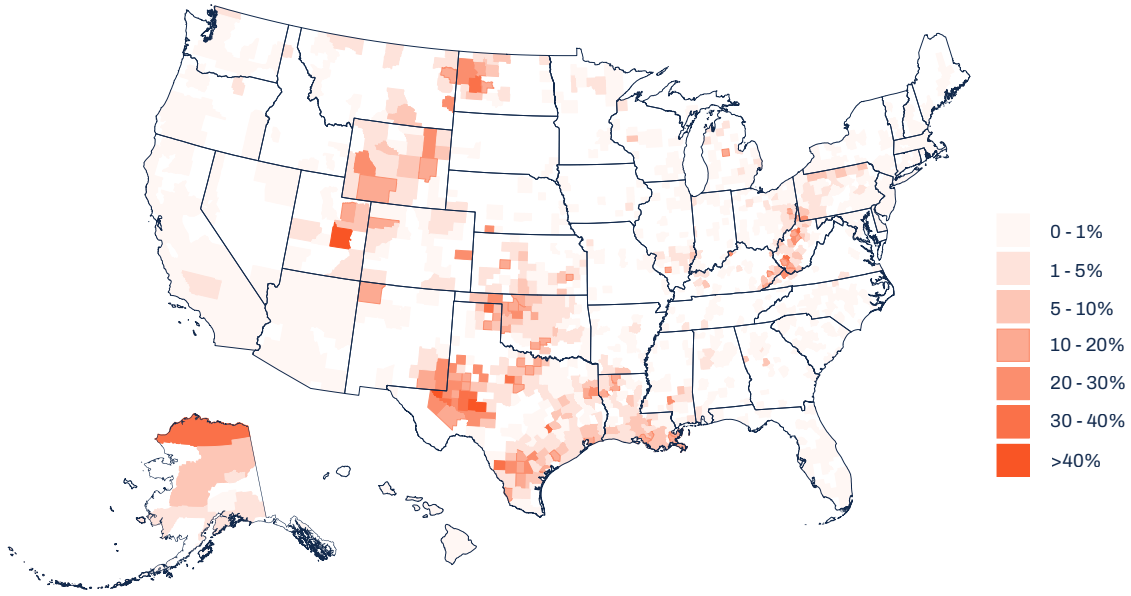
Among other priorities, we recommend research on alternative employment options for the fossil fuel workforce, policies to support governments that depend heavily on fossil fuel revenues, and lessons from previous economic transitions. We also highlight the need for meticulous tracking of ongoing efforts to build economic resilience in fossil fuel-dependent communities to inform the design of more effective strategies over time.

1 By "economic resilience," we refer to the ability of local and regional economies to recover from negative economic shocks (Martin 2012)—in this case, from declining demand for and production of fossil fuels.

The Need to Support US Fossil Fuel–Dependent Communities

The United States is the world's largest producer of oil and natural gas and the fourth-largest producer of coal (Energy Institute 2023). Figure 1 illustrates how fossil fuel industries account for large shares of employment in certain regions (the figure illustrates direct jobs only, excluding indirect or induced employment). State and local governments in these regions also depend heavily on fossil fuel industries for revenue to fund schools, roads, and other essential services (Raimi et al. 2023, 2024).

Figure 1. Direct Fossil Fuel Employment Share by County



Notes: Map by authors based on data from US Census (2023). Percentages represent the share of total employment in each county that comes from North American Industrial Classification Codes sectors 211, 213111, 213112, 213113, 2121, 221112, 221210, 23712, 324, 33313, 4247, and 486 (see Table A-1 in the Appendix for code definitions).

Since its peak in 2008, US coal production has declined by roughly half due to the increased availability of low-cost natural gas, environmental concerns, and other factors (Coglianese et al. 2020; EIA 2024). This decline has created deep economic hardship in some coal-dependent regions, mirroring the experiences of other communities that have lost dominant industries (Morris et al. 2021; Hanson 2021). A transition away from fossil fuels in the coming decades

will create an overlapping mix of economic, environmental, and social challenges for many more US communities, raising the need for new strategies that can build economic resilience, ensure continued high-quality employment opportunities, and maintain public services. Adding to these challenges, as long as fossil resources are still in use, safety and reliability concerns require workers and host communities to continue supporting fossil infrastructure, even with the awareness that such activities are finite (Grubert and Hastings-Simon 2022).

