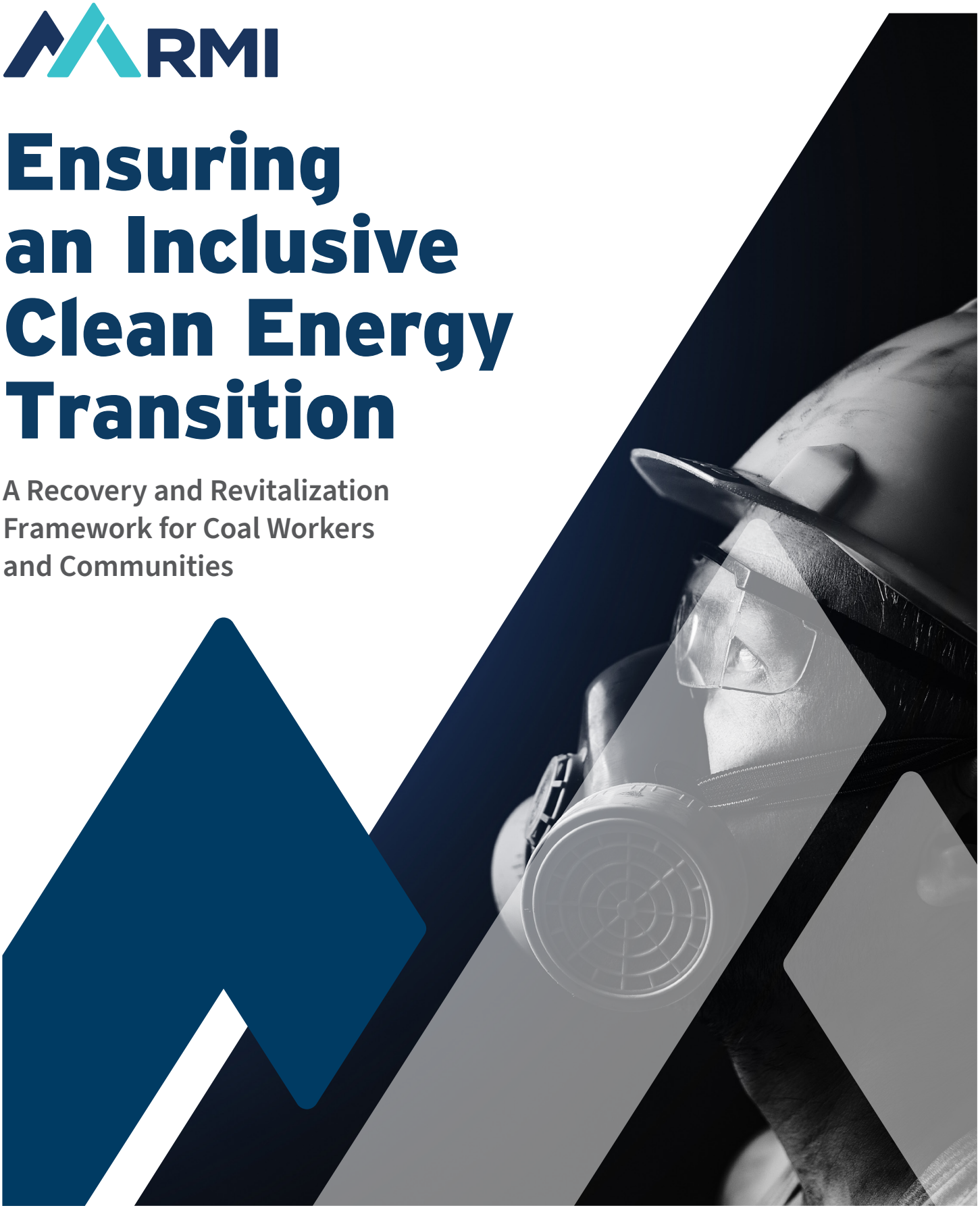
RMI

Ensuring an Inclusive Clean Energy Transition

A Recovery and Revitalization Framework for Coal Workers and Communities



Report / May 2022

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Claire Wang, Sam Mardell, Jeremy Richardson, and Uday Varadarajan, *Ensuring an Inclusive Clean Energy Transition: A Recovery and Revitalization Framework for Coal Workers and Communities*, RMI, May 2022, **https://rmi.org/insight/ensuring-an-inclusive-clean-energy-transition/**.

Acknowledgments

For their support and contributions to this project, the authors would like to thank Chris Markuson from the BlueGreen Alliance (BGA); Carlyn Petrella and Suzanne Tegan from the Center for the New Energy Economy (CNEE) at Colorado State University; Harriet Moyer Aptekar from Crest Renewable Energy; Emily Rhodes and Max Shipman from the Just Transition Fund; Cindy Winland from KeyLogic; and Coreina Chan, Avery McEvoy, Matthew Popkin, Ben Serrurier, and Madeline Tyson from RMI.

About RMI

RMI is an independent nonprofit founded in 1982 that transforms global energy systems through market-driven solutions to align with a 1.5°C future and secure a clean, prosperous, zero-carbon future for all. We work in the world's most critical geographies and engage businesses, policymakers, communities, and NGOs to identify and scale energy system interventions that will cut greenhouse gas emissions at least 50 percent by 2030. RMI has offices in Basalt and Boulder, Colorado; New York City; Oakland, California; Washington, D.C.; and Beijing.

Table of Contents

Executive Summary

Across the United States, the transition from fossil fuels to a clean energy economy is accelerating. However, without thoughtful planning and robust resources, this transition will harm workers who depend on fossil fuels for their livelihoods, as well as the communities where they live and work. Climate policy that is effective and durable must comprehensively address these social and economic challenges if we are to meet the climate challenge.

Building on previous work by stakeholders, this report introduces a policy framework that outlines the risks facing fossil fuel workers and communities in the shift to clean energy and provides guiding principles for supporting them in the transition. Although the report focuses on the coal sector in the United States, the framework offers relevant considerations for other sectors and regions.

Communities that depend on fossil fuel industries for their economic livelihoods face serious risks in the shift to clean energy. Quantifying these risks, such as job losses, depressed property values, and reduced revenue for social services and institutions, is a critical first step in ensuring an orderly transition to clean energy — one that supports workers and communities in the transition instead of leaving them behind. Well-designed, targeted, proactive, and long-term interventions will be required to diversify local economies and to drive new economic activity that aligns the global need for rapid decarbonization with local visions and priorities.

RMI's fossil fuel community recovery and revitalization framework will help policymakers and advocates develop and implement comprehensive, strategic policies to support a fair transition from fossil fuels. Although federal and state policymakers in the United States have begun to address fossil fuel transition challenges, approaches have varied significantly in scope and cohesion, and existing policies do not yet provide a scalable approach to transition support. Using this framework, policymakers and advocates can better understand the issues facing energy transition communities, fill gaps in existing policy, and design innovative solutions to effectively address these impacts.

