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Enabling Fairness for Energy Workers and Communities in Transition

A Review of Federal Policy Options and Principles for a Just Transition in the United States

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About the Project

This report is the culmination of a series of papers prepared by Resources for the Future (RFF), Environmental Defense Fund (EDF), and other partners that examine policies and programs to promote fairness for workers and communities in a transition to a low–greenhouse gas emissions economy, often referred to as a just transition. The series looks at existing public policies and programs, grouped thematically as "tools in the toolbox" for policymakers seeking effective strategies to address challenges associated with transition. We focus on policies and programs that can support workers and communities in regions where coal, oil, or natural gas production or consumption has been a leading employer and driver of prosperity. Other reports in the series present illustrative cases in the United States and describe policy innovation abroad.

Please visit **www.rff.org/fairness-for-workers-and-communities** and **www.edf.org/ensuring-fairness-workers-clean-economy** for more information, including other reports in the series, blog posts, and more.

Acknowledgments

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Contents

Abbreviations

AJC	American Job Center
AML	Abandoned Mine Lands
ARC	Appalachian Regional Commission
CARES Act	Coronavirus Aid, Relief, and Economic Security Act
DOC	Department of Commerce
DOE	Department of Energy
DOL	Department of Labor
EDA	Economic Development Administration (DOC)
EIA	Energy Information Administration (DOE)
ETA	Employment and Training Administration (DOL)
\HUD	Housing and Urban Development
JSC	Jobs Strategy Council
NET	National Economic Transition
NWA	NeighborWorks America
OZ	Opportunity Zone
POWER	Partnerships for Opportunity and Workforce and Economic Revitalization
PZ	Promise Zone
SBA	Small Business Administration
SNAP	Supplemental Nutrition Assistance Program (USDA)
UMWA	United Mine Workers of America
USDA	US Department of Agriculture
WIOA	Workforce Innovation and Opportunity Act
WORC	Workforce Opportunity for Rural Communities

Executive Summary

An energy transition has begun in the United States, including a widespread shift from coal to natural gas and renewables. As society addresses climate change, decarbonizing the economy will lead to further transformation of the energy system, likely involving expansion of clean energy generation, a boost in electric vehicles, and further reductions in fossil fuel use.

In this transition, prioritizing fairness for workers and communities that have historically depended on fossil energy economies will be important—what many refer to as a just transition. Ensuring fairness for workers and communities in transition is a complex task, one that has grown more pressing in the context of the Covid-19 pandemic and associated recession. This research aims to help policymakers explore the range of policy options available for facilitating a just transition in the United States.

In this paper, we compile findings from a series of reports that unpack existing US and European policies related to just transition. To help policymakers identify the components of a comprehensive just transition policy package, we group more than 100 policies into four primary categories, as well as four crosscutting policy areas (Figure ES1). Together, these policy mechanisms address the major challenges associated with energy transition and are likely help facilitate a just transition.

We also distill from our research five important insights for effective just transition policymaking.

1. **Multiple and customizable policy types are needed.** There is no silver bullet for a just transition. Instead, policymakers will need to assemble a package that includes all of the various policy types listed in Figure ES1, in many cases in various forms. As we discuss below, these policy types interconnect and together create a network of support for workers and communities. Furthermore, we find that policies often excel when they are tailored to unique local circumstances, and when they are targeted for populations most in need. Policymakers may also find success in designing policies that focus on a specific sector, such as trainings and financial support for coal workers or workforce training designed around the labor needs of advanced manufacturing.
2. **Coordinated delivery is essential.** Given the need for a dynamic system of intersecting initiatives, policymakers will need to ensure that administration and implementation are well coordinated, both *horizontally* (across federal agencies) and *vertically* (across levels of government—federal, tribal, state, and local governments—and stakeholder groups). We also recommend that policymakers centralize and streamline service delivery, both to help participants easily access the many available resources and to spend federal dollars efficiently.
3. **Strategic timing and sequencing of policy implementation are important.** The sequencing of just transition policy implementation is likely to affect program efficacy and cost-effectiveness. For example, national, regional, and project-specific just transition *planning* are crucial early-stage actions to prepare

for change and seize timely opportunities. Other early-stage interventions include reforms to bankruptcy laws, programs to shore up local governments experiencing a decline in their tax base, and efforts to get displaced workers into new, high-quality jobs—and if that is not immediately possible, to provide temporary income supports and subsidies for foundational living expenses like health care, housing, and childcare. Furthermore, some programs, like infrastructure expansion and environmental remediation, can put people to work relatively quickly in construction jobs while bolstering increased productivity and economic diversification over the long term.

4. **Equitable and inclusive policymaking and implementation are critical**. As the term suggests, equity and fairness play a central role in just transition policy. This includes addressing a legacy of underinvestment and environmental injustice in low-income and minority communities; ensuring procedural equity by engaging affected workers and communities in the design, implementation, and evaluation of policy; designing programs that are accessible and transparent in how funds are allocated and how program effectiveness is measured and evaluated; and making sure that the companies that have benefited from polluting activities bear responsibility in environmental remediation.
5. **Challenges that the energy transition poses for public revenue streams must be addressed**. Although new economic drivers—including clean energy—could replace any fiscal losses that tribal, state, and local governments may face amid energy transition, federal leaders may need to design policy to bolster subnational fiscal solvency. Potential measures include (1) raising new government revenue dedicated to this purpose; (2) increasing spending from general funds; and (3) enhancing local fiscal autonomy.

We also highlight research gaps that can be filled to better inform policymaking in each of the areas discussed above: assessing the scale of the just transition effort; identifying metrics to measure success and enable adaptive management; evaluating which strategies offer the best prospects for success in different geographies and sectors; and learning more from economic transitions of the past.

Figure ES1. Categories of Just Transition Policies Studied

Economic Development

Attracting and Supporting Employers

Attract and support employers

Examples: New Markets Tax Credit, DOD Office of Local Defense Community Cooperation programs

Capacity Building

Support professional skills development and new technology investment for public and private entities

Examples: ARC POWER Initiative, USDA Rural Development Partnership

Public Services

Improve public services in communities through federal funding

Examples: USDA Rural Utilities Service, Secure Rural Schools

Financial Services

Support entrepreneurs with limited access to credit

Examples: Small Business Administration loan guarantee programs, CDFI Fund

Key Design Elements

- Coordination across government agencies and collaboration with local stakeholders
- Increasing the scale of existing economic development programs for affected communities
- Identifying affected workers and communities, then tailoring policy interventions appropriately

Workforce Development

Job Training and Career Services

Train workers and help them find jobs

Examples: Post 9/11 GI Bill, DOL-ETA state grant programs

Foundational and Income Support

Supplement income and/or support basic needs like housing

Examples: Unemployment Insurance, Trade Readjustment Allowance

Labor Standards

Increase the quality of jobs available

Examples: Davis-Bacon Act, Fair Labor Standards Act, Occupational Safety and Health Act

Key Design Elements

- Centralization and integration of service delivery
- Inclusion of "wraparound" services such as childcare or substance abuse therapy
- Identifying affected workers and communities, then targeting and tailoring policy interventions appropriately
- Close collaboration with private sector to improve timing and design of services

Public Benefits

Foundational Support

Offer compensation for specific needs, including health care and food

Examples: Medicaid, Supplemental Nutrition Assistance Program

Income Support

Provide direct cash payments or tax credits to low-income households

Examples: Unemployment Insurance, UMWA Pension Fund

Key Design Elements

- Strengthening of automatic stabilizers to respond swiftly to shocks
- Expansion of eligibility, access, and utilization of social safety net programs
- Reform to industry-specific programs that rely on excise taxes or are easily avoided by companies in bankruptcy processes

Infrastructure and Environmental Remediation

Public Infrastructure

Support access to transportation, clean water, broadband for affected workers and communities

Examples: Clean Water and Drinking Water State Revolving Funds

Environmental Remediation

Clean up a large legacy of pollution, particularly in coal communities and environmental justice communities

Examples: Abandoned Mine Land Program, Superfund Program

Key Design Elements

- Focusing on environmental justice and communities in transition
- Supporting local employment in targeted regions
- Improving public health through cleaner air and water

Crosscutting Policies and Issues

The policy categories above are overlapping and nonexhaustive. We identify four issues that intersect multiple categories.

Research

Federal research across many policies and programs enables informed decisionmaking.

Technical Assistance

Federal technical assistance, coordination, and knowledge sharing can support local efforts across program types.

Planning

Across programs, federal planning assistance can facilitate locally developed initiatives.

Employer Accountability

Federally established rules for business operation can facilitate business growth and protect workers and their benefits.

1. Introduction

In recent years, an energy transition has been taking shape in the United States. Natural gas has dominated the market with plummeting prices, coal production and consumption have declined, the competitiveness of renewable energy and energy storage has skyrocketed, and future reductions in oil and gas use have become more likely. Most of these changes have been driven by market forces (i.e., low-cost natural gas and renewables), but looking forward, policy decisions aimed at sharply reducing greenhouse gas emissions will help shape the future of the energy sector.

Amidst this shift to a clean energy economy, prioritizing fairness for workers and communities in regions where fossil fuel industries have been a leading driver of prosperity is also known as supporting a just transition (JT). Generally speaking, a just transition ensures that a shift to a low-carbon, environmentally sustainable economy does not disproportionately burden these workers and communities (BlueGreen Alliance 2020). To maintain consistency with academic literature and major domestic and international policies, such as the Paris Climate Agreement, we use the *just transition* term in this report, and in so doing we reference the concept of *fairness for workers and communities* provided by the BlueGreen Alliance (2020).

Ensuring fairness for workers and communities in transition is a complex task, one that has grown more pressing because of the Covid-19 pandemic, the continued decline of coal production in the United States, and the advent of increasingly ambitious emissions reduction targets worldwide. Our research aims to help policymakers tackle this complex challenge by identifying and discussing the range of policy options available.

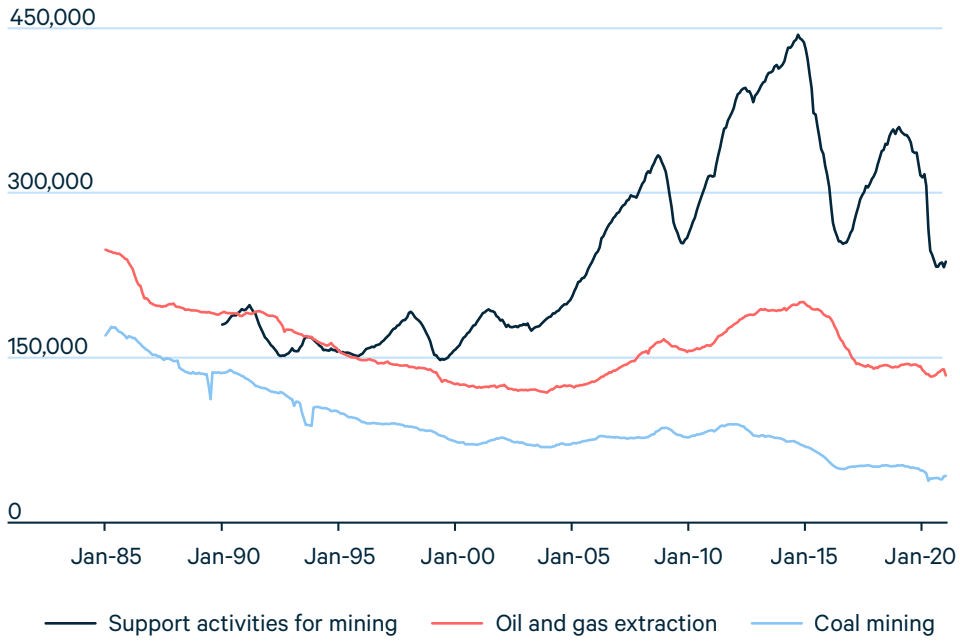
1.1 The Energy Transition

For decades, certain US coal-producing regions, particularly Central Appalachia, have faced acute economic challenges. Three-quarters of domestic coal mining jobs—employment for more than 100,000 workers—have been lost since the 1980s (BLS 2020), largely because of automation and, more recently, declining demand. And, from 2008 through 2019, US coal production and consumption fell by 40 and 48 percent, respectively (EIA 2020a).