Supporting fossil fuel-dependent communities matters for the world's climate ambitions as well. A global response to climate change requires strong US leadership, but providing it will be difficult, if not impossible, if large parts of the nation and their elected representatives oppose climate action in part due to the economic risks of a transition away from fossil fuels. Thus, increasing economic resilience in fossil fuel–dependent regions will advance two major objectives: (1) increasing the likelihood that the United States (and the world) will successfully respond to climate threats and (2) ensuring that the benefits and burdens of an energy transition are broadly shared.

Growing Policy Support

In some fossil fuel–dependent regions—particularly those where coal mines and power plants have closed or face uncertain futures—local government officials, economic development practitioners, and others have worked for years—if not decades—to build local economic resilience. However, their financial and technical capacities are often limited. Until recently, the US federal government had taken few steps to help these communities plan for the future (one exception was the Obama administration's POWER initiative, which received partial finding from Congress of $100–200 million per year to support struggling coal communities (Kaufman 2023)).

In recent years, federal support for fossil fuel communities has increased markedly. The Biden administration has put place-based policy at the center of its economic agenda and established an Interagency Working Group (IWG) to support economic development objectives in coal-dependent regions.

New laws, particularly the American Rescue Plan (2021), Infrastructure Investment and Jobs Act (IIJA, 2021), and Inflation Reduction Act (2022), have authorized major place-based investments. Table 1 illustrates the wide range of programs and policies that exclusively or partially target fossil fuel–dependent communities, including funding boosts for long-standing programs, such as the Appalachian Regional Commission, and new financial incentives for

Table 1. Federal Funding Tied to Place-Based Policy in Fossil Fuel–Dependent Communities

Program	Focus on Fossil Communities	Funding
IWG on Energy Communities (1)	Exclusive	$5 million/year
Health and Human Services Focus on Energy Communities (2)	Exclusive	~$25 million/year
DOE Clean Energy Demonstration Program on Current and Former Mine Land (3)	Exclusive	$500 million
Assistance to Coal Communities (4)	Exclusive	~$550 million
DOE Advanced Energy Manufacturing and Recycling Grant Program (3)	Exclusive	$750 million
Appalachian Regional Commission (3)	Partial	$1 billion
Brownfields (3)	Partial	$1.5 billion
Carbon capture demonstration and pilots (3)	Partial	Over $3 billion
Hydrogen hubs (3)	Partial	~$4 billion
Advanced Manufacturing Tax Credit (5)	Partial	$4 billion for coal communities
Orphaned oil and gas wells (3)	Exclusive	$4.7 billion
DOE Energy Infrastructure Reinvestment Loan Program (5)	Exclusive	$5 billion credit subsidy (up to $250 billion loan authority)
Abandoned Mine Lands (3)	Partial	~$11 billion
Energy Community Tax Credit Bonus (5)	Exclusive	Likely tens of billions

Notes: Authors' analysis of various programs as of January 2024. 1: Established in Executive Order 14008. 2: Authorized under the Consolidated Appropriations Act of 2023. See Appendix for details on these programs and state and NGO-led efforts. 3: Authorized under the IIJA. Appalachian Regional Commission has ongoing funding, with $200 million in appropriations in FY 2023. 4: $552 million was funded under various American Rescue Plan programs and the Build Back Better Regional Challenge, with ongoing funding of $50 million/year. 5: Authorized under the Inflation Reduction Act. See Appendix for details.

clean energy development. Many other programs that do not specifically target fossil fuel-dependent communities offer funding for which these communities are also eligible.

States, Native nations, and NGOs are also seeking to build economic resilience in fossil fuel-dependent regions. For example, Colorado, Illinois, and New Mexico are implementing plans to support coal communities (Colorado Department of Labor and Employment 2020; Kriz 2023; Candelaria et al. 2019), and California is beginning a statewide effort to build economic resilience, including in its major oil-producing region (California Governor's Office of Planning and Research 2024). Fossil fuel–dependent Native nations, such as the Southern Ute Indian Tribe, are diversifying their economic development strategies to support long-term economic and fiscal health (Southern Ute Indian Tribe 2023). NGOs, such as the Just Transition Fund and National Association of Counties, are working to help coal communities diversify their economies, respond to economic disruptions, and build networks between community leaders (Just Transition Fund 2023; National Association of Counties 2023).