The recovery and revitalization framework consists of three steps:

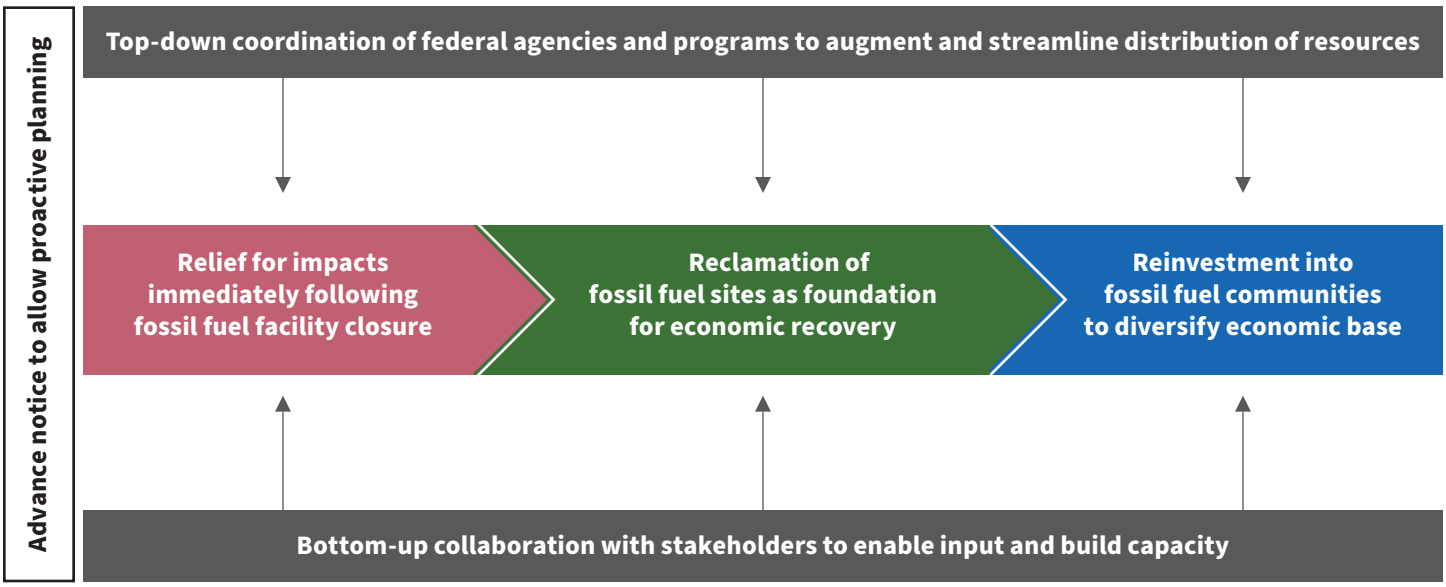
1. **Relief** for fossil fuel workers and communities to alleviate losses of local revenue and jobs that occur **immediately** following fossil fuel facility closure

2. **Reclamation** of remaining fossil fuel sites to prevent prolonged pollution risks and promote **short- and medium-term** job creation and local economic activity

3. **Reinvestment** in fossil fuel communities to promote **long-term** economic resilience and diversification

Exhibit ES1 RMI's Fossil Fuel Community Recovery and Revitalization Framework

This exhibit illustrates how the three-part recovery and revitalization framework relies on policy coordination and collaboration throughout and requires advance notice of closures to maximize successful implementation.



Communities and workers who depend on fossil fuel industries for their economic livelihoods face serious risks in the shift to clean energy, including loss of well-paying jobs with good benefits, loss of health insurance, reduced property values, gaps in local tax revenues, unfunded liabilities for environmental cleanup, and uncertainty around future community economic development. Meeting the climate challenge while ensuring prosperity for all will require targeted policy interventions and innovative solutions.

Introduction

National and subnational governments are confronting the ever more pressing need for a rapid transition away from fossil fuels to address the climate crisis. The energy transition will create broad net economic, social, environmental, and health benefits. However, without thoughtful planning, the clean energy transition will also drive localized economic costs, especially for fossil fuel workers and communities. Climate policy that is effective and durable must comprehensively address these social and economic challenges to meet our climate goals.

This report introduces a policy framework, based on previous platforms and principles advanced by stakeholders, that outlines the risks facing fossil fuel workers and communities in the shift to clean energy and provides guiding principles for supporting them in the transition. Although the report focuses on the coal sector in the United States, the framework offers relevant considerations for other sectors and regions. Critically, fossil fuel workers and communities are not the only stakeholders that must be considered in designing equitable climate policy; fence line and frontline communities must prosper in the transition, and additional policies will be necessary (see *Box 1*, page 10).

Communities that host coal extraction or generation facilities face serious risks in the shift to clean energy, such as lost jobs, depressed property values, and loss of tax revenue to support essential services such as schools and hospitals. Without policy support, these communities face upheaval, economic decline, and social disruption. Job and revenue losses in the coal industry — especially in coal mining — are concentrated in rural places and can devastate communities even when aggregate losses are small relative to the overall US workforce and economy.

As a first step, these risks must be quantified before facilities close. Risks must then be proactively mitigated to ensure that communities are not left behind in the transition. Well-designed, targeted, proactive, and long-term interventions will be required to diversify local economies and to drive new economic activity that aligns the global need for rapid decarbonization with local visions and priorities (see *Box 2*, page 10).

Federal and state policymakers in the United States have begun to address transition challenges, but approaches have varied significantly in scope and cohesion, and existing policies do not yet provide a scalable approach to transition support. Comprehensive policy approaches must address the full range of transition impacts, coordinate policy responses across different levels of government, collaborate with stakeholders before coal facilities close, and proactively provide transition support to prevent economic decline in coal communities.

Given the central importance of transition support to effective and durable climate policy, federal efforts such as the Interagency Working Group on Coal and Power Plant Communities and Economic Revitalization will play a key role in enabling climate action in the United States. The framework presented in this report can help Interagency Working Group members as well as federal and state policymakers to design and implement comprehensive climate policy that works for communities affected by the energy transition — and equip advocates with information necessary to fight for strong policies. Comprehensive climate and transition policy approaches can ensure that the energy transition uplifts — rather than abandons — coal workers and communities and those disproportionately bearing the brunt of health impacts of coal, creating conditions for a healthy and thriving clean energy economy (see *Box 1*, page 10).

A Novel Framework for Coal Community Recovery and Revitalization

RMI's recovery and revitalization framework for fossil fuel communities can be applied to the coal sector to help policymakers and advocates develop and implement comprehensive, strategic policies to support a fair transition away from coal. Using this framework, policymakers and advocates can better understand the issues facing energy transition communities and can design policy solutions to effectively address these impacts.

As shown in Exhibit 1, the recovery and revitalization framework consists of three steps:

1. **Relief** for coal workers and communities to alleviate losses of local revenue and jobs that occur **immediately** following coal facility closure