In the oil and gas sector, the shale revolution has led to dramatic but volatile growth in US production and employment in parts of Texas, North Dakota, Pennsylvania, and elsewhere. In 2020, following steep declines in oil prices caused by the Covid-19 pandemic, upstream oil and gas employment (i.e., oil and gas extraction and support services) fell by more than 100,000 jobs (Figure 1).

The social and economic effects of this transition can be acute, and can have powerful short- and long-term consequences—both directly for workers and indirectly for the communities that depend on the industry for economic support. Local governments may experience sudden budget shortfalls, forcing them to cut essential services, leave

Figure 1. US Upstream Coal, Oil, and Natural Gas Employment



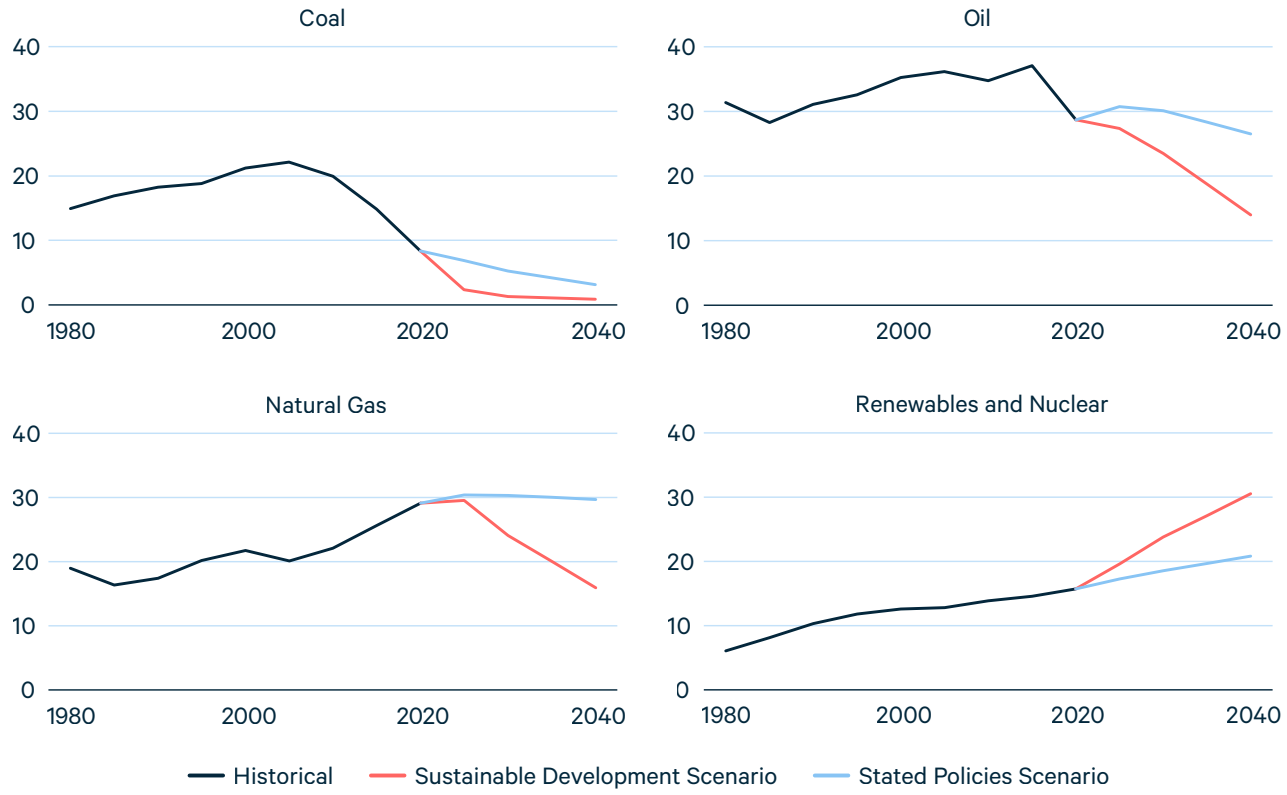
Source: BLS 2020. Support activities for mining (NAICS 21311) includes support activities for oil and gas extraction, such as well drilling and hydraulic fracturing services. Data through 01/01/21.

workers without health benefits, or increase tax rates. Over the longer term, the downturn in coal has left entire regions struggling to generate new economic opportunities. Oil and gas communities have experienced similar challenges of fiscal and economic volatility, even throughout the shale boom of the 2000s (Raimi et al. 2019).

Looking forward, trends in technology and policy will likely exacerbate these local economic challenges. The costs of generating electricity from onshore wind and solar photovoltaic systems have fallen by 70 and 90 percent, respectively, over the past decade, making them increasingly competitive with coal and natural gas–fired power (Lazard 2020). In its 2020 World Energy Outlook, the International Energy Agency projects that even without ambitious climate policies to meet global climate targets, US production of coal and oil will decline in the years ahead, and natural gas will remain roughly flat (IEA 2020). Under ambitious climate policies, coal, oil, and natural gas production decline considerably in the next 10 years (Figure 2).

The COVID-19 pandemic has intensified recent trends in coal and affected oil and natural gas. In the second quarter of 2020, US coal production fell 35 percent below that for the same period in 2019, while oil and natural gas production declined by 18 and 9 percent, respectively, from January through September 2020 (EIA 2020b, 2020d, 2020e). Although federal funding from the CARES Act helped support much of the economy in early 2020, and the Consolidated Appropriations Act passed in December 2020 promises further relief, workers, communities, and state and local governments continue to face major challenges.

Figure 2. Historical and Projected US Energy Production (Quadrillion Btus)



Source: IEA (2020). Stated Policies Scenario reflects current and announced policies. Sustainable Development Scenario limits warming to well below 2°C by 2100. Historical data are estimates provided by International Energy Agency to authors in November 2020.

1.1. Just Transition Policy Landscape

In this report, we integrate the findings from a series of four reports released in 2020 and 2021 that discuss (and where possible evaluate) existing US policies that may play a role in supporting a just transition. The prior reports focus on federal economic development policies (Raimi et al. 2020), environmental remediation and infrastructure (Raimi 2020a), public benefits (Higdon and Robertson 2020), and workforce development (Look et al. 2021). This synthesis also incorporates information from three case studies that examine US communities affected by the downturn in coal: Colstrip, Montana (Roemer et al. 2021); Athens, Ohio (Raimi, Glaser, and Michaud 2021); and Tonawanda, New York (Propp and Look, forthcoming). Finally, this synthesis report also considers just transition policy efforts underway in Europe.

We categorize policies in Figure 3 to help policymakers quickly assess a wide array of policy types across the just transition landscape. We classify the major policy types, list the core activities that those policies might include, and give relevant examples. The Appendix lists and categorizes all the existing policies we reviewed, and provides fiscal year (FY) 2020 spending estimates for each program where such information is readily accessible.

Figure 3. Categories of Just Transition Policies Studied

Economic Development

Attracting and Supporting Employers

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Examples: New Markets Tax Credit, DOD Office of Local Defense Community Cooperation programs

Capacity Building

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Infrastructure and Environmental Remediation

Public Infrastructure

Support access to transportation, clean water, broadband for affected workers and communities

Examples: Clean Water and Drinking Water State Revolving Funds

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Clean up a large legacy of pollution, particularly in coal communities and environmental justice communities

Examples: Abandoned Mine Land Program, Superfund Program

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Technical Assistance

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Planning

Across programs, federal planning assistance can facilitate locally developed initiatives.

Employer Accountability

Federally established rules for business operation can facilitate business growth and protect workers and their benefits.

Table 1. Recently Proposed Congressional Bills to Support Workers and Communities in Transition

Program target	Type of intervention	Proposed bills
Coal workers and communities	Workers' health care and pensions	116th Congress: **S.27**, **S.2205**, **H.R.934**, **H.R.935**, **H.R.3876**
	Local economic development	115th Congress: **S.1743**, **S.2569**, **H.R.405**
	Environmental remediation	116th Congress: **S.1193**, **H.R.4248**
	Multiple interventions	116th Congress: **S.4306**, **H.R.2156**, **H.R.4318**
Oil & gas workers and communities	Public revenues	117th Congress: **S.Amdt.653**
	Environmental remediation	116th Congress: **S.4642**, **H.R.8332**
Clean energy workers and communities	Workforce development	116th Congress: **S.876**, **S. 2185**, **S.2334**, **S.2393**, **H.R.1315**
	Local economic development	115th Congress: **H.R.5441**
	Multiple interventions	114th Congress: **S.2398**
Not specific to energy communities	Rural economic development	116th Congress: **S.2028**, **H.R.5762**
	Workers' pensions	116th Congress: **S.1486**, **S.2737**, **H.R.397**
	Workforce development	116th Congress: **S.538**
	Environmental remediation	115th Congress: **S.1669**

1.1.1. Proposed US Just Transition Policies

In the past several years, dozens of federal bills have been introduced to support workers and communities in transition. In addition to our primary analysis on existing programs, we have reviewed several proposed policies. Table 1 provides a representative, though far from exhaustive, list of recent proposals that address transition issues.

These bills take different approaches to supporting workers and communities in transition. Some, such as the Marshall Plan for Coal Country (S.4306), take a multipronged approach, with economic development, health benefits, and environmental remediation components. Others tackle a single issue; the Surface Mining Control and Reclamation Act Amendments of 2019 (H.R.4248), for example, would fund mine reclamation activities.

Some proposals harness the powers of the US tax code: the Coal Community Empowerment Act (S.1743), for example, creates tax incentives to spur investment in education and training. And in addition to addressing declining sectors, such as coal, some focus on the energy workforce of the future. The 21st Century Energy Workforce Act of 2019 (S.2334), for example, directs the Department of Energy (DOE) to develop a strategy to train workers for clean energy jobs. Most of these bills have not made it into law, but several have received bipartisan sponsorship and support. Certain facets of these proposals have also made their way into broader legislation, such as consolidated appropriations bills, which in recent years have included measures to preserve the solvency of the United Mine Workers of America (UMWA) pension program and extend the black lung excise tax (Cuellar 2020).

Notably, in our research we have come across few bills that target oil and gas communities. The small amount of proposals related to oil and gas is understandable, since most oil and gas economies, though volatile, have been booming. However, the oil and gas sector will likely be affected by the energy transition over the long term—and a larger number of workers and communities would feel the effects—suggesting that policymakers may want to begin considering solutions with these stakeholders.

It is possible that policies to enable fairness for workers and communities will gain further traction under the 117th Congress and Biden Administration. Support for fossil fuel-dependent communities was a plank of the Biden campaign's plan for achieving net-zero emissions across the economy by 2050. The campaign pledged to make a $2 trillion investment in clean infrastructure, prioritizing unionized jobs for vulnerable communities and displaced workers. Additionally, President Biden's January 27 executive order established an Interagency Working Group on Coal and Power Plant Communities and Economic Revitalization that aims to assess, plan, and coordinate federal support for workers and communities in transition. By late March, this Interagency Working Group is expected to present initial policy recommendations.