Limitations of Existing Policies

Although unprecedented in magnitude and scope, these efforts to support fossil fuel–dependent communities are likely insufficient for a variety of reasons. First, they primarily focus on coal communities, whereas the oil and gas sector is a larger employer and public revenue generator (IEA 2023; Raimi et al. 2023). Some major programs, such as the federal bonus tax credit for investment in "energy communities," also poorly target the locations with the greatest economic dependence on fossil fuels (Graham and Knittel 2024).

Second, most policies focus not on building long-term economic resilience but instead focus narrowly on boosting clean energy deployment or addressing site contamination. Moreover, in places where alternative private sector investment and employment opportunities may be limited, existing policies generally do not offer other forms of relief for workers or communities, such as extended unemployment insurance, support for local government finances, or other broad needs.

Third, these efforts—particularly at the federal level—offer little assurance that policies will be sustained. Although political priorities naturally change over time, the deep divide between the two major US political parties on energy and climate policy threatens the durability of public policies, including those designed to build economic resilience. A lack of sustained commitment to these regions will exacerbate many local stakeholders' distrust of the federal government, deterring their participation in ongoing and future efforts (Gazmararian and Tingley 2023).

Fourth, policy efforts are small, relative to not only the needs of workers and communities but also the scale of investment flowing to transform the physical energy system. For example, federal incentives to speed deployment of clean energy in the Inflation Reduction Act may cost $1.2 trillion over the next 10 years (Goldman Sachs 2023), whereas federal programs focused on fossil fuel–dependent communities are smaller by roughly two orders of magnitude (see Table 1). Similarly, no federal program supports state and local government budgets that receive tens of billions of dollars annually from fossil fuel extraction and infrastructure (Raimi et al. 2023).

Finally, with only a limited evidence base on what strategies offer the most promising approaches, the design of place-based policies to support fossil fuel communities has been driven primarily by theories of change and political expediencies. Such a lack of analysis and evidence creates an enormous opportunity for scholars.

The Opportunity for Additional Scholarship

A modest but growing body of research examines strategies for building economic resilience in fossil fuel–dependent communities. Insights include the importance of proactive planning for future transitions (Haggerty et al. 2018; Grubert 2020) and the need to empower local communities (Grubert and Hastings-Simon 2022). Scholars have also begun to establish crucial baseline data, such as the employment and economic outcomes of displaced fossil fuel workers (Curtis et al. 2023; Colmer and Krause 2024; Colmer et al. 2023).

Still, much more research is needed to identify and evaluate tangible strategies that can scale to meet the challenges facing the economies of fossil fuel–dependent regions. Notably, the discipline of economics has, with some important exceptions (e.g., Bartik 2020), focused on the limitations of place-based policies rather than designing better strategies to support these local economies. Thankfully, economists and other scholars are now focusing more attention on these issues due in part to the unique challenges posed by the energy transition and a better understanding of the limits of capital and labor mobility (Hanson 2023; Krause 2023; Lawrence 2024).

The remainder of this section describes how new scholarship can help policymakers better identify and mitigate risks to local economies. As with any emerging research program, new areas will also arise, leading to a dynamic accumulation of knowledge and best practices.

First, research is needed to better understand the nature and scale of the forthcoming challenges facing fossil fuel–dependent economies. Fiscal risks are one key example. The loss of dominant industries can create downward spirals of eroding local tax bases and increased difficulty raising public funds (Morris et al. 2021; Anderson 2023), degrading the public services that are vital to future economic development and community well-being. In fossil fuel–rich states that lack income taxes (e.g., Texas and Wyoming) or broad-based taxes altogether (e.g., Alaska), balancing state budgets without new public finance structures may require scaling back essential services.

More work is also needed to better characterize the challenges faced by fossil fuel workers, including assessing the transferability of their expertise and skills to new economic sectors. Researchers can also characterize the costs and benefits of decommissioning fossil fuel infrastructure, the scale and character of social safety net supports that may be needed, and much more.