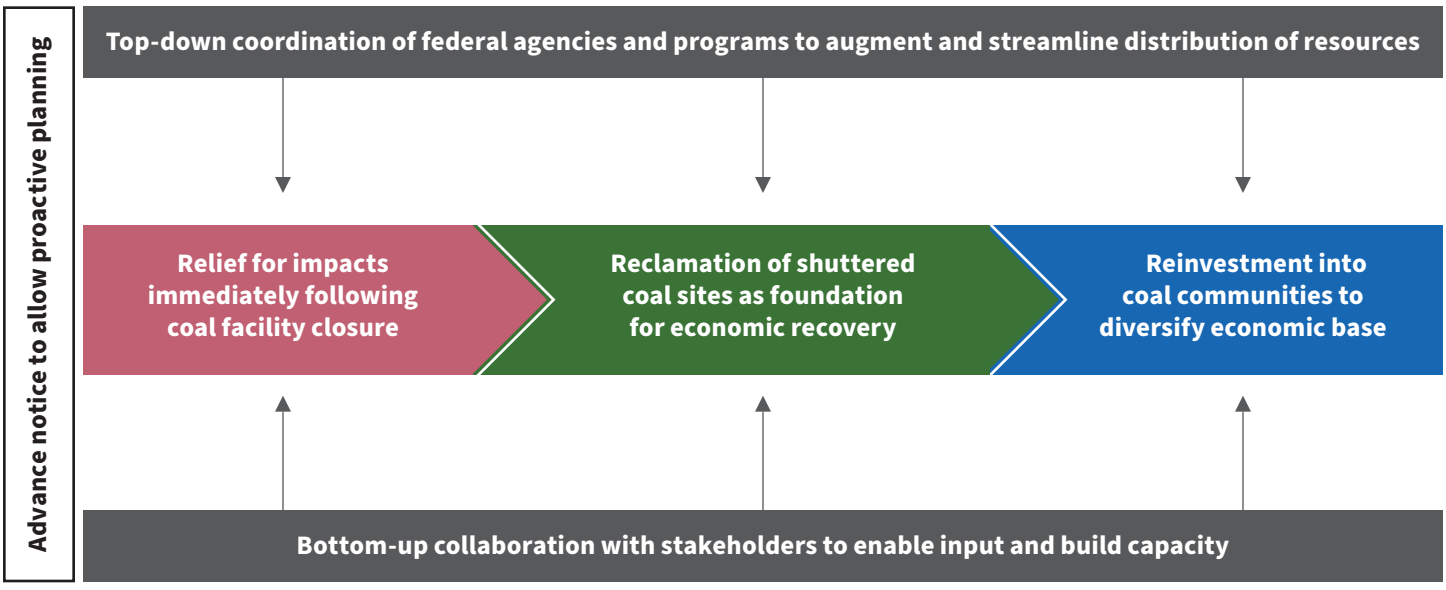
2. **Reclamation** of remaining coal sites to prevent prolonged pollution risks and promote **short- and medium-term** job creation and local economic activity

3. **Reinvestment** in coal communities to promote **long-term** economic resilience and diversification

This framework requires solid and ongoing engagement with affected communities. Policy development and implementation must be conducted in **collaboration** with coal workers and communities to ensure that local needs and priorities are defined and supported, to build local capacity for accessing and using resources, and to source policy ideas from local contributors. Transition policy must be closely **coordinated** across federal agencies, state governments, and community stakeholders to ensure that policy rollout and delivery are successful. In short, successful solutions must be both bottom-up and top-down.

Finally, affected communities and workers need **advance notice** about closures. Proactive planning for coal transition can provide affected workers and communities time to develop risk management tools and strategies and to conceive and implement economic recovery measures in time to mitigate disruptions caused by coal closures.

Exhibit 1 **Recovery and Revitalization Framework as It Applies to the Coal Sector**



Applying the Framework to the Coal Sector in the United States

RMI's framework can be applied whenever the closure of a fossil fuel (or other major industrial) facility leaves behind economic losses, although the specifics will vary depending on geography, fuel, and sector. This report focuses specifically on coal plant and mine transition as an illustrative case.

US coal is in a protracted decline due to market forces and policy interventions. Coal plant retirements announced through the first half of 2021 show that over half of coal generating capacity that was on line in 2015 will retire by 2035.[1] Coal mining employment fell 57% between 2011 and 2020,[2] with losses concentrated in central Appalachia. As coal production, generation, and employment continue to decrease, the need for policies to support coal communities and workers becomes even more urgent.

The framework is based on interviews with 48 stakeholders with firsthand experience navigating coal transition and transition policy development.[i] These interviews revealed the painful impacts that coal workers and communities experienced as coal plants and mines closed, identified policy approaches that can address these impacts, and highlighted the substantive and procedural difficulties of developing effective transition policies. The framework is also grounded in a survey of academic and NGO literature on coal transitions in the United States and internationally.

This report is organized into three sections:

1. **Scale and Scope of the Coal Phaseout** describes the geographic distribution of the coal transition challenge, the stakeholder groups affected by coal closure, and the economic impacts of the coal phaseout.

2. **RMI's Recovery and Revitalization Framework Applied to the Coal Sector** details how these impacts are experienced during each stage of the framework and identifies gaps in policy that must be addressed in future transition policy.

3. **Principles for Developing and Implementing Transition Policy** describes key policy principles for coordinating transition policy supports among different levels of government. This section also describes principles for collaborating and engaging with stakeholders to expand local capacity, build trust, and envision a future beyond coal.

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i Interviewees include representatives from environmental groups, labor unions and federations, utilities, grassroots organizations, state governments, and local governments.

Box 1: **Ensuring the Benefits of Clean Energy for All**

Although the framework and policy principles in this report focus on the needs of coal workers and communities, well-designed and inclusive climate policy must benefit all communities, including frontline and fence line communities, which are often communities of color and/or low-income communities. Fence line communities are those that have been disproportionately harmed by health impacts resulting from fossil fuel pollution as well as reduced economic opportunities and property values for decades, and frontline communities are those that face the growing threat of climate impacts with few resources to respond.

Importantly, policies focused on local economic development must provide a pathway toward wealth building and economic prosperity for these communities. The reclamation, remediation, and reinvestment provisions presented in this report can be applied to address disproportionate pollution burdens and to drive economic development and new job opportunities in frontline and fence line communities. Explicit consideration of disadvantaged communities must be included in developing strong climate policies to ensure that the shift to clean energy is truly inclusive.

Box 2: **Looking beyond Clean Energy for New Opportunities**

Clean energy is a powerful driver to generate investment and create new jobs, but it is only one of many options that must be considered to create economic diversification and recovery. Transition assistance for fossil fuel workers and communities cannot rely on clean energy alone to replace economic activity from the fossil fuel sector. The clean energy industry is a crucial and growing job creator in the United States — and together the wind and solar industries are already the largest employer in the US energy sector.[3] However, clean energy jobs and projects are often unable to meet the specific economic needs or interests of fossil fuel workers and communities. Clean energy jobs often pay much less than coal industry jobs, do not necessarily align with coal workers' existing skills, and, in the case of construction jobs, are temporary.[4]

Although clean energy projects provide economic activity and property tax revenue in the places where they are located, they will not replace better-paying permanent fossil fuel jobs and may not make up the shortfall in local taxes contributed by a coal plant or mine for a single county, municipality, or school district.[5] To maximize local resources and meet local needs, addressing the economic challenges arising from the shift to clean energy must consider climate-aligned economic solutions that look beyond the energy industry entirely.