In addition to legislative and executive proposals, stakeholder groups and researchers have offered frameworks and strategies to support a just transition, including principles to guide future policy efforts (e.g., BlueGreen Alliance 2020) and specific policy recommendations (e.g., Just Transition Fund 2020; EFI and AFL-CIO 2020; WE ACT 2020; House Select Committee on the Climate Crisis 2020). More recently, the National Academies of Sciences, Engineering, and Medicine released an in-depth study (National Academies of Science, Engineering, and Medicine 2021) that addresses a wide range of issues related to the energy transition. Among other recommendations, the report proposes to address socioeconomic challenges through unique governance structures, workforce training programs funded at $5 billion per year, and public finance mechanisms such as a National Transition Corporation and a Green Bank aimed at investing billions of dollars per year in transitioning communities.

In the following section, we present the insights for just transition policy design, developed throughout our report series. We provide examples of relevant policies and discuss policy options that could support a just transition. Section 3 highlights areas where additional research could better inform policymaking, and Section 4 concludes.

2. Key Findings

2.1. Multiple and Customizable Policy Types Are Needed

In many fossil fuel- and electricity-producing regions, the energy industry forms the bedrock of the economy and culture. Shuttering this production can cause systemic upheaval for workers and communities. To compound the challenge, some energy-producing regions—especially Appalachian coal communities—have a history of high poverty rates, exposure to environmental pollution, and substance abuse, especially opioid abuse (Metcalf and Wang 2019; Glasmeier and Farrigan 2003; ARC 2019a).

Because the challenges are numerous and interconnected, complementary policies are needed. "Silver bullet" attempts to target a given piece of the puzzle are unlikely to succeed in supporting a transition to decent work and stable local economies. Further complicating just transition policymaking is the reality that different regions and populations will experience transitions differently, requiring policies to be customized to local circumstances. For example, the timing, scale, and types of challenges faced in Appalachian coal country may differ considerably from those in West Texas oil country. In addition, distinct populations (e.g., coal miners, older workers) will face distinct challenges.

In this section, we discuss how various policy types might function as a set, as well as some specific considerations for tailoring and targeting policies to meet the unique needs of communities.

2.1.1. Policy Types

In our preceding reports, we summarized and discussed nearly 100 existing federal (and some state) policies and programs related to just transition (Appendix, Table A 1). We have grouped these policies into four major policy categories (Figure 3, above): economic development, workforce development, public benefits, and infrastructure and environmental remediation. We have also identified crosscutting policies (which play a role in most of the four major categories): research, technical assistance, planning, and employer accountability policies. Below we unpack these policy categories and assess how they might fit together to facilitate a just transition.

2.1.1.1. Workforce Development

At the heart of the just transition challenge is the question of how best to support workers undergoing transition. When a coal mine or a power plant closes, people lose jobs and the local economy often goes into a tailspin, making new jobs scarce. Therefore, programs that directly help workers are important parts of a just transition policy package.

One prominent workforce development tool is **job training**. The human capital growth facilitated by job training and education is foundational to economic growth (Hanushek and Woessmann 2015); however, there is mixed evidence on the effectiveness of job training in terms of improving employment outcomes and earnings for workers (Lechner et al. 2011; Choi and Kim 2012).

Another important form of workforce development is **career services**, which include skill assessments, career planning, and job search and placement assistance. Research indicates that career services may be one of the most cost-effective and impactful forms of workforce development, with positive effects on earnings and employment rates (Leigh 1990). Federal workforce programs with both job training and career services include the state grant programs of the Employment and Training Administration (ETA, part of the Department of Labor, DOL) and the Post 9/11 GI Bill, two of the largest federal workforce development programs by annual spending.

Some workers, however, may not be in a position to participate in job training or career services programs. Low-income workers who don't have a savings cushion, people with childcare responsibilities, and individuals struggling with substance abuse, for example, could benefit from **income support** (i.e., income subsidies like unemployment insurance) and what we call **foundational support** (e.g., subsidized housing, childcare, transportation, and substance abuse therapy). Policies that offer these supports, along with the public benefit policies mentioned below, are examples of "wraparound" policies: they meet the preconditions for pursuing new skills and employment opportunities. In eastern coal communities that have a history of poverty and opioid abuse, such wraparound policies may be particularly important for just transition.

Finally, if the goal of just transition policy is to provide high-quality, family-supporting jobs, then there is a role for federal **labor standards**; which ensure, for example, that work environments are safe, compensation is fair, and workers are able to participate in well-functioning unions if they choose to. One labor standard particularly relevant for transitioning workers is the WARN Act, which requires advance notice for employees prior to predictable or planned business closures, such as coal mine or electricity plant shutdowns, that will lead to layoffs. Proposed federal legislation, such as the Good Jobs for 21st Century Energy Act (S.2185), has sought to ensure strong labor standards in emerging energy sectors, such as clean energy manufacturing or carbon capture, which might be considered destinations for transitioning fossil fuel workers.

2.1.1.2. Economic Development

Even well-designed workforce development programs will not effectively support transitioning workers unless there are jobs awaiting them. Therefore, policies to promote economic development and job creation are a needed complement to workforce programs.

The overarching goal of many federal economic development programs is to bolster and diversify local economies—critical for areas that have been built around fossil fuel extraction or processing. In the context of just transition policy, economic development efforts will need to **attract and support employers,** both new and existing. Tax

incentives, such as those offered by the New Markets Tax Credit program and the Opportunity Zones Program (Text Box 1), can catalyze investment, and programs such as SelectUSA seek to attract new employers by facilitating foreign direct investment in American communities and by "reshoring" the operations of US firms.

In addition, economic development programs can build **public services** and infrastructure to facilitate business growth in transitioning communities. These programs provide resources to state and local governments—and in some cases to businesses and nonprofit organizations—to build the physical foundations for economic prosperity. The Public Works program of the Economic Development Administration (EDA), which offers grants for upgrading municipal infrastructure and building physical business assets like office parks, is a prime example of a public services program.[1]

Publicly subsidized **financial services** are another important component of economic development policy. Businesses in rural locations, low-income communities, and communities with high proportions of marginalized individuals often lack access to affordable financing—a problem that federal programs can help address. The Small Business Administration (SBA) 7(a) and CDC/504 loan guarantee programs, and the US Treasury's CDFI Fund, are good examples of how federal dollars are used to support local lending. Furthermore, the CDFI Fund and various SBA programs are targeted specifically for low-income and distressed communities.

Federal economic development programs also often offer **capacity building** for the public and private sector in transitioning communities. Programs like the National Rural Development Partnership (administered by the US Department of Agriculture, USDA) enhance municipal professionals' ability to access federal grants and prepare economic development plans. In the private sector, programs like the NIST Manufacturing Partnership are designed to help businesses access new markets, adapt to changing global trade patterns, integrate new technologies, or develop new business plans.

2.1.1.3. Infrastructure and Environmental Remediation

A robust economy requires adequate and reliable **infrastructure**. Businesses need connectivity—for example, safe, efficient transportation networks and high-speed internet—to move products and services to market. Businesses also need the same fundamentals that underpin broader society, including waste management and energy services (Srinivasu and Rao 2013; Garin 2019).

As discussed in greater detail below (Section 2.5), changes in fossil fuel production and prices can dramatically affect state and local tax revenues (R. Newell and Raimi 2018; Morris et al. 2019), and a rapid shift away from these fuels will create acute fiscal challenges, pressuring governments to reduce spending on infrastructure (and other services). This can lead to a downward spiral for regional economies, where out-of-date infrastructure depresses economic activity further.

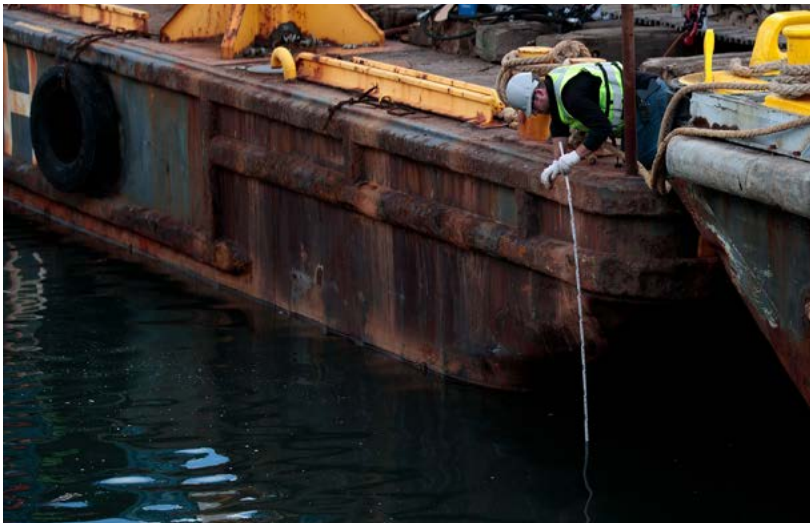
1 There is strong overlap with this category of economic development and the infrastructure policies discussed below.

In energy-producing communities with a legacy of pollution, **environmental remediation** programs, such as Superfund, Brownfields, and the Abandoned Mine Lands (AML) program, can also help establish the preconditions for economic prosperity by ensuring basic levels of environmental safety. For example, agriculture requires arable land, and tourism presupposes safe and aesthetic natural environments for outdoor recreation. Likewise, environmental remediation projects can create near-term jobs while leveraging workers' existing skillsets. For instance, one recent study estimates that remediating the known inventory of 57,000 orphaned wells could create roughly 13,000 job-years while addressing methane leaks and other legacy pollution (Raimi, Nerurkar, and Bordoff 2020).

Historically, federal support has been needed to finance these often-costly remediation projects, and a just transition policy would likely need to expand these efforts.

2.1.1.4. Public Benefits

Even a robust combination of the above policies may not be sufficient to support workers and communities in transition. As noted in an earlier paper in this series (Higdon and Robertson 2020), **public benefits** provide additional supports as a crucial foundation and first line of defense for individuals experiencing economic hardship. This includes cash transfers (or other income supports), such as Unemployment Insurance; subsidized health care, such as Medicaid or more tailored programs like



the Black Lung Disability Trust Fund; and publicly fortified pension programs for workers in transition.

Many Appalachian coal communities have a high percentage of low-income residents and public health challenges like substance abuse and black lung disease (Metcalf and Wang 2019; CDC 2018; Hendryx and Ahern 2008; Rauner et al. 2020; Canu et al. 2017). Moreover, fossil fuel workers' benefits may become unreliable if coal companies cut costs or face bankruptcy (Rapaport 2014; Randles 2019). Such conditions and historical inequities make direct benefits policies necessary and appropriate for a just transition.

2.1.1.5. Other Crosscutting Policies

Below we discuss three crosscutting policy areas—planning, research, and technical assistance—which affect the implementation of the mechanisms discussed above. We also explore employer accountability, which could be important for balancing costs borne by workers and employers in a transition, and overlaps with workforce development, economic development, and public benefits policies.

Across each of the policy types (Section 2.1.1), there is an important role for thoughtful and robust **planning**. For example, state and local workforce development boards are required by DOL-ETA to regularly develop plans for the delivery of workforce development services. Furthermore, a growing number of jurisdictions—including Germany, Canada, and Colorado—are establishing deliberate stakeholder engagement and planning processes to tackle just transition issues.[2] These efforts acknowledge that policy success will likely be built on up-front stakeholder engagement and analysis of policy options. See further discussion of planning below (Section 2.3.1).

As a complement to proactive planning, ongoing **research,** including retrospective policy evaluation, will be essential to deploying resources effectively, given the complex, challenging, and novel nature of just transition policy. Ideally, these efforts would include well-coordinated research across federal agencies and academic, nonprofit, and community-based organizations. In addition, pilot projects such as the AML Pilot Program, which provides federal funding to economic development projects on legacy coal sites, can provide early evidence and test the waters for novel policy approaches. To enable research that can evaluate the success of any policy efforts, federal data gathering tools will, as always, play a prominent role.