A better understanding of these issues will enable researchers to evaluate strategies to build economic resilience in fossil fuel–dependent regions. The raft of new programs in the United States and around the world offer opportunities for scholars to draw insights from policy successes and failures. Without the ability to conduct randomized controlled trials—typically the gold standard for establishing causation between policies and outcomes—scholars can use case study and quasi-experimental approaches to assess the effectiveness of policies to support these economies and their potential to scale up. Existing programs, which largely focus on deploying clean energy technologies and their supply chains, should enable researchers to assess the degree to which these industries can offer high-quality employment opportunities to transitioning workers and communities and also the limitations of such strategies. Research on how these programs influence public perceptions of the government and the energy transition may be valuable in designing more durable policy strategies.

Research can also draw lessons from different times and places. The challenge of transforming the world's energy system is unprecedented, so history provides no perfect analogue for guidance. Yet, a robust literature exists on the economic and governance risks faced by natural resource–dependent economies (Lashitew and Werker 2020), along with a growing body of work that assesses the consequences of major economic shocks and policies designed to mitigate them (Autor et al. 2016; Hanson 2021; Hyman 2022). Governments have long experimented with place-based economic policies, including regional efforts, such as the Tennessee Valley Authority, Appalachian Regional Commission, and Gulf Opportunity Zones (Kline and Moretti 2014; ARC 2015; Lunder 2006). Other policies, such as Empowerment Zones and the New Markets Tax Credit, have targeted select communities spread across the country (Neumark

and Simpson 2014; Mukherjee and Raimi 2023). Outside of the United States, governments in Europe, the Middle East, and elsewhere are pursuing efforts to support fossil fuel–dependent regions and boost economic resilience (Chadwick and Widdop 2022; Verdolini et al. 2024). Insights from each of these experiences may be applicable to the contemporary moment, whether as creative solutions or cautionary tales.

Even the best-designed strategies will fail without sufficient desire and capacity for successful implementation, especially at the local levels, where administrative limitations may be most acute (Carley et al. 2015; Haggerty and Smith 2023). Scholarship should therefore focus on not only the resources or incentive provided to economic actors but also the most effective structures for implementing durable and inclusive strategies.

Because fossil fuel–dependent communities across the United States (and many more around the world) differ by geographic, socioeconomic, political, and other factors, a one-size-fits-all policy approach is unlikely to succeed, and policy assessments may not generalize from one place to another. Instead, successful strategies and assessments will need to understand the relevant policy contexts, then assess strategies that can cater to the financial and technical resources, along with the local strengths and priorities of affected communities; researchers should seek to understand these local priorities rather than imposing "top-down" visions (Gazmararian and Tingley 2023; Devine-Wright and Ryder 2024). Achieving these goals will require strong ties between the academic and practitioner communities, including policy engagement from scholars and transparency from policymakers.

Today's Scholarship Can Inform Future Policy Design

Even a rapid transition to a net-zero emissions energy system will likely take decades. Speed must remain a priority given the dangers posed to society by the continued emissions of greenhouse gases and other pollutants. Yet, these decades will provide time to develop strategies, learn from mistakes and successes, and adapt policy to support fossil fuel–dependent communities. This process of learning and adapting will require continued attention from the scholarly, philanthropic, government, and NGO communities for decades to come. Major new efforts from each of these groups are needed to ensure that the energy transition does not leave behind the people and places that have powered the US and global economy for more than a century.

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Appendix

Table A1. North American Industrial Classification Codes Used in Figure 1

NAICS code	NAICS Name
211	Oil and gas extraction
213111	Drilling oil and gas wells
213112	Support activities for oil and gas operations
213113	Support activities for coal mining
2121	Coal mining
221112	Fossil fuel electric power generation
221210	Natural gas distribution
23712	Oil and gas pipeline and related structures construction
324	Petroleum and coal products manufacturing
33313	Mining and Oil and Gas Field Machinery Manufacturing
4247	Petroleum and petroleum products merchant wholesalers
486	Pipeline transportation

Federal, State, and NGO Efforts to Support an Equitable Energy Transition

Federal Government

Interagency Working Group (IWG) on Coal and Power Plan Communities and Economic Revitalization

President Biden created the IWG by Executive Order 14008: Tackling the Climate Crisis at Home and Abroad on January 27, 2021. In two annual reports to the president, the IWG has identified the communities that should be prioritized for federal investment, $38 billion in available funds that may be immediately accessed, and summarizes the outreach and engagement that the IWG has conducted with energy communities. The IWG has created a funding clearinghouse that organizes opportunities available to fossil energy communities into a single platform. Its website also features information on how to apply for technical assistance. Rapid Response Teams (RRTs) have been created to achieve more direct engagement with these communities. The IWG has four RRTs, located in Wyoming, the Four Corners regions, the Illinois Basin, and Eastern Kentucky.