Scale and Scope of the Coal Phaseout

Coal Transition Impacts Are Concentrated in Vulnerable, Rural Communities

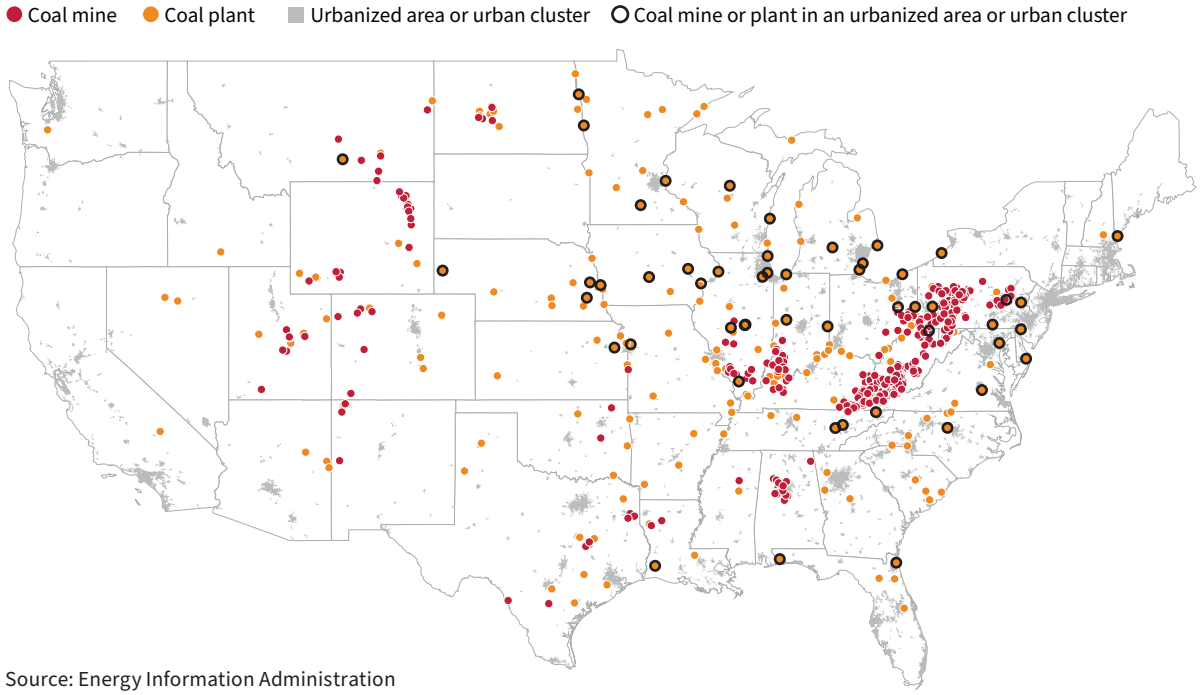
Nearly every US state has experienced coal plant and mine closures in the past decade. As shown in Exhibit 2, most current coal sites — 77% of coal plants and 99% of coal mines — are concentrated in rural counties.[6]

Isolated rural communities are more vulnerable to economic transitions than densely populated areas. Unlike urban communities, which tend to have access to diversified economies, a rural community may depend on a coal plant or mine (or both) to provide a significant share of local jobs and funding for public services.[7] These facilities have often formed the center of economic life in their communities for generations and may be a source of pride for residents.

Rural areas can also face challenges attracting new employers,[8] due to limited infrastructure (particularly broadband), overburdened local government leaders, and population losses and brain drain.[9] Replacing economic activity and local employment lost due to a coal plant closure therefore requires more targeted and long-term support than closures affecting urban areas.

Exhibit 2

Coal Mines and Plants in Relation to Urban Areas



Source: Energy Information Administration

Coal Transition Will Affect a Broad Range of Stakeholders

Coal phaseout will affect stakeholders across the coal energy supply chain. Exhibit 3 lists the stakeholder groups most directly affected by coal transition and identifies which issues these groups are most likely to experience following coal closure. Exhibit 4 summarizes potential policy solutions to address these issues.

Exhibit 3 Stakeholders Experiencing Coal Transition Impacts

Issue	Relief			Reclamation		Reinvestment	
	Losses of well-paying jobs	Losses of local revenue and cuts to public services	Lack of adequate knowledge about coal closure time line, impacts	Exposure to health hazards from residual plant or mine waste	Unclear or unfunded liabilities for reclamation	Difficulty attracting new sources of economic activity	Loss of cultural or social attachments centered on coal
Affected individuals							
Coal workers (plant, mine, transport, manufacturing) *Represented by unions if unionized, local government representatives, community organizations*	✓	✓	✓	✓	✓		✓
Residents of towns, counties, or tribal territories that host a coal plant or mine *Represented by local or tribal government representatives, community organizations*		✓	✓	✓	✓	✓	✓
Community members disproportionately exposed to coal-related health and environmental hazards *Represented by local government representatives, community organizations, environmental justice organizations*	✓	✓	✓	✓	✓		✓
Ratepayers in territories where coal plants are retiring early *Represented by consumer advocate organizations*					✓		
Affected institutions							
Local or tribal governments of towns or counties hosting a coal plant or mine		✓	✓			✓	✓
Electric utilities or asset owners of a coal plant retiring early					✓		
Coal mining companies					✓		

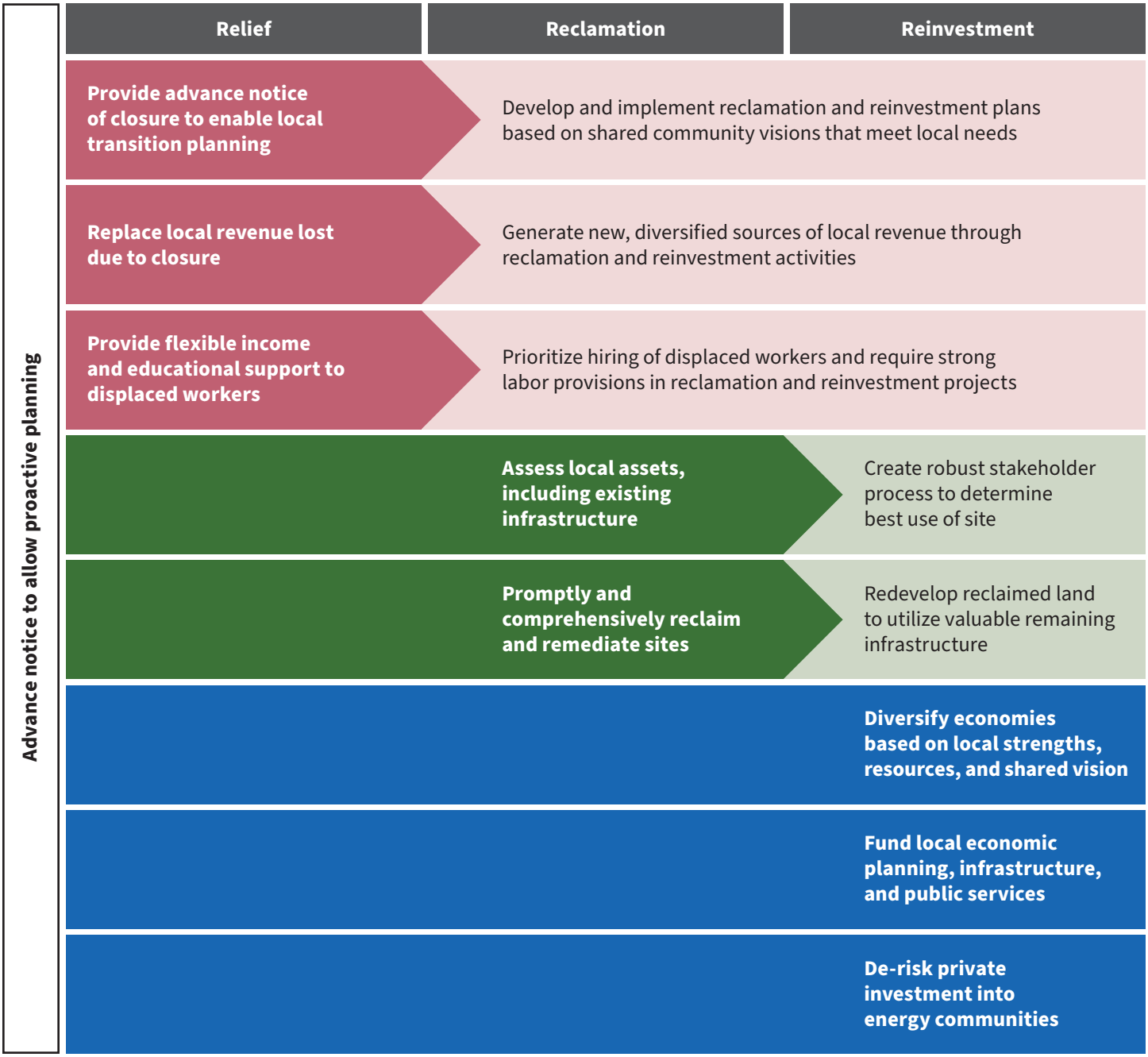
Exhibit 4 **Potential Policy Solutions for Coal Closure Impacts**