Technical assistance that connects government and third-party expertise with communities undergoing transition will also be crucial for a variety of policies. This assistance may be delivered to workers and entrepreneurs through programs such as the SBA Entrepreneurial Education programs, or to local governments, workforce development boards, and other service providers through programs like the DOL-ETA and the DOE Jobs Strategy Council (JSC).

2 The German Coal Commission, the Task Force on Just Transition for Canadian Coal Power Workers and Communities, and the Colorado Just Transition Advisory Committee.

Finally, policies that promote **employer accountability** to workers and environmental cleanup commitments may be applicable to a range of just transition efforts. Most notably, under current law, an increase in bankruptcies could jeopardize the fiscal solvency of important federal programs[3] and leave communities and government agencies shouldering the burden (e.g., paying for environmental remediation, providing health care and pension benefits for mineworkers). Reforms to bankruptcy rules, as exemplified in bills like the Prioritizing Our Workers Act (S.1468), have been proposed to address these concerns.

2.1.2. Solutions Will Need to Address Regional, Individual, and Sectoral Circumstances

The burdens of economic transitions tend to be distributed unevenly across geographies, populations, and sectors of the economy (Bernstein and Hassett 2015). The geography of energy production in North America, from Central Appalachia to the Navajo Nation, suggests that the US energy transition will have concentrated impacts. Just transition policies can address this dynamic through three approaches: a *tailored* (place-based) approach, a *targeted* (demographic-based) approach, and a sector-based approach (Fay 1996; Rodríguez-Pose and Wilkie 2017; Harper-Anderson 2008).

Tailored policies customize their services to specific locales. Some programs, such as SBA's Small Business Development Centers and the American Job Centers (AJCs) implemented under the Workforce Innovation and Opportunity Act (WIOA), provide services nationwide but rely on local partners to meet unique local needs. Other programs take an explicitly regional approach, such as the Appalachian Regional Commission (ARC) and the six other federal regional commissions and authorities modeled after it,[4] and the various geographically focused economic development "zone" policies, such as the Promise Zones initiative (Box 1). Though the methods differ, all tailored policies allow local stakeholders to customize implementation to address their priorities.

Similar policies exist in other countries. For example, the government of the United Kingdom identifies regions in acute economic distress as "assisted areas," making businesses in these regions eligible for support from certain public investment programs (UK Department for Business, Innovation and Skills 2014). Many of Germany's coal transition policies are designed entirely around specific regions, combining a range of policies and programs (e.g., targeted industrial development policies, workforce policies, cultural development programs) to meet the unique environmental and economic needs of affected regions (Herpich et al. 2018).

3 Prominent programs that rely on tax or fee revenue from coal production (liabilities to which have been shed through bankruptcy) include the Black Lung Disability Trust Fund, the UMWA Health and Retirement Funds, and the Abandoned Mine Land (AML) Reclamation Program.

4 For more detail on these seven federal regional commissions and authorities, see M. H. Cecire (2019).

Several researchers have found that tailoring helps connect workers to employers, improving employment outcomes of workforce development programs (Harper-Anderson 2008; Pynes 2004; McCarthy 2018). Tailoring also may enhance the cost-effectiveness of government efforts by focusing support where it's needed most and delegating aspects of implementation to community partners (Markusen and Glasmeier 2008).

Targeted policies provide services to specific populations based on demographic criteria. The rationale for targeting comes from the recognition that economic realignments often disproportionately affect certain groups, such as specialized workers[5] (Jacobson et al. 1993). Some federal programs, like the Supplemental Nutrition Assistance Program (SNAP) Employment and Training Program, target support based on income. Others, like Trade Adjustment Assistance, focus on specific causes of joblessness (i.e., trade policy). Examples of other targeted policies include those designed for Native American communities (e.g., ETA's WIOA Sec. 166 program), veterans (e.g., Post 9/11 GI Bill), youth (e.g., ETA's Youth program), and previously incarcerated individuals (e.g., ETA's Reentry Employment Opportunities program).[6]

Targeting can improve the effectiveness of just transition policies when the target populations form a distinct group with distinct needs (OECD 2005), as may be the case with workers displaced by an energy transition. Indeed, targeted federal job training programs have been shown to improve short-term employment rates and earnings (Kemple 2008; Fares and Puerto 2009; Heinrich 2008; Besharov and Cottingham 2011). However, if eligibility criteria are defined narrowly, the program will not benefit individuals who may be indirectly hurt by the economic shift, such as workers in adjacent industries that depend on the declining industry (Rosen 2002).

Sector-based policies support workers and employers in a particular industry. Some relevant sector-based policies, such as the POWER Initiative, support workers and communities that have relied on coal. Others, such as California's Clean Energy Workforce Training Program and DOE's Energy and Advanced Manufacturing Workforce Initiative, provide training or incentives for workers to enter a growing industry, such as clean energy or advanced manufacturing.

By building on existing capacities and cultivating links with employers in the industry of focus, sector-specific programs offer a promising pathway for worker reemployment—indeed, such programs have been found to increase employment and earnings (Rademacher 2002; Conway et al. 2004; Harper-Anderson 2008). If they focus too narrowly on a specific industry or set of industries, however, they run the risk of limiting the scope of recovery.

5 By "specialized workers" we mean workers who have developed specialized skills connected to industries in decline. Given this specialization, such workers can struggle to find new employment if their skills do not easily transfer to emerging sectors.

6 See (Look et al. 2021) for more detail on each of these programs.

Combined approaches deploy two or more of the above strategies. For example, SBA's Women Business Centers target women-owned businesses and tailor their offerings to the communities in which they are located. The DOE Utility Industry Workforce program (which the DOE JSC helped develop) is targeted at veterans but has a sector-specific focus on the utility industry.

All three policy types, and their combinations, likely have some role to play in planning for a just transition. For example, a recent proposal from the State of North Carolina would direct low-income and laid-off fossil energy workers (targeted) into infrastructure jobs (sector-based), thereby building the foundation for a new wave of economic prosperity while getting people back to work (e.g., NCDEQ 2019). A similar approach, suggested by the World Resources Institute, would use stimulus funds to employ former fossil energy workers in environmental remediation projects (WRI 2020). Germany's Action Program Ruhr and the United Kingdom's National Coalfields Programme also incorporate a link between job creation and environmental protection. However, moving workers from coal, oil, and gas to green sectors is unlikely to be a silver bullet. Fossil energy workers' skills do not always transfer neatly to many green jobs, and compensation in the renewable energy sector may be lower (Raimi 2020b).

Box 1 describes federal economic development efforts that are targeted and tailored to particular populations in designated communities.

Box 1. Targeting and Tailoring: US "Zone-Based" Economic Development Programs

The US federal government has historically provided economic development programs that are both targeted and tailored. For example, the Empowerment Zones and Enterprise Communities programs were established in the early 1990s, followed in 2000 by the Renewal Communities and New Market Tax Credit (NMTC) programs. These programs *target* low-income populations and are *tailored* to the unique needs of designated low-income areas—offering grants, tax incentives for investors, technical assistance to communities and other support (Bernstein and Hassett 2015).

Two recent examples of this type of policy are the Opportunity Zone (OZ) tax incentive program established in 2017 by the Tax Cuts and Jobs Act, and the Obama administration's Promise Zone (PZ) initiative. Under the OZ program, state governments nominate economically distressed locales under their jurisdiction to be opportunity zones; if the Secretary of the Treasury certifies them, investments in these areas become eligible for deferral and exclusion of capital gains taxes (IRS 2020; Theodos et al. 2018). Under the PZ program, urban, rural, and tribal communities can apply for PZ status, which involves submitting a detailed economic development strategy to the Department of Housing and Urban Development (HUD). After HUD approves a community for inclusion in the program, local organizations (including schools, health clinics,

and local governments) gain priority access to federal investment programs that support economic development and job creation for a minimum term of 10 years. The PZ program also provides technical assistance to local agencies directly to boost local organizational capacity. The Obama administration designated 22 areas as PZs between 2014 and 2016; though no new PZs have been created since, the program continues to provide these locations the aforementioned services (Stoker 2020).

Evidence regarding the success of zone-based economic development policies is mixed. Government Accountability Office analyses of Enterprise Communities, Empowerment Zones, and Renewal Communities recorded increases in employment after the programs' implementation but could not demonstrate a causal relationship. The New Market Tax Credit yielded more promising results, with investors reporting that 64 to 90 percent of the $31 billion they invested through the program would have been directed to other locales if not for the tax incentive (Bernstein and Hassett 2015). The PZ and OZ programs, being more recent, have yet to yield any measurable results, though the latter has been criticized for benefiting wealthy developers and investors rather than delivering local economic development gains and jobs (Drucker 2020; Tankersley 2020).

2.2. Harmonized Delivery Is Essential

Given the need for a complementary set of interconnected programs to facilitate a just transition, policymakers will need to take measures to ensure that multiple governmental (and non-governmental) entities are working together efficiently and effectively. Both *horizontal* cooperation (across federal agencies or "domains") and *vertical* cooperation (among levels of government—federal, tribal, state, and local governments—as well as local stakeholder groups) are required (NRC 2013).

Although cooperation of any kind can impose costs, generate friction, and take time, it has several merits. First, cooperation can reduce program fragmentation, redundancy, and conflict between organizations pursuing the same or similar policy goals. Second, organizations that cooperate can increase effectiveness by leveraging a diversity of expertise and resources. At the federal level, cooperation can also improve congressional and executive oversight where agency jurisdictions overlap (Kaiser 2011).

2.2.1. Forms of Interorganizational Cooperation

There are many ways of understanding the various types of cooperation among organizations. The following distinctions, from the Congressional Research Service, could be helpful in considering approaches to just transition policy implementation.

- **Collaboration:** entities with relatively equal power voluntarily participate in an engagement.

- **Coordination:** a lead entity directs a project or program being carried out with the participation of multiple organizations.
- **Merger:** the authorities and resources of one or more entities are dissolved and permanently transferred to another (new or existing) entity.
- **Integration:** the authorities and resources of one or more entities are temporarily shared with one or more other entities to execute a specific project.
- **Networks:** the federal government shares responsibilities with other levels of government (tribal, state, local, or in some cases, foreign countries or international bodies like the United Nations).
- **Partnerships:** public sector entities (at any level of government) share responsibilities with private sector entities (which may be nonprofit and nongovernmental organizations and for-profit businesses) (Kaiser 2011).

Below we discuss four issues related to effective interorganizational cooperation, all of which arguably will play an important role in just transition policy solutions: (1) federal interagency cooperation; (2) intergovernmental networks; (3) community participation and public-private partnerships; and (4) centralized service delivery.

2.2.2. Federal Interagency (Horizontal) Cooperation

Our review of policies related to just transition includes nearly 100 existing federal programs over 20 federal agencies and sub-agency offices. Because successful just transition policy requires a multipronged approach, the harmonization of these federal efforts is essential.

To date, the closest the United States has come to a comprehensive just transition policy is the Obama administration's POWER Initiative, a multi-agency approach to providing assistance to coal communities experiencing economic decline. The POWER Initiative involved 11 agencies, and interagency coordination was an explicit component. This coordination was led by EDA, but each agency retained control over its own spending decisions and program implementation (M. Cecire 2019). Little research has been conducted on the effectiveness of interagency coordination under POWER; however, it could provide examples of what a future just transition interagency effort might look like, and it is ripe for further research. With EDA in the lead role, the POWER Initiative is an example of interagency *coordination*.

Another example of transition-related interagency activity comes from DOE's JSC, which supports the economic and workforce development needs of the US energy and advanced manufacturing sectors (DOE 2020). Extending sector-specific DOE expertise to interagency policy development and implementation has been a core part of the JSC, including, for example, collaborating with the Bureau of Labor Statistics to improve the gathering of energy jobs data, which was published during the Obama administration in the annual US Energy and Employment Report. The JSC is an example of interagency *collaboration*.