Budget: Fiscal year (FY) 2024 est. $5 million (BUDGET-2024-APP.pdf (govinfo.gov), page 382)

Assistance to Coal Communities, Economic Development Administration

The Assistance to Coal Communities program is a carve-out of the EDA's annual Economic Adjustment Assistance set aside for regions that are negatively affected by changes in the "coal economy," which includes not only mining and power plant activity but also the supply chain of coal-reliant industries. The program began in 2015 with a $10 million appropriation, which increased to $33.5 million by 2021. For FY2023, the funding was $48 million. Through the American Rescue Plan, the EDA allocated $300 million as a one-time investment into coal communities through coal commitment provisions of the Build Back Better Regional Challenge and the Economic Adjustment Assistance program. Across all six American Rescue Plan programs managed by the EDA, $551.8 million was invested into coal communities.

Budget: FY 2023: $48 million (R46991.pdf (fas.org), page 64)

Appalachian Regional Commission (ARC) POWER Initiative

The Obama administration launched the Partnerships for Opportunity and Workforce and Economic Revitalization Initiative in 2015. As it is managed by ARC, its region is limited to 423 counties across 13 states, including three federally and five state recognized tribes. According to ARC, the POWER initiative is estimated to have supported 53,000 jobs and leveraged more than $1.8 billion in private investment into the region's economy since its creation. It is just one of the funding opportunities run by ARC; activities span recovery programs for the impact of the opioid crisis, funding for critical infrastructure through the Area Development Program, and the ARISE program that funds projects that strengthen economic ties between the region's states.

Budget: $72 million FY2023 (President Biden's FY 2023 Budget Reduces Energy Costs, Combats the Climate Crisis, and Advances Environmental Justice)

Focus on Energy Communities, Community Economic Development, Department of Health and Human Services

The CED program's primary focus is creating high-quality jobs in low income communities with high unemployment and poverty rates. In 2021, the Office of Community Services began offering bonus points for applications for coal, oil and gas, and power plant communities. By 2022, energy communities were provided funding through a separate program. In FY23, the program awarded $14.5 million in grants to support 19 CED projects in coal, oil and gas, or power plant communities. CED funds are deployed to create jobs that provide a living wage, paid leave, fringe benefits, and opportunities for career growth. The Department of Health and Human Services uses its own discretion to identify applicants as energy communities, following the general rule of "communities that have either experienced employment loss and/or economic dislocation events as a result of declines in the fossil fuel industry and/or are disproportionately reliant on fossil fuel energy production or distribution."

Budget: FY 2023: $24 million (hhs_fy2023.pdf (whitehouse.gov), page 53)

Advanced Energy Manufacturing and Recycling Grant Program, DOE

The Advanced Energy Manufacturing and Recycling Grant Program provides grants to small- to medium-sized manufacturers to build or retrofit advanced energy industrial facilities in communities where coal mines or coal power plants have closed. The grant opportunity, with a funding amount of $750 million, featured a Readiness Technical Assistance Program in collaboration with NREL, which aimed to assist prospective grantees with the application

process. Eligible projects include renewable electricity generation, energy storage component manufacturing, grid modernization equipment, carbon capture and storage, low emissions fuels, energy efficiency technologies, electric vehicle production, heavy-duty hybrid vehicles, and other projects that reduce greenhouse gas emissions. The first round of application was completed in May 2023.