	Issue	Policy solutions
Relief	**Losses of well-paying jobs**	Temporary wage differential for displaced coal workers Pension or health care support or guarantees for displaced coal workers Retraining for displaced coal workers Educational support for displaced coal workers (incl. apprenticeships, postsecondary education) Career counseling and job placement resources for displaced coal workers Mandates or incentives to rehire displaced coal workers Relocation support for displaced coal workers (as a last resort)
	Losses of local revenue and cuts to public services	Funding for temporary tax revenue replacement Fiscal reforms that enable greater local control of revenue uses and savings
	Lack of adequate knowledge about coal closure time line, impacts	Advance notice before coal facility closure Agreed-upon time line for coal phaseout Studies or reporting to estimate timing, location, and impacts of coal closure Funding or assistance for local economic planning before coal closure
Reclamation	**Exposure to health hazards from residual plant or mine waste**	Studies to identify groups disproportionately exposed to health hazards Incentives or mandates to direct investment to communities disproportionately exposed Incentives or mandates to hire workers from disproportionately exposed communities Mandates for safety and health protections for workers on reclamation projects
	Unclear or unfunded liabilities for reclamation	Requirements and resources to ensure comprehensive cleanup of sites Asset mapping to evaluate opportunities for redevelopment of coal sites Incentives to repurpose coal sites for new economic use
Reinvestment	**Difficulty attracting new sources of economic activity**	Funding or assistance for local economic development projects Small-business resources, prioritizing displaced coal workers and underserved communities Funding or incentives for local infrastructure investments Inclusive financing mechanisms to invest or reinvest in communities
	Loss of cultural or social attachments centered on coal	Funding for and availability of counseling and social services Creation of commemorative monuments or symbolic recognition

RMI's Recovery and Revitalization Framework Applied to the Coal Sector

RMI's recovery and revitalization framework categorizes coal transition into three phases, which occur on different timescales and require different policy approaches (see *Exhibit 1*, page 8). Well-designed transition policy should create a comprehensive, proactive package of resources that addresses all phases of coal transition and is flexible enough to work in different geographic areas and individual circumstances. Policy solutions for each phase are related, and as illustrated in Exhibit 5 (next page), policies designed to provide relief can also support reclamation and reinvestment needs. Importantly, although the impacts in each phase play out on different timescales, sufficient advance notice of closure can help ensure that resources are in place for each phase by the time the closure happens. A comprehensive, quantitative, and localized assessment of these potential risks in communities across the country could be an important first step in kick-starting early preparation for transition.

Exhibit 5 **Cascading Benefits of Transition Policy Actions**



1. Relief for Immediate Losses of Local Revenue, Jobs from Coal Closure

Losses of well-paying jobs

In 2020, the coal industry employed about 185,000 workers, 40% of whom worked in fuel extraction and processing, 43% in power generation, and the remainder in fuel transport and distribution.[10] Coal jobs usually offer generous wages and benefits and are often the best jobs in a small community. In 2020, average annual compensation (wages and benefits) was about $127,000 for workers in fossil fuel power plants[11] and $90,000 for coal miners.[12] Plant workers earn double the national average compensation for all workers nationally, and coal miners earn 40% more than the national average compensation for all workers.[13]

These high-paying coal jobs are difficult to replace. In some cases, usually in regulated utility territory, some workers can be transferred to other power plant facilities to avoid layoffs, often requiring relocation. Others may be eligible for early retirement. But as the coal industry continues to decline, more workers will face job losses with fewer options to stay within the company. Especially in rural areas, alternative options for employment can be difficult to find, leading to prolonged unemployment or severe wage and benefit cuts.[14] For coal plant workers and coal miners, the lost jobs may represent the best long-term career opportunities and — often thanks to strong collective bargaining agreements — the best wages and benefits (retirement contributions, pensions, and health plans) they could hope to receive.

> **I didn't expect [the plant to close] as soon as it did.... In some ways [the retirement announcement] was a relief to the community because they knew something was up, they knew something was coming, but they didn't know what.... They didn't know how much their job was in jeopardy.**
>
> — Local government official in Colorado

To address these challenges, affected workers will need **flexible income and educational support to get back on their feet**. Federal or state policy could provide this support, but additional options such as new financial mechanisms or insurance could also reduce the serious risks these workers face in the transition. In any case, systematic and comprehensive resources that address individual barriers to new employment, such as child care, transportation, or mental health needs, will be crucial to connecting dislocated workers with dependable and well-paying work and to set them up for success. Given the difficulties of finding family-sustaining jobs outside the coal industry and within their communities, conventional forms of short-term unemployment assistance and approaches to worker training will not be sufficient to meet coal workers' needs.

Comprehensive, individualized, and flexible resources include temporary wage replacement or insurance (to include benefits such as pension or retirement contributions and continued health care coverage), career counseling and job training opportunities, and educational benefits (including apprenticeships, certifications, and access to higher education).[15] Such a holistic approach can create better long-term outcomes for displaced workers and, combined with long-term economic development, can help them stay in their communities.

Finally, federal bankruptcy laws prioritize paying creditors first, often at the expense of workers, communities, and environmental cleanup. Reforms are needed to ensure that when a coal company declares bankruptcy, workers are paid, governments receive tax revenue and royalty payments, required contributions to retirement and health funds are made, and sites are adequately remediated.[16] As described below, additional legislative changes are needed to require that coal companies set aside sufficient funds for reclamation of former mine sites.