Finally, the recently released National Economic Transition (NET) platform, a prominent just transition policy proposal produced by a consortium of tribal, labor, and coal

community organizations, calls for a new federal Office of Economic Transition to "coordinate and oversee the new national community transition program" and "synchronize ongoing efforts" (Just Transition Fund 2020). This interagency approach is an example of a *merger* or *integration*.

2.2.3. Intergovernmental (Vertical) Networks

Recognizing the localized nature of energy transition and economic development and the need to tailor policies to local circumstances, just transition policy should thoughtfully address activities across federal, state, and local levels of government—that is, to develop intergovernmental *networks*.

One of the best and most relevant examples is the ARC, which was established in 1965 to build community capacity and bolster economic development across 13 states in Appalachia, running from New York to Mississippi (ARC 2020a). Its governing structure combines federal, state, and local leadership. ARC is cochaired by a federal representative appointed by the president and a governor from one of the 13 states (with a new governor cochair elected each year). Each state assigns a program manager to work with ARC staff to execute ARC projects. Though not formal members of the commission, local governments are represented through bodies defined by ARC as Local Development Districts (Section 2.2.4, below; ARC 2020b).

This approach has yielded positive results. Gomez et al. (2015) found that counties that received grants from ARC experienced 6 percent higher income growth and 4 percent higher employment growth over 50 years, compared with counties that received no ARC funding.

2.2.4. Community Participation and Public-Private Partnerships

Effective just transition policy implementation will also engage nongovernmental stakeholders—including businesses, nonprofits, and other community-based organizations. One rationale for tailoring policies to specific geographies is the specialized, context-specific expertise that local actors bring to the table, in both policy design and implementation. However, connecting federal programs to local entities can be difficult to structure and implement in practice.

ARC again provides a useful example: as mentioned above the commission works with 73 multicounty planning and economic development agencies called Local Development Districts, whose boards comprise local elected officials, businesspeople, and other local leaders. Their primary role is to identify community priorities for ARC programs, facilitate local economic development planning, and build local leadership engaged in community development (ARC 2020a). Similarly, some recent ARC grant solicitations require that proposals include stakeholders from multiple sectors along with robust community input (ARC 2019b).

Another example comes from the NeighborWorks America (NWA) program, also known as the Neighborhood Reinvestment Corporation. NWA is a congressionally chartered nonprofit funded primarily by the federal government and overseen by a board that includes a number of federal agencies. Its goal is to enhance local economic development, and it pursues this goal by supporting nearly 250 local and regional nonprofits around the United States, which work directly with communities to advance economic development, affordable housing and other community development activities (NeighborWorks America 2020). NWA is sometimes cited as a model for just transition, partly due to its locally-driven, nationally-networked and federally-supported approach.

2.2.5. Centralized Service Delivery

In addition to orchestrating roles across various organizations, policymakers must consider how to deliver services to workers and communities in a well-coordinated way. In general, we find precedent and rationale for centralizing and streamlining service delivery as much as possible. Centralized service delivery characterizes major US workforce development programs, helping participants easily access the many available resources and spending federal dollars efficiently (Noble 2010; D'Amico et al. 1999; Eyster et al. 2016).

One example of locally centralized service delivery comes from the network of roughly 2,500 AJCs used to deploy WIOA workforce development services in communities across the country. AJCs are intended to be a central point of service for numerous

workforce development programs. AJCs, for example, facilitate access to ETA-funded job training, employment counseling, and job placement programs, as well as access to benefits from Unemployment Insurance, Trade Adjustment Assistance, the Social Security Administration, and many other federal programs. AJCs collaborate with other local and regional centers to form a comprehensive network of workforce development services (Collins et al. 2019).

2.3. Strategic Timing and Sequencing of Policy Implementation Are Important

The timing and order of just transition policy implementation are likely to affect program efficacy and cost-effectiveness. For example, a community experiencing a coal plant retirement may need workforce and economic development support well before the plant closes; while environmental remediation may be most useful later on. Below we explore some details related to timing and sequencing of just transition policy intervention.

2.3.1. Planning Is Essential—Start Now

The clearest first step is planning, which involves numerous activities. One key aspect of planning is convening stakeholders to share and gather information, to express their views, and to establish collective goals. During this participatory planning process, conflicts and potential solutions can be identified and discussed prior to implementing a given policy or project. These efforts are especially important when substantial opportunities for social and economic innovation may exist, or when the social or economic order of the community is undergoing fundamental change (Friedmann 1987)—dynamics that will exist for many communities in transition.

Economic development planning is currently funded by EDA, ARC, and numerous other federal agencies. Local and regional economic development plans incorporate strategies for promoting the development of public infrastructure, growth sectors, and housing. The lack of planning has been a particular challenge in some communities in transition, such as Colstrip, Montana (Roemer et al. 2021).

Related to economic development planning, with relevance to just transition, are *predevelopment activities*. As defined in a 2015 presidential memorandum, predevelopment activities consist of tasks that must occur before major construction projects—primarily infrastructure—break ground, such as project feasibility studies, economic assessments, engineering work, permitting and environmental review, and public outreach (Obama 2015).

A 2015 interagency study found that predevelopment generally accounts for less than 10 percent of a total project costs, yet “the lack of funding for these activities is often a significant obstacle to development in public sector-dominated infrastructure areas due to fiscal constraints or risk aversion” (US Treasury and DOT 2015). By “de-risking” projects, predevelopment may be a particularly effective tool for leveraging private dollars and creating public-private partnerships (Carol 2020).

In addition to regional, local, and project-specific planning, some governments and non-governmental organizations are advancing economy-wide just transition planning efforts. Such efforts provide an opportunity to build consensus across divided political landscapes, analyze the complex issues pertaining to transition, and collaboratively hammer out policy solutions.

For example, the German Coal Commission (formally, the Commission for Growth, Structural Change and Employment) was established in 2018 as a multistakeholder initiative to establish a roadmap for a just transition away from coal mining and coal-fired electricity generation in Germany. In January 2019, the commission published its final recommendations, which the legislature has since been working to enshrine in law (Furnaro et. al., forthcoming). In the United States, the NET platform has proposed a similar process—the creation of a "national just transition task force, which can assess the financial and social costs of the energy and economic transition, identify solutions, and make recommendations about a path forward"—leading to the creation of a "National Community Transition Action Plan" (Just Transition Fund 2020).

2.3.2. Policies Will Need to Address Short- and Long-Term Objectives

Other timing considerations must be considered for just transition policy. In the short term, affected workers need quality family-supporting jobs; communities need health care facilities and other core services like safe drinking water; and local governments need to remain fiscally solvent. Longer-term needs include worker retraining, environmental remediation, infrastructure expansion, and economic diversification. Policies will need to be deployed at different stages to meet these various needs, as the following examples show.

Some just transition policies, such as the AML reclamation program, are funded by fees on coal company revenues (Section 2.1.1.5). US bankruptcy law can allow coal companies to shed these liabilities on entering bankruptcy, leaving taxpayers or communities shouldering the burden. Therefore, one early-stage intervention policymakers may want to consider is revising bankruptcy laws with regard to energy or establishing other safeguards to ensure that state and local governments are not overwhelmed by capital-intensive remediation projects and that miners don't lose retirement and health care benefits.

Similarly, as we discuss in detail below (Section 2.5), policymakers may need to consider early measures for shoring up the fiscal solvency of tribal, state, and local governments, whose tax revenues are likely to fall as fossil energy economies decline.

The timing of intervention also matters for workforce policy. While workforce development policies like job training and career services are crucial, if workers in transition are facing unemployment, what they need first is either a job, or income support and other foundational supports like subsidized health care (Section 2.1.1.1). Apprenticeships are particularly attractive in this situation because they offer employment in tandem with job training and credentialing. However, apprenticeships

in (especially remote) energy communities undergoing decline may not be available. In the absence of employment, Unemployment Insurance and Trade Adjustment Assistance are vital early-stage stopgap measures to support workers while they train and take other steps to find new employment.

Some policies can simultaneously address near- and long-term objectives. For example, certain infrastructure projects can put people to work relatively quickly in construction while increasing productivity and economic diversification over the long-term (US Treasury and DOT 2015). Environmental remediation efforts have a similar profile. In addition, the skill requirements of these sectors may overlap with those of the coal, oil and gas sectors, improving employment prospects and earning opportunities for transitioning workers (Raimi 2020a). On the other hand, some infrastructure and environmental remediation projects can be quite capital-intensive and require long lead times, in which case the near-term employment benefits may be quite small (Strand and Toman 2010).

2.4. Equitable and Inclusive Policymaking and Implementation Are Critical

Although the concept of just transition has been interpreted in different ways by different groups (Section 1), equity and fairness are common to all definitions of the term. Below we discuss some aspects of equity (we cannot not claim to be exhaustive) that policymakers may want to consider when designing just transition policy.

2.4.1. Procedural Equity Forms the Foundation of Just Transition Policy

Many advocates assert that the engagement of those most affected by a transition away from fossil energy should be central to the development, implementation, and evaluation of just transition policy (e.g., WE ACT 2020; BlueGreen Alliance 2020; Kentuckians for the Commonwealth 2017). Such procedural fairness, a key consideration in the planning discussed in Section 2.3.1, is at the heart of the administrative structure discussed in Section 2.2.4, and represents a form of accessibility—to the decision-making and policymaking process—discussed below. As one example of how procedural equity is articulated in the just transition context, the International Labour Organization includes the following in its widely cited *Guidelines for a Just Transition towards Environmentally Sustainable Economies and Societies for All:*

> Social dialogue has to be an integral part of the institutional framework for policymaking and implementation at all levels. Adequate, informed and ongoing consultation should take place with all relevant stakeholders … [and] Governments should: (a) actively promote and engage in social dialogue, at all stages from policy design to implementation and evaluation …; (b) promote the creation, development and formalization of dialogue mechanisms and structures at all levels to discuss the best means to implement national social, economic and environmental goals (ILO 2015).

Participation of stakeholders is important not only because they often have the most expertise about effective just transition solutions, but also because participatory process often smooths the path to policy advancement by addressing stakeholders' concerns upfront (e.g., P. Newell and Mulvaney 2013; Carley and Graff 2020). Of course, the ultimate effectiveness of such a process depends on how it is carried out.

One notable example of procedural equity in the just transition context comes from Colorado's Just Transition Act. Established in 2019, the Just Transition Act created a Just Transition Advisory Committee (JTAC) charged with developing a roadmap (Just Transition Action Plan) for assisting Colorado workers and communities dependent on declining coal mining and coal-fired electricity sectors. The Act specified that the JTAC should be comprised of stakeholders from a number of groups, including coal transition workers, members of communities undergoing energy transition, representatives of electric utilities, and disproportionately impacted communities—as well as government officials (Raimi et al. 2020). The JTAC also held public meetings in communities undergoing transition (Colorado Department of Labor and Employment 2020).

2.4.2. Programs Need to Be Accessible and Implementation Needs to Be Transparent

For any just transition program to be successful, services and opportunities need to be accessible to the intended recipients. Information on available services could be distributed through a variety of channels, including targeted communications to trade groups, unions, or large employers; through new or existing community hubs, such as AJCs (Section 2.2) or Small Business Development Centers (Look et al. 2020); and through broader outreach efforts via social media and local outlets.

Colorado's Just Transition Action Plan, discussed above, ensures accessibility to programs by engaging coal workers in the state's existing network of workforce training centers as early as 2 years before a planned mine closure. The plan also calls for funding to support capacity building not just for workers to develop new skills but also for technical assistance delivered to coal community leaders as they develop place-specific transition plans (Colorado Just Transition Advisory Committee 2020).[7]

To promote public confidence in the delivery of these services, policy implementation needs to be transparent. The need for transparency extends from how funds are allocated and spent to how (and to whom) services are delivered and how program effectiveness is measured and evaluated. Online tools include existing platforms such as USASpending.gov; and new, purpose-built tools could focus exclusively on JT-related policies. Such a tool could build on lessons learned (both successes and failures) from the rollout of HealthCare.gov or other federal platforms (e.g., Anthopoulos et al. 2016; US Digital Service 2016).