Budget: One-time allocation of $750 million (https://www.energy.gov/mesc/advanced-energy-manufacturing-and-recycling-grants)

Abandoned Mine Land Economic Revitalization (AMLER) Program, DOI

The AMLER program began in 2016 to transform legacy mining sites into areas of economic production and development. Total funding is determined by the need to remediate mine land at the state level. States or tribes may develop projects that reclaim abandoned mine lands so they may be productively reused or directly incorporate economic development activities in the reclamation process. For FY2023, Kentucky, Pennsylvania, and West Virginia received nearly $30 million. Alabama, Ohio, and Virginia received $11.7 million, and the Crow and Hopi Tribes and the Navajo Nation received just less than $4 million. Since the creation of the program, 60 projects have been completed, with 239 active projects remaining as of FY 2022.

Budget: FY 2023: $115 million (Fiscal Year 2023 The Interior Budget in Brief Office of Surface Mining Reclamation and Enforcement (doi.gov), page 2)

Energy Infrastructure Reinvestment Loan Guarantee, DOE

Created by IRA, the program is designed to revitalize energy communities by providing a loan guarantee to repurpose or replace energy infrastructure that had ceased operations or augment existing infrastructure to reduce greenhouse gas emissions. The Department of Energy defines energy infrastructure as “a facility, and associated equipment, used for (1) the generation or transmission of electric energy; or (2) the production processing, and delivery of fossil fuels, fuels derived from petroleum, or petrochemical feedstocks.” IRA sets the cap on total loan guarantees to $250 billion, with a $5 billion in credit subsidy to support the program. The loan guarantee is available for commitment until September 30, 2026.

Qualifying Advanced Energy Project Credit (48C) Program, DOE

The American Recovery and Reinvestment Act of 2009 established the 48C program, which was significantly expanded with a $10 billion investment by IRA; $4 billion must be directed to

energy communities, defined as census tracts with a coal mine that closed after 1999 or a coal-fired generating unit that retired after 2009. Advanced energy projects include manufacturing equipment to generate renewable energy, manufacturing fuel cells and grid modernization, low-carbon fuels, energy conservation, electric vehicles, and hybrid heavy-duty vehicles and projects that re-equip facilities with emissions reduction measures and those involved with the processing of critical minerals.

"Energy Communities" Bonus Tax Credits (Production Tax Credit (PTC) for Electricity from Renewables and the Clean Energy PTC), IRS

First created in 1992, the federal renewable electricity PTC was renewed and expanded in IRA. The tax credit lasts for 10 years after the qualifying facility begins service, amounting to 2.6 cents per kilowatt-hour for geothermal, closed-loop biomass, and wind energy and 1.3 cents per kilowatt-hour for biomass, irrigation power, landfill gas and trash installations. Projects more than 1 MW are eligible for a 0.5 cents per kilowatt-hour base credit. Developers may earn bonus credits if the project is sited in an energy community. Energy communities include areas that are 1) former brownfield sites, 2) communities that have 0.17 percent or more in direct employment relating to the fossil fuel supply chain or derived 25 percent or more in local tax revenue to related activities and have an employment rate at or below the national average for the previous year, or 3) a census tract, including adjoining tracts, in which a coal mine closed after 1999 or a coal-fired plant closed after 2009. Siting projects within energy communities increases the tax credit by 10 percent.

The 1992 PTC is replaced by the Clean Energy PTC for facilities placed in service in 2025 and later, although the energy community bonus credit operates in the same way.

"Energy Communities" Bonus Tax Credits (Investment Tax Credit for Energy Property (ITC) and the Clean Electricity Investment Tax Credit), IRS

ITC reduces the federal income tax for a percentage of the cost of installing a qualifying clean energy facility rather than providing a tax credit based on kilowatt-hour as in the federal PTCs. If projects meet labor requirements, the base credit is 30 percent, with an additional 10 percent for installations that are sited in an energy community. The qualifications for an energy community under ITC are the same as for a PTC. Similar to the dynamics between the PTC for Electricity from Renewables and Clean Energy PTC, the Clean Electricity Investment Tax Credit replaces ITC for facilities placed in service in 2025 or later.