Losses of local revenue and cuts to public services

Local revenue losses are a significant, but often underappreciated, source of economic hardship after coal closure. County and municipal governments and school districts can derive a substantial share of their revenue from coal plants and mines through property taxes, payment in lieu of taxes (PILOT) agreements, severance taxes, federal royalty payments, or other means. For example, Moffat County in Colorado relies on one coal plant and two coal mines for 44% of all property taxes paid in the county; these facilities contribute 47% of the affiliated school district's property tax revenues and nearly 60% of the rural fire district's property tax revenues.[17]

Failure to replace these revenues as facilities reduce or cease operation may require severe cutbacks to local public services or layoffs of public employees. The town of Tonawanda, New York, lost $6.2 million in PILOT revenue between 2008 and 2012 when the Huntley Generating Station cut back on generation — which forced the closures of four schools and the layoffs of 140 teachers, even before the plant closed.[18] Revenue losses may also threaten local governments' ability to repay debts, which could affect their credit ratings and introduce instability into the municipal debt market.[19]

Coal communities are largely unequipped to handle a sudden revenue loss from a coal closure. Local governments often lack capacity to plan for transition impacts, can be reluctant to plan for a future without coal, or can lack fiscal autonomy to save or invest local revenues.[20] To address these challenges, transition policy must **temporarily replace local revenue lost from a coal facility closure**. Creating new public funding sources to supplement lost local revenue (such as New York's Electric Generation Facility Cessation Mitigation Fund[21]) or tapping permanent mineral trust funds that many Western states like Wyoming established decades ago can help mitigate losses from a coal closure.[22]

Other models include federal precedents like the Secure Rural Schools Program, administered by the US Forest Service, which allows a portion of federal revenues from multiuse activities on federal lands to be used to support schools and maintain roads in nearby communities.[23] Legislation introduced in the 117th Congress seeks to establish a similar fund for coal-fired power plant communities.[24]

Lack of adequate knowledge about coal closure time line and impacts

Unpredictable time lines for coal closures make recovering from immediate economic impacts even more difficult. Coal plants are retiring long before the end of their expected lifetimes, a trend that is accelerating in response to the poor economic competitiveness of coal-fired electricity, as well as state or corporate climate goals.

The time line between a plant retirement announcement and the closure date varies, and in some cases, workers and communities have received only a few months' notice. For example, the Dickerson Generating Station in Maryland retired in August 2020 — just three months after the closure was announced that May.[25] Federal law requires 60 days' notice of a plant closure or mass layoff, although some states have required longer lead time.[26] For example, Illinois' Climate and Equitable Jobs Act requires two years' notice before mass job losses or relocation at power plants or coal mines.[ii]

Coal workers and communities can be caught off guard by coal retirement and therefore face difficulty predicting — and, consequently, planning for — the economic impacts of a coal closure. Further complicating the transition challenge, the announcement of a facility closure can immediately bring negative economic consequences even if the retirement date is years in the future. In Adams County, Ohio, property tax revenue fell quickly because of devaluation of the power plant assets (based on local and state tax laws), and workers were left scrambling to find new jobs as quickly as possible before the plant closed.

One example of proactive planning before a coal plant closure is the Centralia Generating Station in Washington State. After the sudden and devastating 2006 layoff of 600 coal miners in Centralia, the utility announced that the nearby coal-fired power plant would be closed beginning in 2020. The long lead time allowed community leaders to plan for the transition and provide economic development grants to the town — leading to strong economic development and offering a model for communities around the country.[27]

It is critical to **provide advance notice of coal facility closures to enable local transition planning**. The transition away from coal is already happening and is accelerating, but the lack of a comprehensive national plan and time line for that transition is leading to acute economic hardship for affected communities and workers. With thoughtful planning and meaningful local engagement, these impacts can be minimized. Robustly funded state or federal grants and technical assistance to support proactive worker and community transition planning can help stakeholders identify and begin implementing transition solutions before economic crisis hits.

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ii Other state and federal legislation proposals with advance notice requirements include: Virginia SB1247; Clean Energy Innovation and Deployment Act (CEIDA), introduced by US Rep. Diana DeGette (D-CO); and NEW PROMISE Act, introduced by US Rep. Tom O'Halleran (D-AZ).

2. Reclamation and Remediation of Remaining Coal Sites

Exposure to health hazards from residual plant or mine waste

Reclamation and remediation of coal sites refer to the cleanup of the brownfield sites left behind after extraction and electricity generation. In general, reclamation focuses on restoring abandoned mine lands (both surface and underground) and includes removal of equipment and wastewater ponds from coal processing, as well as cleanup of acid mine drainage. Remediation refers to activities on a former coal plant site and can include decommissioning of the plant and equipment, removal of any toxic chemicals like asbestos, and cleanup and proper disposal of coal ash. These terms can be used interchangeably.[iii]

Left unaddressed, shuttered coal sites will pose health and environmental hazards indefinitely, including groundwater contamination at coal plants from coal ash ponds and landfills, as well as acid mine drainage and coal waste at coal mines. At least 91% of the coal plants that have federal reporting requirements have coal ash disposal sites that are leaking contaminants at levels exceeding health-based standards,[28] disproportionately affecting communities of color and exacerbating health and economic inequities[29] (see *Box 1*, page 10). The damage from this pollution can have an impact on a vastly greater geographic area than the site location alone, as demonstrated by the high-profile coal ash spills at the Tennessee Valley Authority's Kingston plant and Duke's Dan River site.[30]

Methane leaks at coal mines also cause persistent and significant climate impacts,[31] and active and abandoned coal mines together contribute an estimated 8% of annual US methane emissions[32] — equivalent to the emissions from 40 million passenger vehicles.[iv] Despite these significant emissions, US mine reclamation standards do not require actions to mitigate methane emissions.

Lack of site reclamation and remediation can also result in depressed property values by continuing to degrade and hampering local economic development indefinitely. Any potential new developer is unlikely to assume liability for site cleanup, especially if the scope of the damage is unclear. **Comprehensive cleanup of former coal sites is therefore critical to economic revitalization and new development, likely requiring policy action to help fund cleanup and to mandate or incentivize private sector action for remediation and redevelopment.**

iii In this framework, reclamation generally refers to both reclamation and remediation.

iv Conversion from methane to CO_2 equivalency on a 20-year timescale (global warming potential, GWP20 = 86).

Unclear or unfunded liabilities for reclamation

Coal mining operators are required to issue performance bonds to fund reclamation activities, which are forfeited to regulators if the operator cannot carry out the reclamation plan. However, according to a 2018 analysis by the Government Accountability Office, only 52% of forfeitures between 2007 and 2016 were sufficiently funded to complete reclamation; 22% were insufficient; and 26% had yet to be assessed.[33]

Federal coal reclamation programs primarily lie with the Environmental Protection Agency's brownfields program and the Department of the Interior's Office of Surface Mining Regulation and Enforcement (OSMRE), both of which provide grant funding to public or nonprofit entities for site cleanup. However, neither of these programs is funded at adequate levels to meet cleanup needs.[34] OSMRE alone faces a $10.4 billion shortfall to clean up mines abandoned before 1977,[35] and coal operators have not set aside enough money to clean up future abandoned mines as required by federal law.[36]

Though not required to set aside money for remediation, utilities often face uncertain costs and, in the case of rate-regulated utilities, are incentivized to lowball costs to limit impacts on ratepayers. Some coal plant owners will simply shutter plant sites after retirement without decommissioning and remediation, preventing reuse of the site and allowing pollution from coal ash to continue indefinitely. As of 2017, over one-third of retired coal plants tracked by an industry expert remained in this "cold and dark" status rather than being fully reclaimed, with little recourse to ensure prompt reclamation if liable actors failed to complete their obligations.[37]

Reclaiming and remediating former coal sites will require more federal funding than is currently available, but new requirements or incentives to ensure comprehensive cleanup are also essential. Some advocates have proposed that the federal government enforce and strengthen mandates for coal power plant operators to fully remediate coal plant sites and cover the cost of coal ash cleanup to protect groundwater.[38] The federal government could also provide a limited period for coal asset owners to be eligible for federal reclamation funding, contingent on a resource match from the asset owner and full reclamation of the site within a given time.

Federal loan and loan guarantee programs can also de-risk private reclamation activities; for example, with congressional action, the Department of Energy's Loan Programs Office or the Department of Agriculture's electric infrastructure loan program could expand program offerings to include coal site reclamation.