7 Notably, Colorado's plan estimates that the number of affected workers would be between 2,000 and 3,000, while the number of affected counties would be eight or nine. The scale of any nation-wide JT effort would clearly be much larger.

2.4.3. Programs Can Address a Legacy of Underinvestment and Environmental Injustice

The development of US energy, transportation, and other infrastructure has contributed to a legacy of underinvestment and environmental injustice in many communities. For example, rural energy-producing communities in Appalachia often face a legacy of pollution associated with energy production (e.g., Herlihy et al. 1990; Boyles et al. 2017) while also lacking reliable access to infrastructure—robust transportation networks, broadband internet—that could underpin new economic sectors. Relatedly, the siting of energy, waste, and other infrastructure has subjected low-income communities and communities of color to a disproportionate amount of air, water, and soil pollution, creating cumulative burdens that can hinder people's ability to live healthy, productive lives (e.g., Evans and Marcynyszyn 2004; Banzhaf et al. 2019).

Whether in the hills of Appalachia or the cities of the industrial Midwest, just transition policies can help address this legacy if designed with these goals in mind. For example, by channeling investments (e.g., infrastructure, environmental remediation, workforce development) toward communities that have been historically underserved, federal efforts can enhance access to job training and employment opportunities, reduce air pollution, provide better access to transportation networks, and remediate contaminated water supplies.

In the European Union, such policies have been in place since the 1970s. Although its specific form has shifted over decades, the "cohesion principle" has guided policies that direct a portion of economic development funds to the poorest regions, including new EU member states (European Commission 2020). However, political differences across EU member states have recently threatened the cohesion principle (Casalino 2018), an issue that could also arise in the United States.

In addition, when policies and/or funds are directed toward specific geographies, it is important to consider the risk of gentrification, which occurs when the economic benefits (e.g., higher property values) brought about by remediation or other improvements raise housing costs, potentially forcing longtime residents from the community (e.g., Lee and Mohai 2012).

2.4.3.1. Funding Environmental Remediation Efforts

In many cases, particularly environmental remediation programs, the polluter-pays principle can help guide policy development. For example, the remediation of petroleum leaks from underground storage tanks is funded by a federal tax on motor fuel sales, and the cleanup of abandoned mine lands is funded by a federal fee on coal production. In other cases, environmental performance standards may be more appropriate to ensure that coal ash ponds and other fossil energy infrastructure do not endanger environmental or human health.

However, some legacies of fossil energy production are more difficult to address through the polluter-pays principle. For example, oil and gas companies that have gone bankrupt or otherwise ceased to exist may be unable to finance the decommissioning of well sites (e.g., Davis 2015). Similarly, when government decisions about public infrastructure (e.g., the siting of highways) are a leading contributor to environmental injustice, it is difficult to identify the "polluter" who should pay. In these or similar cases, public funding to remediate polluted sites may be necessary; comparable examples include the federal Superfund and nuclear waste management programs (Raimi 2020a).

2.5. Challenges for Public Revenue Streams Must Be Addressed

The fiscal challenges of large-scale energy transition may be substantial—especially at tribal, state, and local levels (Section 2.3.2). As fossil energy sources lose market share, the public revenues they generate—which fund core services like education, municipal water, and public safety—will likely erode. Although new economic drivers, including clean energy generation, could replace or exceed the losses, it is important to identify and assess the potential fiscal effects of transition.

2.5.1. Major Revenue Sources

From extraction to end use, coal, oil, and natural gas generate public revenues for local, state, tribal, and federal entities. Table 2 illustrates some of the most prominent sources: production or "severance" taxes are applied primarily by state governments; revenue from production on public lands (e.g., leasing bonuses and royalties) flows to states, tribes, and the federal government; local and state property taxes are applied to underground resources, power generation facilities, and midstream infrastructure, such as pipelines and refineries; fees are levied by states and federal entities, often to support specific environmental remediation programs; additional fuel-specific taxes are applied to various petroleum products; income taxes are paid by employees across the value chain for each fuel; and sales taxes are generated both directly (e.g., from sales of mining equipment) and indirectly by the range of purchases made by energy companies and workers.

Table 2. Public Revenue from Fossil Energy Sources

Revenue type	Coal	Oil	Gas	Primary recipient(s)[a]
Production or severance taxes	⚒	▮	🔥	States, some tribes
Production on public lands	⚒	▮	🔥	Federal, tribes, states
Property taxes	⚒	▮	🔥	Local, states
Program-specific product fees	⚒	▮	🔥	Federal, states
Petroleum product taxes		▮		States, federal, some tribes
Income taxes (corporate and personal)	⚒	▮	🔥	States, federal
Sales taxes (direct and indirect)	⚒	▮	🔥	Local, states, some tribes

[a] Tribal tax policies are complex and vary widely. In general, tribes do not levy property or income taxes, though some impose severance taxes (or share revenue with states), sales taxes, and petroleum product taxes. Revenue from production on tribal lands is generally collected by the federal government and distributed to tribes and tribal members.

Although a comprehensive analysis of the scale of these revenues is not available, some recent studies provide indications of their magnitude. R. Newell and Raimi (2018a) estimate that in fiscal year 2013, revenue from the first three rows in Table 2 (severance taxes, production on public lands, and property taxes on resources) totaled $28 billion for state and local governments from oil and gas production alone. Morris et al. (2020) estimate that dozens of coal-dependent counties could lose 20 percent of their revenue, on average, if coal consumption declines dramatically. In some isolated communities, such as Rosebud County, Montana—home to a large coal mine and coal-fired power plant—more than 70 percent of the property tax base consists of coal-related property (Roemer et al. 2021).

As fossil fuel consumption declines, clean energy sources will see rapid growth, and these new energy sources will generate government revenue through many of the same channels—property taxes, income taxes, sales taxes, and leasing revenue from public lands (e.g., Slattery et al. 2011; Wiser et al. 2016). However, it is unclear whether these new sources will deliver comparable revenue streams, or whether their locations coincide with the regions that currently depend on fossil energy for public revenue. Additional research on this topic would be valuable (see Section 3).

2.5.2. Options to Address Funding Shortfalls

Several policy options are available to address the fiscal effects of a transition away from fossil energy: (1) raising new government revenue dedicated to this purpose; (2) increasing spending from general funds; and (3) enhancing local fiscal autonomy.

First, governments have the option—at least in theory—to increase tax, fee, or royalty rates to raise additional revenue from fossil energy production and consumption, which could be dedicated to filling public revenue shortfalls. For example, carbon pricing could raise considerable revenue while also speeding the shift to clean energy. Depending on the price and the scope of coverage, carbon pricing could annually raise hundreds of billions of dollars,[8] which could be used to support public finances at all levels of government. In addition, these funds could support economic diversification efforts that would reduce the dependence of local finances on coal, oil, and natural gas over the longer term.[9]

The obvious difficulty with both product-specific taxes or fees and carbon pricing is that they would place additional economic pressure on fossil fuels, accelerating their decline. This approach would contribute to reducing emissions but may not provide adequate support for public finances, particularly if fossil energy production declines more rapidly than expected. Theoretically, policymakers could address this issue in two ways. First, taxes and fees could rise as production and consumption decline, keeping revenues stable (most carbon pricing proposals take this approach; most fuel-specific fees historically have not). Second, revenues could be invested in trust funds (examples include the federal Underground Storage Tank program, and programs in Alaska, Wyoming, Norway and Saudi Arabia), with interest on the principal used to support transition efforts. This second approach would be more fiscally sustainable but may not generate enough to bolster fiscal solvency and other transition-related priorities.

Subnational fiscal pressures could also be addressed by deploying federal general funds to tribal, state, and local governments. One example is the Secure Rural Schools program, which allocates funds for public entities in timber communities where market conditions and federal policies have reduced logging and associated public revenues (Raimi et al. 2020). Although the program offers a clear analogy for supporting fossil energy communities, studies have identified issues with program design, particularly the uncertainty and volatility of payments to local governments (Haggerty 2019a). In addition, the scale of funding needed to support fossil energy communities would greatly exceed the scale of the SRS program. A similar policy mechanism, designed for energy communities has recently been proposed: in early 2021, Senator John Barrasso of Wyoming proposed a budgetary amendment that would offset potential losses to primary and secondary school revenues due to a federal moratorium on oil and gas leasing on public lands (Congressional Record 2021).

8 RFF's analysis of recently proposed carbon pricing bills estimates government revenues on the order of hundreds of billions of dollars per year. See **www.rff.org/cpc** for details.

9 Revenues from carbon pricing may also be earmarked for other purposes (e.g., dividends to citizens), as in multiple recently proposed bills (Hafstead 2019).

States can undertake similar measures and use general funds to bolster local governments. The State of New York, for example, administers a program that extends fiscal support to local governments undergoing energy transition.[10]

Lastly, states could help municipalities by giving them more fiscal autonomy. Counties and municipalities in many resource-rich states are not allowed to invest resource revenues in local trust funds to support future spending (R. Newell and Raimi 2018a; Haggerty 2019b). Relaxing these restrictions would allow the communities that may be most heavily affected be more proactive in planning for an energy transition.

10 Electric Generation Facility Cessation Mitigation Program. The cost and feasibility of scaling such a program in major energy producing states or nationwide may be challenging and would need to be investigated further.

3. More Research Is Needed

More research is needed to better inform just transition policymaking. Here, we identify several areas of research we believe will be most useful for policymakers in the years ahead as they seek to design effective, efficient, and equitable policies to support workers and communities in transition.

3.1. Assessing the Scale of the Challenge and Identifying Tools to Meet It

First, policymakers need a better understanding of the necessary scale of intervention. For example, what is the appropriate scale of workforce training and economic development investment in communities that may experience disruptions? What gaps might public finances face as the value of fossil energy resources declines (Section 2.5)? What is the appropriate level of investment to remediate abandoned mines, coal ash ponds, orphaned oil and gas wells, and other sites?

Answering those questions fully will require quantitative analysis of the costs *and* benefits of different levels of funding, which will be challenging in some cases. For example, what benefits might society expect from remediating an abandoned coal mine that damages freshwater resources? If remediation costs $10 million and the social benefits total $100 million, the investment is clearly worthwhile. However, if it is difficult to quantify the benefits of remediation because of uncertain environmental, ecosystem, and public health values, the answer becomes more elusive.

Additional research would also be useful for identifying promising mechanisms to finance just transition efforts. For example, which funding strategies would be most equitable, financially stable, and politically durable? And which strategies could raise the needed levels of funding, whether from public or private sources?

3.2. Identifying Metrics to Enable Adaptive Management

To successfully implement just transition policies over time, adaptive management that incorporates multiple streams of information will be essential (e.g., McLain and Lee 1996; Allen et al. 2011). To enable adaptive management, metrics to evaluate policy effectiveness need to be developed in advance, along with systems for tracking those metrics over time (which may require new or refined data-gathering efforts). Furthermore, procedures for incorporating lessons learned into an evolving policy framework will be required.

Which metrics will be most useful in tracking the success of just transition policy? Without an agreed-upon policy framework or explicit goals, it is difficult to identify

specific metrics. However, several types of data are likely to be important and can be refined by additional research, both before and during policy implementation:

- population and demographic data in regions of interest;
- economic indicators (e.g., employment, income, economic diversification, unionization rates);
- social and public health indicators (e.g., substance abuse rates, chronic disease indicators);
- energy data (e.g., oil production, coal consumption, renewable energy production);
- mobility indicators (e.g., in- and out-migration, reasons for moving); and
- fiscal indicators (e.g., tax or fee revenues and expenditures at all levels of government).