State Government

Office of Just Transition, Colorado

Colorado created the Office of Just Transition in 2019 with the passage of House Bill 19-1314. Its responsibilities include administering the Just Transitions program, tracking the timing and location of coal facility closures, appointing and managing the Just Transition Advisory Committee, and preparing an action plan. The office organizes Colorado's affected communities into two tiers to reflect the differing level of urgency in risks to transition impacts. As of June 2023, the office has approved $4.9 million in grants across all Tier One communities, which include Montrose, Moffat, Rio Blanco, Routt, Morgan, and Pueblo County, and one Tier Two community. In response to the passage of the American Recovery Act, BIL, CHIPS and Science Act, and IRA, OJT has created a grant writer program to assist coal communities access the new opportunities. The office has also conducted a survey among Colorado coal workers to determine how to set up programs to meet the workforce's needs.

Energy Transition Act, New Mexico

New Mexico's 2019 Energy Transition Act sets aggressive renewable portfolio standards for the state's investor-owned utilities and rural electric cooperatives, including a 100 percent decarbonized grid by 2050. The bill also allocated $30 million to coal mine reclamation and $40 million to reinvest in displaced workers and coal-reliant communities. The act established the $12 million Displaced Worker Assistance Fund, which provides direct payments and apprenticeships to workers laid off from the closure of the San Juan Generating Station and mine. Under the act, the New Mexico Economic Development Department is directed to disburse $6 million in funding to projects that contribute to economic diversification efforts in the San Juan region. In October, 2023, the economic development assistance fund split the funds equally between Big Navajo Energy, Kinetic Power, Libertad, and Sonoash, which focus on hydrogen production, pumped hydro storage, and mineral recovery from coal fly ash.

Community Economic Resilience Fund (CERF), California

In the aftermath of the COVID-19 pandemic, the California legislature created the CERF Program to promote the production of regional roadmaps for economic recovery and transition that identify steps to develop sustainable industries and high-quality jobs. Initially, its $600 million funding was appropriated from the American Rescue Plan Act. The fund's interventions are organized into five phases: planning, pilots, catalyst program, tribal funding opportunity, and implementation. In the planning phase, the program organizes 13 regional bodies that are

responsible for managing projects and leading research and development. The pilot phase funds projects that aim to serve as proofs of concept for the implementation phase. The catalyst program invests $14 million into each regional economic development entity to bolster efforts to build CERF-aligned projects. The tribal funding opportunity dedicates $25 million into planning and implementation efforts with California Native American tribes. Finally, the implementation phase dispenses $268 million into projects that arise from the regional economic development strategy plans.

Kern Coalition, California

The Kern Coalition is a collaboration between the Kern Community College District, B3K Prosperity, Kern Inyo Mono Central Labor Council, Community Action Partnership of Kern, and Building Healthy Communities Kern organized to attract investment into the Kern region from the CERF. The coalition is one of the 13 regional bodies within the CERF program. The Kern Community College District aims to provide technical assistance to economic development projects within Kern County by serving as a fiscal agent for state grant opportunities. The coalition hosts subregional collaborative meetings across the county to develop recovery and transitional plans with key stakeholders, with the target being communities that are disinvested, have high poverty and unemployment rates, or are disproportionately affected by income inequality.

Wyoming Energy Authority (WEA), Wyoming

WEA is an advocacy organization formed by the legislature in 2020 to support Wyoming's energy economy. As a collaborative effort between the Infrastructure and Pipeline Authority and the State Energy Office, the organization promotes developing new commercial energy projects, preserves existing energy assets, streamlines access to capital, and develops public policies that ensure the responsible use of Wyoming's energy resources. The group advocates for an "all of the above" approach to the energy transition. WEA serves as an intermediary between federal government financing opportunities and entities developing carbon capture and storage, hydrogen, biomass and biochar, hydropower, lithium processing, and battery storage or wind and solar energy projects through its Energy Matching Funds program. The organization is able to issue $3 billion in industrial revenue bonds for energy projection and transmission projects. Other financing activities include grants for K–12 schools for energy efficiency and technical assistance for energy performance contracting.