To address these challenges, transition policy should **assess local assets, including coal site infrastructure, and promptly reclaim coal sites**.

Reclamation, remediation, and abandoned mine methane capture can offer short- to medium-term employment opportunities to support dislocated coal workers and workers from communities disproportionately affected by coal pollution. Reclamation activities and coal mine methane activities can align well with skill sets that coal workers already possess and can therefore help workers bridge the gap during training periods or before retirement.[39] The federal government could require that any reclamation activity receiving federal funding prioritize the hiring of displaced energy workers and train and hire workers in environmental justice communities. State and federal governments can also enact standards or incentives for the capture of coal mine methane for existing and abandoned mines. Federal funding should also be contingent on paying workers prevailing wages, protecting their right to unionize, and ensuring worker health and safety standards on reclamation projects.

Reclamation activities can also be used as a launching point for economic recovery. Within coal communities, specifically, valuable infrastructure from closed plants and mines — such as transmission lines and switchyards, buildings and equipment, rail and water access, and land — can be used to support new uses, such as data centers, manufacturing facilities, clean energy projects such as solar and storage, or even office buildings.[40] Although these projects alone will not replace all economic activity and employment lost due to coal closure, they represent clear opportunities for profitable and productive reuse of former coal sites.

Comprehensive cleanup of abandoned coal mines and retired power plants can protect human health and the environment, address long-standing environmental justice issues, create local jobs, and open the door to new economic opportunities.

3. Reinvestment in Local Communities

Difficulty attracting new sources of economic activity

Diversifying economies based on local strengths, resources, and shared vision is essential to successful long-term economic development. Economic recovery is particularly complex in many coal communities because they are often isolated from major economic centers and because of their reliance on a single industry for the bulk of their economic activity.

Coal communities will need to bring in new investment to generate alternative sources of economic activity, ideally prioritizing local entrepreneurs, and will need to provide family-supporting jobs to residents. This reinvestment will need to include local infrastructure improvements (particularly access to broadband in rural communities), as well as economic development plans that capitalize on local resources and advantages (such as valuable infrastructure left over from coal facilities).

Economic development strategies should focus on economic diversification to avoid replicating the economic dependence on a single employer or industry that exacerbates coal communities' vulnerability to closure. Similar approaches can be used to revitalize communities of color, many of which have suffered from historical disinvestment and economic stagnation.

Additional **funding for local economic planning, infrastructure, and public services, as well as de-risking private investment in coal communities**, will be critical to supporting long-term economic development. Community members and dislocated workers face the risks of tying their future income and property values to an uncertain future by remaining in their communities. This points to the critical need for innovative financing solutions that not only improve the value proposition for investors and entrepreneurs but also encourage people to build new opportunities in their communities. In addition, the federal government already provides a variety of economic development grant programs, but more flexible financing methods and improved accessibility will be needed to ensure effective implementation.

Importantly, resources and technical support must also be made available to local leaders to build capacity and facilitate access to federal investments. Federal programs can also be modified to set aside funding dedicated to or prioritizing coal communities and environmental justice communities. Federal loan and loan guarantee programs can help de-risk private sector investment in these communities.

Any economic development project using federal funding should include project labor agreements and community benefit agreements, which together can establish local hiring requirements, prioritize training and hiring of displaced energy workers and residents of fence line communities, protect worker health and safety, ensure that workers receive fair wages, and protect workers' right to unionize.[41] Reinvestment projects should take a holistic view of recovery, investing not only in economic prosperity but also in community connections, public health, and personal well-being. Projects should also be aligned with climate priorities to avoid adding new sources of carbon emissions.

Loss of cultural or social attachments centered on coal

In addition to economic hardships, the social impacts of coal closure can persist. In some communities, the decades- or generations-long legacy of the coal industry has created strong cultural and identity-based attachments to coal. The sudden decline of the industry can be damaging for mental health, can exacerbate other social and health problems such as substance abuse, and can solidify opposition to strong climate action. For example, prescription drug abuse and heroin use in Appalachian coal-mining regions are even greater than the already high rates of abuse in rural non-coal-mining areas.[42]

Federal and state policies that provide transition assistance tend to focus on economic recovery — and do not directly address these social and cultural impacts — or on individualized resources and support for finding new employment. Transition support that provides comprehensive services such as access to mental health resources and counseling can help community members and workers weather this major personal and structural change.

Principles for Developing and Implementing Transition Policy

The efficacy of the framework outlined above hinges on stakeholders' ability to access these resources to meet local needs. The delivery of transition resources must be coordinated across state and federal agencies to ensure the organized rollout of public support. Policy development and implementation must also take place in active collaboration with affected workers and communities to support local priorities, build local capacity, develop local trust and connection, and meet local needs. Exhibit 6 (next page) lists the stakeholder groups critical to coordination and collaboration issues, and Exhibit 7 (page 25) summarizes potential policy solutions to address these issues.

Exhibit 6 Stakeholders Critical to Effective Coordination and Collaboration

Issue	Coordination and collaboration		
	Difficulties coordinating resources to support recovery from coal closure	Lack of capacity to access resources	Lack of adequate consultation in coal closure process
Affected individuals			
	Coal workers (plant, mine, transport, manufacturing) *Represented by unions if unionized, local government representatives, community organizations*	✓	✓	✓
	Residents of towns, counties, or tribal territories that host a coal plant or mine *Represented by local or tribal government representatives, community organizations*	✓	✓	✓
	Community members disproportionately exposed to coal-related health and environmental hazards *Represented by local government representatives, community organizations, environmental justice organizations*	✓	✓	✓
	Ratepayers in territories where coal plants are retiring early *Represented by consumer advocate organizations*			✓
Affected institutions			
	Local or tribal governments of towns or counties hosting a coal plant or mine	✓	✓	✓
	Electric utilities or asset owners of a coal plant retiring early			
	Coal mining companies			

Exhibit 7 Potential Policy Solutions to Ensure Coordination and Collaboration

	Issue	Policy solutions
Coordination and collaboration	**Difficulties coordinating resources to support recovery from coal closure**	Creation of government offices or bodies to coordinate resources for affected communities Development of local one-stop shops for community leaders and workers to access resources
	Lack of local capacity	Investing in trusted local institutions Technical assistance or workshops for supporting grant writing to access resources
	Lack of trust	Investing time in building relationships in communities Resources to promote dialogue among local groups
	Lack of adequate consultation	Convening or consulting stakeholder advisory groups to guide planning and funding Mandates for public meetings to guide recovery and revitalization Outreach and engagement efforts to assist local access to coal transition support resources

Coordination of Policy Support

Because recovery from coal closure involves a range of environmental, workforce development, labor, environmental justice, and economic development issues that cross agencies' jurisdictions, close coordination across agencies will be needed to ensure that federal approaches are deployed effectively and strategically, rather than haphazardly.

President Joe Biden's Interagency Working Group on Coal and Power Plant Communities is intended to fulfill this coordination role by acting as a one-stop shop of federal resources for coal communities, conducting research and analysis on transition impacts, and developing strategies to assist revitalization in these communities.[43] Various advocacy and legislative proposals have also sought to create a new White House office to establish a whole-of-government approach to ensuring that coal communities are not left behind in the shift to clean energy.[44] Additionally, to ensure that communities connect with government agencies, locally trusted institutions must be strengthened or created to serve as one-stop shops for community leaders and workers alike to access resources and information.