Some metrics are already available from the US Census Bureau and the Bureau of Labor Statistics, and the ARC tracks such trends for its member states (Pollard and Jacobsen 2020). An effective adaptive management strategy will need to identify which metrics are of most use, and which may need to be added or modified.

For guidance on which metrics to include (among other lessons), policymakers can look to just transition policy approaches being developed and implemented in Colorado and New Mexico. Experience from other nations, such as Germany or the United Kingdom, may also offer useful lessons, though the considerable differences in social policy between the United States and those nations may complicate comparisons.

3.3. Which Strategies Offer the Best Prospects for Future Prosperity?

A range of policies will be needed to support workers and communities in transition (Section 2.1). How these policies are designed and implemented will matter a great deal, and policymakers will need to account for differences across regions, sectors, and individuals. To better inform the details of policy design, more research is needed on the following two topics.

3.3.1. Identifying Plausible Regional Economic Growth Strategies

Because the production and processing of coal, oil, and natural gas are geographically concentrated in regions with different physical and socioeconomic characteristics, economic diversification and growth strategies will almost certainly vary across regions. For example, growth strategies along the Gulf Coast, where refining and petrochemicals operations are heavily concentrated, will likely differ from those in central Oklahoma, where oil and gas production play the leading role.

Future research could inform just transition policymaking by identifying plausible economic growth strategies that account for unique regional characteristics. Such

research would likely cover regional economic drivers, identify physical assets and human capital, and analyze how these assets could be adapted or repurposed for new sectors. Research could also explore appropriate ways for the federal government to invest in specific sectors, given that policymakers have often shied away from interventions that are viewed as "industrial policy" (Ladislaw 2020).

In addition to those technical analyses, the most useful research would engage deeply with local stakeholders—public officials, union leaders, local trade groups, nongovernmental organizations, and others. Existing regional approaches, such as the ARC, the Delta Regional Authority, or the several zone-based economic development programs (Text Box 1), could also offer useful lessons. Some of this work is currently underway, with recent analyses emerging from the MIT/Harvard Roosevelt Project (e.g., Peluso et al. 2020).

3.3.2. Employment Matching

Little research is available to assess the potential for matching the existing fossil energy workforce to viable employment alternatives. Because of wide variation in workforce characteristics, both within and across each energy type, multiple characteristics will need to be considered to evaluate the suitability of potential matches. These include the following:

Skills. Some emerging employment opportunities—inside and outside the energy sector—may be good matches for the skill sets of today's coal, oil, and gas workers. For example, environmental remediation projects that require earth moving may be well suited for some coal workers. Similarly, new energy sector opportunities in hydrogen, geothermal, and carbon capture may offer good matches for segments of today's oil and gas workforce. A more detailed assessment of the potential for skills matching would be valuable.

Geography. The locations of today's fossil energy jobs may or may not coincide with those of tomorrow's alternatives. The development of regional strategies may offer some workers a promising path forward in their current location. For others, relocation may be the best option. Additional research would be valuable to help understand the extent to which workers may need to relocate to pursue new employment options, and what policies may facilitate either relocation or regional development.

Job quality. Many of today's jobs in fossil energy offer high pay, good benefits, and relatively high rates of unionization (NASEO and EFI 2020). For workers to see an appealing path forward, alternative employment opportunities will likely need to match, or at least approximate, the quality of these existing jobs. Additional research would be valuable to (1) identify determinants of job quality relevant to energy transition, including compensation, unionization, and job safety; and (2) better understand whether, and to what extent, government policy can incentivize the creation of high-quality jobs that are accessible to workers in transition.

Intangibles. Jobs are more than a source of income and benefits. They also shape local culture, history, and our identity and sense of community (e.g., Brown et al. 2007). Additional research to characterize these intangibles for today's coal, oil, and gas workers would help identify appealing future employment opportunities.

3.4. What More Can We Learn from the Past?

The necessity of public policies to drive deep emissions reductions means a transition towards clean energy is relatively foreseeable. The ability to foresee major changes in the energy system offers policymakers, workers, businesses, and others, the chance to lay the groundwork for a prosperous future for communities in transition.

This opportunity to plan highlights the need to better understand the effects (positive, negative, and mixed) of previous government interventions to support communities affected by economic changes. Scholars have published numerous case studies of cities and regions experiencing economic changes, highlighting lessons learned across a variety of contexts (e.g., Detrick 1999; Autor et al. 2019; Cooke 2020); and recent work has looked to connect these experiences with environmental and energy policy (e.g., Schilling and Logan 2008; Roemer et al. 2021; Weber 2020). Nonetheless, much work remains to identify lessons from previous economic transitions in the United States and see how those lessons can be applied to the energy transition.

4. Conclusion

The urgent need to reduce greenhouse gas emissions is expected to usher in an unprecedented global energy transition. This transition will produce widespread benefits, but also create significant challenges for workers and communities in regions where coal, oil, and natural gas production or consumption (e.g., coal-fired electricity generation) have been a leading employer and source of prosperity.

This report reviews the wide range of options available to federal policymakers aiming to prioritize fairness for these workers and communities in the shift to a low-carbon economy, what is also known as a "just transition." These options include policies to advance economic development, workforce development, environmental remediation, infrastructure, and public benefits programs. This also includes several crosscutting policy areas, such as government support for research, technical assistance, and planning.

Our key findings (Section 2) are that **multiple and customizable policy types will be needed** to enable a just transition; and that to effectively implement these policies, **coordinated delivery is essential**—across federal agencies, among levels of government, and with stakeholders. Furthermore, because of the complex set of intersecting challenges associated with transition, **strategic timing and sequencing of policy implementation is important**. In addition, **equitable and inclusive policymaking and implementation are critical**, and we discuss aspects of equity policymakers may want to consider when designing just transition policy. Lastly, the **challenges that the energy transition poses for public revenue streams must be addressed**.

We have also highlighted research gaps that can be filled to better inform policymaking (Section 3): assessing the scale of the just transition effort, identifying metrics to measure success and enable adaptive management, evaluating which strategies offer the best prospects for success in different geographies and sectors, and learning more from economic transitions of the past.

The energy transition will be essential to reducing the greatest risks of climate change. This report seeks to inform policymakers interested in addressing this environmental threat, while simultanesoulsy investing in the workers and communities that have built the American fossil fuel industries, such that they may contribute their expertise to the challenges of the clean energy future and thrive.

5. Appendix

5.1. Just Transition Policies Discussed in This Series

The following table categorizes the various policies we have reviewed and details the mechanisms through which these policies are implemented. The core mechanisms we observe are grants, loans, loan guarantees, access to federal agency expertise, direct payments to individuals, tax credits and deductions, cooperative agreements, and government regulations.

Policies are organized first by policy type—for example, workforce development, economic development, etcetera—then by funding level. Policies may be listed more than once if they are classified as more than one policy type. These policies will have their additional policy type listed in the final column: "cross-listed policy type".

We also identify the major activities of each program. We identified distinct operations within and across programs that make up the core operations of each policy type:

- **Job training and career services:** Training for workers and help finding careers through job search assistance, interview preparation, and employer matching services.
- **Labor standards:** Minimum standards for employment benefits, job safety, and workers' rights.
- **Attracting and supporting employers:** Incentives for new businesses to grow and support for existing businesses to stay afloat and develop.
- **Capacity building:** Support for professional skills development and new technology investment in public and private entities.
- **Public services:** Investment in community public services to increase the appeal of business development.
- **Financial services:** Support for entrepreneurs with limited access to capital by offering low-interest loans and supporting financial institutions that offer financial services to those entrepreneurs.
- **Environmental remediation:** Funding to clean up pollution, particularly in fossil fuel-producing communities and environmental justice communities.
- **Public infrastructure:** Investment in transportation, clean water, broadband, and other public infrastructure.
- **Income support:** Direct cash payments or tax credits to low-income households.
- **Foundational support:** Subsidies for or access to specific needs like health care, food, and housing.

5.2. Information about These Tables

In the policy tables, fiscal year "spending" is most often estimated using enacted appropriations for each program. Notable exceptions include tax credit policies, where we identify the estimated tax expenditure, and benefits policies, where we identify outlays based on mandatory spending. Sources for the tables include consolidated appropriations bills (marked with a *), Joint Committee on Taxation estimates (marked with a ^), Congressional Research Service reports (marked with a ‘), and budget documents from the relevant agency (marked with a °). Footnotes indicate where figures deviate from these sources or otherwise require additional context. Specific sources are linked in the digital version of this report. Spending column entries of "- -" indicate programs that don't have appropriations or spending data available in the sources we reviewed.

Table A.1. US Workforce Development Policies

Agency	Policy or program	Activities	Policy Mechanism(s)	Targeted communities	FY2020 spending ($M)	Cross-listed Policy Type
DOL	Unemployment Insurance	Income support	Direct payments	Unemployed workers	**$131,449^**[1]	Benefits
IRS	Education and training tax incentives (various)	Job training and career services	Tax credit, tax deduction	Not targeted	**$17,400^**[2]	
DOD	Post 9/11 GI Bill	Job training and career services, income and foundational support	Direct payments	Veterans	**$11,575°**	
ED	Vocational Rehabilitation grants	Job training and career services	Grants	Disabled workers	**$3,610***	
DOL	State grant programs	Job training and career services, foundational and income support	State formula grants	Dislocated workers, adults, youth (16–24)	**$2,820***	
DOL	Job Corps (with USDA)	Job training and career services, foundational and income support	Contracts for service	Disadvantaged youth*	**$1,744***	
DOL	Employment Service	Job training and career services, technical assistance	State formula grants	Not targeted	**$690°**	

1 Total includes $129 billion in benefits and $2.5 billion in administrative expenses. Anomalously high due to Covid-19 recession; 5-year avg from 2015-2019 = $34.4 billion

2 Combination of FY20 tax expenditures for WOTC and "Credits for tuition for post-secondary education"

Table A.1. US Workforce Development Policies, continued

ED	Adult education	Job training and career services	Grants	Adults without high school education, ELL	**$679°**	
DOL	Trade Adjustment Assistance for Workers	Job training and career services, foundational support	State grants	Trade-affected workers	**$640°**	
USDA	SNAP Employment and Training Program	Job training and career services, foundational support	State formula grants	Workers receiving SNAP	**$614°**	Benefits
DOL	Occupational Safety and Health Act	Labor standards	Regulation	Workers facing hazards	**$582***	
DOL	Senior Community Service Employment Program	Job training and career services	State grants	Seniors	**$405***	
DOL	Federal Mine Safety Act	Labor standards	Regulation	Miners	**$380°**	
DOL	National dislocated worker grants	Job training and career services	Grants	Dislocated workers	**$271°**	
DOL	Trade Readjustment Allowance	Income support	Direct payments	Dislocated workers	**$207°**	Benefits
DOL	Apprenticeship Program	Job training and career services, foundational support	Grants, cooperative agreements	Not targeted	**$175***	
SBA	Small Business Centers (various)	Job training and career services, technical assistance, capacity building	Cooperative agreement	Small business owners (also specific programs for women and veterans)	**$174°**[3]	Economic development
DOL	Evaluations and research	Research	Access to agency expertise	Not targeted	**$104'**	
DOL	Reentry employment opportunities	Job training and career services, foundational support	Competitive grants	Previously incarcerated individuals	**$98°**	
DOL	YouthBuild Program	Job training and career services	Competitive grants	Disadvantaged youth	**$95***	

3 Includes Small Business Development Centers, Women Business Centers, Veterans Business Outreach (which itself includes the Boots to Business program), and Native American Outreach