Energy Transition Office, Minnesota

In 2021, the Minnesota legislature established the Energy Transition Office to advise the governor, Commissioner of the Department of Employment and Economic Development, and legislature on the energy transition and create programs that aid communities and workers impacted by fossil fuel plant closures. In December 2022, the Energy Transition Advisory Committee released a plan that identified host communities, reported results from stakeholder surveys, assessed future impacts of shutdowns on tax revenue, and proposed recommendations for future action. Its recommendations are broken down between workforce, tax base and financial incentives, reuse, and economic diversification approaches. The Energy Transition Office helps administer the Energy Transition Grant Program, which disburses grants to assist workers find new jobs, develop site readiness plans, and conducted economic planning for sites that are scheduled to be decommissioned

Climate and Equitable Jobs Act (CEJA), Illinois

CEJA was enacted in September 2021 to incentivize renewable energy development, establish statewide clean energy workforce training programs, spur electric vehicle adoption, and invest in fossil fuel communities. It also created the Energy Transition Workforce Commission, whose members represent business, labor, environmental justice, and administrators of the workforce programs funded by CEJA. This group is responsible for reports identifying the existing fossil fuel workforce in the state, projecting the job losses due to anticipated closures, and determining loss in local government revenues. Its programs include tuition support for students whose parents lost employment in the energy sector, energy transition grant funds to communities that experience a mine, nuclear plant, or fossil fuel plant closure, and the establishment of 13 workforce hubs for training in clean energy industries.

Community and Worker Economic Transition Office, Michigan

In November 2023, Michigan passed a package of four bills to position the state as a leader of climate action. The bills make new commitments on grid decarbonization, reform the Michigan Public Service Commission, expand energy efficiency programs, and establish a Community and Worker Economic Transition Office within the Department of Labor. The office is tasked with providing assistance to "transition communities," which are defined municipalities, counties, or regions that are impacted by the loss of 50 or more jobs in the fossil fuel, internal combustion, or building trades industry. By December 31, 2025, the office will be responsible for a transition plan on how to align local, state, and federal programs to assist communities through economic disruption and determine if additional legislation is required to implement its mission.

Nonprofit

Just Transition Fund

The Just Transition Fund was founded in 2015 to help local organizers across Appalachia secure federal investment from the POWER initiative. The fund has spread to various coal-producing regions and expanded technical assistance to encourage investment across various government programs. Through direct engagement with communities, it aims to connect markets, stimulate entrepreneurship, prepare workers, expand broadband, and advance policies at the state and federal level that channel investment into the affected regions. The Federal Access Center is a "one-stop resource hub" for communities to access technical assistance, one-year capacity-building grants, or large grants that may serve as matching funds. The fund has a particular focus on Internet accessibility and the build-out of rural broadband networks.

Coalfield Development

Coalfield Development is an nonprofit organization founded in 2010 with the objective to build economic diversification in the Appalachian region through designing projects in sustainable sectors, incubating social enterprises, building human capital, and managing community-based revitalization projects. Over the past decade, it has supported and grown 72 new businesses. In southern West Virginia, it has trained over 1,200 people, created more than 250 new jobs, and leveraged $20 million of investment. In September, 2022, Coalfield Development, in partnership with West Virgina Cities, economic revitalization organizations, academic institutions and private companies, won $63 million from the Economic Development Administration for various projects organized under the Appalachian Climate Technology now coalition.

Building Resilient Economies in Coal Communities (BRECC)

In June, 2022, the Economic Development Administration awarded a $2.6 million grant to the National Associations of Counties to develop a community of practice under BRECC, which is composed of four activities: a national network open to all local, state, and national stakeholders focused on coal communities, a Coal Communities Commitment Coalition, which serves as a peer-to-peer learning network for local leaders, a Coal Communities Action Challenge that connects 15 coal communities to technical assistance coaches and capacity-building support, and a national storytelling campaign. The national network has published bimonthly virtual learning sessions on economic diversification, place-based economic

revitalization, infrastructure investments, workforce solutions, entrepreneurial ecosystems, business development, and funding planning.

Permian Basin Strategic Partnership (PSP)

PSP is a nonprofit supported by the oil and gas industry with the mission to "strengthen and improve the quality of life for Permian Basin residents by partnering with federal, state, and local leaders to develop and implement strategic plans that foster superior schools, safer road, qualify health care, affordable housing, and a trained workforce." It surveyed the region's local residents in 2018 to develop their focus areas. It has also pursued building local capacity by hiring grant writers to direct state and federal funding toward improving roads. The organization also makes direct donations to local schools and universities. From 2018 to 2022, PSP has directly invested $125 million into the region.