Collaboration with Stakeholders

Transition policy must also be designed and implemented in collaboration with individuals who are affected by the transition from coal. This will require building capacity among local leaders to enact transition plans, building trust with affected workers and communities, and prioritizing stakeholder engagement to ensure that stakeholders are willing and able to carry out transition plans that align with their own priorities.

Capacity building

Even where public or private support is available to assist coal workers and communities, lack of capacity can prevent stakeholders from accessing funding. Local government officials or community representatives who are often overwhelmed by other responsibilities may be unaware of the range of opportunities and funding that is available and may not have the time or resources to complete labor-intensive grant applications. Local institutions such as nonprofits often run impactful programs in their communities but may struggle to find adequate support for operations. Federal, regional, or state transition programs should include support for building capacity among local stakeholders and ease the cost of accessing resources, such as by providing grant-writing assistance or conducting local educational or technical assistance workshops.

Developing trust

To engage effectively and equitably with local partners, policymakers and external partners must take the time to build trust and relationships in recognition of historical disinvestment. Coal communities may attribute coal plant and mine closures to state and federal policy action, even if such closures are primarily due to market factors. As a result, it can be easy to resent or mistrust policymakers who are perceived as interfering with local affairs, failing to understand the impacts of climate and energy decisions, or simply not caring about constituents in these communities. Rural-urban divides can also exacerbate this distrust, as stakeholders in rural coal communities may believe that policymakers from urban areas hold elitist, patronizing, or ignorant attitudes about their communities.[45]

> **"Environmentalists didn't care [about workers], and when I would talk to them about it, they would get angry and speak to the planet....**
>
> **[In 2018, there was] a working group of environmentalists, labor unions, and some community activists where we all got together and we all started talking about our issues.**
>
> **That's when some environmentalists realized that we aren't just a bunch of union thugs, that we do care, but we also care about our members."**
>
> — Labor representative in Colorado, describing stakeholder dialogues among labor, environmental, and community groups before transition legislation was developed in 2019

To overcome this distrust — and to address any genuine concerns or misunderstandings by local stakeholders — policymakers, environmental advocates, utilities, and mine operators must work to build genuine understanding and time-tested relationships with local actors through stakeholder engagement efforts. Community partners can also assist in trust-building efforts by promoting dialogue and collaboration among local groups to develop a shared community vision. A new grant program could also be created to fund collaborative workshops in coal communities to build trust among stakeholders and create a shared vision for future development, similar to the EPA's Environmental Justice Collaborative Problem-Solving Cooperative Agreement Program.

Engaging with coal communities over longer periods, rather than one-off meetings or conversations, is crucial to building trust and shared understanding. Additionally, understanding the lived experience of coal workers and community members can help demonstrate policymakers' attention to stakeholders' needs. For example, several interviewees from coal communities noted that outside actors should tour the local coal plant or mine to fully understand local conditions. Taking the time to create these foundations not only will enable smoother collaboration but also can help local stakeholders come to terms with the clean energy transition and plan proactively for the future of their communities after the coal industry closes.

Stakeholder engagement

Trust building is possible only with long-term and genuine engagement with affected communities. Transition support programs must include stakeholder consultation at each stage of development and implementation of the program. Stakeholder input helps create more robust and effective community-led solutions that address needs on the ground, which are best understood by local actors who are experiencing the impacts of coal closure firsthand. These stakeholder engagement initiatives should be spaces not merely for debate, but also for listening and for collaborative innovation to build mutual understanding and stronger solutions.

Importantly, although some stakeholder groups may have related concerns, their interests will likely not fully overlap. For example, coal workers are members of coal communities, but policies to support these workers may not be in communities' best interest (e.g., helping coal workers relocate to find new employment may weaken the economic and social base of coal communities, which would lose skilled labor and population, as well as harm social cohesion).

Additionally, different stakeholders may require different forms of support to recover from the same impact. For example, tribes that host coal infrastructure are a type of coal community, but they will require unique economic, environmental, and social solutions to address the history of dispossession and disinvestment in tribal lands.

A key component of stakeholder engagement efforts should be to understand what positions different stakeholders hold, where these positions converge and diverge, and how stakeholders can be brought together to educate one another and agree on a shared and community-driven solution.

Stakeholder engagement is also crucial to generating buy-in and support for transition planning, given that coal workers and communities may be reluctant or hostile to planning for a future without coal. The interviews conducted for this report revealed that the reasons for this reluctance can include:

- Lack of transparent communication by utilities. Utilities may fail to indicate that a plant is likely to close before retirement is officially announced. In these cases, coal workers and communities may not realize that their plant is vulnerable to closure.

- Lack of information about market forces driving coal decline. Coal workers and communities often blame the decline of coal on environmental policy, rather than market forces. As a result, stakeholders may underestimate the strength of trends leading to coal closure and may believe that community resistance to coal closure can keep facilities open.

- The boom-and-bust nature of coal extraction. Workers and communities who have experienced the cyclical nature of extractive industries may believe the decline of coal to be a temporary blip rather than a long-term trend. This view is more common in areas that host coal mines rather than coal plants, since plant operations tend to be stable over time.

- Fear of openly acknowledging coal transition. Although workers, community members, and elected officials may privately agree that coal closure is coming, they may be reluctant to say so publicly because of fear of opposition or fear of being seen as supporting closure.

- Difficulty accepting a large degree of change. Coal plants and mines have deep roots and long histories, producing an entrenched cultural legacy and community routine. Facing the loss of such a central institution can be challenging and will require time for workers and communities to accept and process.

Stakeholder engagement and education efforts can help address these challenges by providing workers and communities with key context for coal's broader decline, as well as opportunities for honest discussion.

To ensure that all participants have a common understanding of the intent and function of stakeholder engagement efforts, policymakers and conveners should clearly communicate the form and purpose of different engagement methods and articulate how stakeholder input will be used. These elements of engagement include:

- Listening to affected stakeholders and genuinely hearing their concerns. Stakeholder engagement must begin with meeting people where they are.

- Informing stakeholders about changes and decisions and inviting them to learn about the impacts and rationale. Examples include public forums and informational sessions.

- Consulting stakeholders about impending decisions and inviting them to provide feedback or counsel. Examples include public forums, listening sessions, and workshops. Building trust will help stakeholders buy into the process and believe their input will be heard and incorporated.

- Collaborating with stakeholders in the decision-making process and inviting them to share the responsibility of creating the solution. Examples include workshops, committees, or working groups.

- Delegating to stakeholders and supporting them as the primary decision makers. Examples include committees, working groups, or distribution of financial or technical support to local decision makers.

Collaboration and delegation approaches are necessary means of promoting local leadership and ensuring that outcomes of transition planning align with local needs and priorities.

Conclusion

Communities and workers who depend on coal for their economic livelihoods face serious risks in the shift to clean energy, including loss of well-paying jobs with good benefits, loss of health insurance, reduced property values, gaps in local tax revenues, unfunded liabilities for environmental cleanup, and uncertainty around future community economic development. Meeting the climate challenge while ensuring prosperity for all will require targeted policy interventions and innovative solutions. Importantly, successful and long-term solutions will vary in the types and levels of support for different fossil fuel–dependent economies, and this report focuses on applying the framework to the coal sector. Future work will include aggregation of localized data to help communities quantify the risks they are facing in the shift to clean energy and the development of novel financing mechanisms to reduce those risks and support communities and workers through the transition to clean energy.

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