Table A.1. US Workforce Development Policies, continued

DOL	National Farmworker Jobs Program	Job training and career services, foundational support	Competitive grants	Migrant farmworkers	**$92***	Benefits
DOL	Native American Program	Job training and career services	Competitive grants	Native Americans	**$55***	
ARC	POWER Initiative	Job training and career services, employer attraction and support, public services, technical assistance, research, planning	Organization grants	Workers in Appalachian communities	**$48°**	Economic development
SBA	Microloan Technical Assistance Program	Financial services, technical assistance, job training and career services	Lending	Small business entrepreneurs	**$35°**	Economic development
DOL	Workforce Opportunities for Rural Communities Initiative	Job training and career services	Grants	Not targeted	**$29°**[4]	
SBA	SCORE	Job training and career services, capacity building	Cooperative-agreement	Small business entrepreneurs	**$12°**	Economic development
State level	Illinois Future Energy Jobs Act	Job training and career services	Contract for service	Disadvantaged communities	**$10**[5]	
SBA	Program for Investment in Micro-Entrepreneurs	Job training and career services, technical assistance, capacity building	Organization grants	Entrepreneurs from underserved communities	**$6°**	Economic development
SBA	Entrepreneurship Education Initiative	Job training and career services, capacity building	Organization grants	Underserved communities	**$2.5°**	Economic development
DOL	Technical assistance	Technical assistance	Access to agency expertise	Employers, dislocated workers	**$0'**	
DOE	Job Strategy Council	Job training and career services, technical assistance, research	In-house service	Energy workers	--	

4 This is the number for distributed funds in 2020, not including program administration, which is not a line item in DOL appropriation documentation

5 Reflects funding for job training programs only. Assumes only one electric utility (ComEd) is required to pay in; also this reflects the amount paid in either 2017, 2021, or 2025 (not a FY2020 figure); Funding number pulled from public legislation

Table A.1. US Workforce Development Policies, continued

DOL	Fair Labor Standards Act	Labor standards	Regulation	Not targeted	--	
DOL	Davis Bacon Act	Labor standards	Regulation	Federally contracted workers	--	
DOL	Employee Retirement Income Security Act	Labor standards	Regulation	Not targeted	--	
DOL	Federal transit labor standards	Labor standards	Regulation	Transit workers	--	
DOL	Labor-Management Reporting and Disclosure Act	Labor standards	Regulation	Not targeted	--	
DOL	COBRA	Labor standards	Regulation	Displaced workers	--	
DOL	Worker Adjustment and Retraining Notification Act	Labor standards	Regulation	Pre-displacement workers	--	
State level	California Clean Energy Jobs Act	Job training and career services	Competitive grants	Disadvantaged communities	--	
State level	California Clean Energy Workforce Training	Job training and career services	Grants, cooperative agreements	Disadvantaged communities	--	
State level	Colorado Just Transition Act	TBD	TBD	Coal-dependent communities in Colorado	TBD	Economic development

Table A.2. US Economic Development Policies

Agency	Policy or Program	Activities	Policy Mechanism(s)	Targeted Communities	FY2020 spending ($M)	Cross-Listed Policy Type
SBA	7a and 504/CDC loan guaranty programs	Financial services	Loan guarantees	Small business entrepreneurs	**$37,500.00°**	
USDA	Rural Housing Service	Financial services, public services, technical assistance	Loans, grants, and loan guarantees	Rural communities	**$2,101.00*[6]**	
USDA	Rural Utilities Service	Public infrastructure, financial services	Loans, grants, and loan guarantees	Rural communities	**$1,100.00*[7]**	Infrastructure and environmental remediation
DOL	Trade Adjustment Assistance	Foundational and income support, job training and career services, technical assistance	Grants	Trade-affected communities	**$640.00***	Workforce development
DOC-EDA	Disaster relief	Community building	Grants	Economically distressed areas suffering from declared emergency	**$474.00°**	
DOD	Office of Economic Adjustment	Technical assistance, research, capacity building, infrastructure, employer attraction and support, community building	Grants	Military communities with reductions nationwide	**$449.60°**	
USDA	Rural Business Cooperative service	Job training and career services, capacity building, technical assistance, employer attraction and support	Grants, low-interest loans, loan guarantees	Rural communities	**$319.00°[8]**	
Treasury	Community Development Financial Institutions fund	Financial services, technical assistance, capacity building, employer attraction and support	Grants, technical assistance, tax credits	Financially underserved communities	**$262.00***	

6 This number reflects the annual budget authority; total FY2020 program level funds were $31 billion

7 This number reflects the annual budget authority; total FY2020 program level funds were $9 billion

8 This number reflects the annual budget authority; total FY2020 program level funds were $1.5 billion

Table A.2. US Economic Development Policies, continued

DOI	Secure Rural Schools	Community building	Grants	Forestry, timber communities nationwide	**$241.00***	
SBA	Small Business Centers (various)	Job training and career services, technical assistance, capacity building	Cooperative agreement	Small business owners (also specific programs for women and veterans)	**$174.00°**[9]	Workforce development
DOC	National Institute of Standards and Technology manufacturing partnerships	Employer attraction and support, technical assistance, capacity building	Grants, technical assistance	Manufacturing businesses	**$146.00***	
DOC-EDA	Public works	Employer attraction and support, community building, public infrastructure	Grants	Economically distressed areas	**$118.50°**	Infrastructure and environmental remediation
ARC	POWER Initiative	Job training and career services, employer attraction and support, public services, technical assistance, research, planning	Organization grants	Workers in Appalachian communities	**$48.00°**	Workforce development
DOC-EDA	Economic Adjustment Assistance	Technical assistance, infrastructure, public services	Grants	Economically distressed areas	**$37.00°**	
SBA	State Trade Expansion Program	Capacity building	Grants	Small business entrepreneurs	**$35.50°**	
SBA	Microloan Technical Assistance Program	Financial services, technical assistance, job training and career services	Lending	Small business entrepreneurs	**$34.50°**	Workforce development
DOC-EDA	Planning	Planning	Grants	Economically distressed areas	**$33.00°**	
DOC-EDA	Build to Scale/ Regional Innovation	Capacity building, financial services, community building	Grants	Economically distressed areas	**$33.00°**	
DOC-EDA	Assistance to Coal Communities	Employer attraction and support, capacity building, community building	Grants	Economically distressed areas, including coal communities	**$30.00°**	

9 Includes Small Business Development Centers, Women Business Centers, Veterans Business Outreach (which itself includes the Boots to Business program), and Native American Outreach

Table A.2. US Economic Development Policies, continued

SBA	Small Business Investment Companies	Financial services	Grants	Small business entrepreneurs	**$22.10°**[10]	
SBA	SCORE	Job training and career services, capacity building	Cooperative-agreement	Small business entrepreneurs	**$12.00°**	Workforce development
DOC	SelectUSA	Capacity building, technical assistance, research		Businesses	**$10.00'**	
DOC-EDA	Local technical assistance	Technical assistance, planning	Access to agency expertise	Economically distressed areas	**$9.50°**	
SBA	Entrepreneurship Education Initiative	Job training and career services, capacity building	Organization grants	Underserved communities	**$8.80°**	Workforce development
SBA	Small Business Innovation Research and Small Business Technology Transfer programs	Research, capacity building	Competitive grants	Small business entrepreneurs	**$7.00°**[11]	
SBA	Program for Investment in Micro-Entrepreneurs	Job training and career services, technical assistance, capacity building	Organization grants	Entrepreneurs from underserved communities	**$5.50°**	Workforce development
SBA	Regional innovation clusters	Employer attraction and support, capacity building, research, technical assistance	Coordination	Small business entrepreneurs	**$4.50°**	
ARC	Business Development Revolving Loan Fund	Financial services, employer attraction and support, capacity building	Loans	Appalachian communities	--	
State level	New Mexico Energy Transition Act	Tbd, public infrastructure, employer attraction and support	Regulation, TBD	Coal-dependent communities in New Mexico	--	
State level	Colorado Just Transition Act	TBD	TBD	Coal-dependent communities in Colorado	--	Workforce development

10 Does not include SBA-backed debenture capital, $5.9 billion was deployed by SBICs in FY2019

11 Funding is for SBIR and SBTT collectively

Table A.3. US Environmental Remediation and Infrastructure Policies

Agency	Policy or Program	Activities	Policy Mechanism(s)	Targeted Communities	FY2020 Spending ($M)	Cross-Listed Policy Type
DOT	Federal-Aid Highway Program	Public infrastructure	Grants	Not targeted	**$46,365.09***	
IRS	Tax incentives for infrastructure bonds	Public infrastructure	Tax exemption	Not targeted	**$23,400.00^**[1]	
DOT	Federal Public Transportation Program	Public infrastructure	Grants	Not targeted	**$10,800.00°**	
DOE	Offices of Environmental and Legacy Management	Environmental remediation	Contracts	Nuclear communities	**$7,617.00°**	
HUD	Community Development Block Grant program	Public infrastructure	Grants	Not targeted	**$3,425.00°**[2]	
EPA	Clean Water State Revolving Funds	Public infrastructure	Grants	Not targeted	**$1,638.80°**	
EPA	Superfund	Environmental remediation	Contracting	Polluted communities	**$1,184.76°**	
EPA	Drinking Water State Revolving Funds	Public infrastructure	Grants	Not targeted	**$1,126.09°**	
USDA	Rural Utilities Service	Public infrastructure, financial services	Loans, grants, and loan guarantees	Rural communities	**$1,100.00°**[3]	Economic development
DOI	Abandoned Mine Lands	Environmental remediation	Grants	Mining communities	**$139.71°**	
DOC-EDA	Public works	Employer attraction and support, community building, public infrastructure	Grants	Economically distressed areas	**$118.50°**	Economic development
EPA	Underground Storage Tank Program	Environmental remediation	Grants	Petroleum communities	**$91.94°**	
DOI	Oil and gas well restoration on federal lands	Environmental remediation	Grants	Oil and gas communities	$53.30	
EPA	Brownfields	Environmental remediation	Grants, technical assistance	Polluted communities	**$23.65°**	

1 Does not include tax expenditures for private activity bonds or qualified tax-credit bonds

2 This number reflects annual appropriations; FY20 total outlays: $7.4 billion

3 This number reflects the annual budget authority; total FY2020 program level funds were $9 billion

Table A.4. US Benefits Policies

Agency	Policy or Program	Activities	Policy Mechanism(s)	Targeted Communities	FY2020 Spending ($M)	Cross-Listed Policy Type
SSA	Social Security (OASDI)	Income support	Direct payments	Retirees	**$1,085,674.00°**	
HHS	Medicare	Foundational support	Direct payments	Retirees	**$696,507.00°**	
HHS	Medicaid	Foundational support	Direct payments	Low-income families	**$447,241.00°**	
DOL	Unemployment Insurance	Income support	Direct payments	Unemployed workers	**$131,449.00°**	Workforce development
VA	Veterans Health Administration (VHA) Medical Care	Foundational support	Health care	Military veterans	**$87,537.93°**	
OPM	Federal Employees Retirement System	Income support	Direct payments	Retired federal civil service employees	**$79,486.00°**[1]	
USDA	SNAP		Direct payments	Low-income families	**$74,156.60°**	
SSA	Supplemental Security Income	Income support	Direct payments	Aged, disabled, or blind individuals	**$59,127.00°**	
HHS	Temporary Assistance for Needy Families	Income support	Direct payments	Low-income families with children	**$16,714.00***	
UMWA	United Mine Workers of America health and retirement funds	Foundational support, income support	Direct payments	Retired coal workers	**$1,962.60°**	
DOL	Black Lung Disability Trust Fund	Foundational support	Direct payments	Coal workers	$339.15*	
DOL	Trade Readjustment Allowance	Income support	Direct payments	Dislocated workers	**$207.00°**	Workforce development

1 Reflects net cost of operations

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