



Advocating a just transition in Appalachia: Civil society and industrial change in a carbon-intensive region

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ABSTRACT

Whereas research to date has focused on the role of governments and unions in leading just transition initiatives, this study explores the role of a broad range of civil society actors. It focuses on the central Appalachian region in the U.S. (Kentucky, Virginia, and West Virginia), which has significant fossil-fuel resources. Based on an analysis of 98 initiatives related to a just transition led by 70 civil society organizations during the 2010–2020 period, the study contributes to the just transitions literature by showing the role of non-labor civil society in defining and motivating a just transition in the context of resistance from actors associated with fossil-fuel industries. The study develops a framework for researching just transitions that is based on two sets of goals: societal change (democracy and equity) and sociotechnical system change (support for renewable energy and energy efficiency and opposition to fossil-fuel extraction and pollution). Results from the comparative and network analyses indicate that the four goal types are not equally represented and that civil society organizations tend to specialize with respect to the goals, with only a few organizations providing bridges across the goals. Implications for strategy for funders and advocacy organizations are discussed.

1. Introduction

In some countries, there is increasing attention to the problem of achieving a just transition for regions that historically have been dependent on an environmentally unsustainable legacy industry such as fossil-fuel extraction. Of the various definitions of a just transition, most include the combination of an industrial transition to more sustainable industries with attention to distributive justice for workers and communities. Although the goal is laudable, achieving it is challenging. From one perspective, local communities and their cultures are bound up with the legacy industries such as coal. Workers and businesses associated with the industries can mobilize in opposition to industrial transition policies, and these alliances can have considerable political capacity to slow or roll-back transition policies. However, from another perspective, other actors both inside and outside the region, including workers and businesses in other industries, recognize the need to make shifts away from dependence on carbon-intensive industries to address climate change and to adapt to the legacy industries' declining economic competitiveness [1].

In some countries (e.g., Germany), the national government has provided leadership for the regional sustainability transition process,

and the primary problem is successful implementation [2,3]. However, in other countries, the push-back on transition proposals from legacy industries and associated actors can weaken government support. This study focuses on the latter type of situation, which is relatively common in countries and subnational regions with strong fossil-fuel industries [4]. In this situation, civil society organizations (CSOs) other than unions, and associated allies in the private sector, may step in to provide support for a just transition.

This study focuses on the attempts to define and implement a just transition in three states in the coal-mining areas of central Appalachia in the U.S. The region has been a center of coal extraction and, more recently, natural-gas and fossil-fuel generation and processing. Central Appalachia has also faced a number of challenges, including widespread inequality and insufficient support from state and federal governments for just transition initiatives in the region. We argue that the region provides a good site to examine the role of CSOs and associated actors because government support is either weak or opposed to a just transition. Although we focus on a single region where broader government support for a just transition is weak and sometimes opposed it, the study is of general interest to research on just transitions because it points to how CSOs and allied actors may play an important and arguably under-

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recognized role. The role of local civil society and allied actors may be especially important in tightly knit rural communities that are suspicious of further exploitation by external actors and government programs.

This study builds on the emerging literature on just transitions by making theoretical and empirical contributions based on the comparative analysis of initiatives led by civil society and allied actors in a single region. In the background section that follows, we review the literature on just transitions, including vision statements for a just transition in central Appalachia, to develop a broader and clearer understanding of the different types of goals included in the concept of a just transition. We then use the typology of goals to guide the selection of initiatives led by CSOs and allied actors, and we construct two data sets, one of initiatives that meet the inclusion criteria and one of coalitions associated with the initiatives. Using the data sets, we make two contributions: we map the range of goals associated with a just transition onto the diverse initiatives of CSOs in the region, and we analyze the network associated with the coalitions in support of initiatives. The results draw attention to differences between actors with focused or siloed goals and those with broad, bridge-building goals, and we provide various ways to measure the differences. The results also show which types of goals are prominent and how they are related to organizational networks. In the process, we contribute to the theory of just transitions by showing how even where government leadership is weak or lacking, CSOs and allied actors can play a significant role in motivating and defending goals associated with a just transition. We do not imply that government action is unnecessary; instead, where political opportunities are blocked, CSOs may help to motivate the political will for government action.

2. Background

2.1. Defining a just transition

The concept of a “just transition” dates back to the 1980s, when unions drew attention to the need for employment for workers who were displaced by environmental regulation and trade agreements [5]. In this context, the concept of a just transition was not always linked to environmental sustainability. The meaning of a “just transition” became broader during the late 1990s with the founding of the “Just Transition Alliance,” which brought together the labor and environmental justice movements [6]. During the first decade of the twenty-first century, the discussion also broadened to include climate mitigation policy and the transition for both workers and communities in coal-mining regions such as the Hunter Valley of Australia [7]. Trade unions also combined the call for a just transition with support for green-job development, and in some countries, governments developed green jobs programs that also addressed energy access and affordability [8]. In short, the understanding of a just transition gradually broadened from the original understanding of justice as finding good jobs for displaced workers and a new economic basis for affected communities.

Among researchers, the broadening trend drew on diverse concepts of justice. For example, the discussions of just transitions expanded to emphasize the connection with environmental justice such as the negative effects of energy infrastructure on communities and the need for remediation and restorative justice [9–12]. Researchers also drew attention to the problem of energy justice as energy access and affordability [13]. Moreover, they connected discussions of just transitions to the democratic governance of energy and the procedural strands of theories of justice [11,12]. This approach to justice overlapped with the literature on energy democracy, which emphasized greater public participation in decision-making and local control and ownership of energy systems [14–16]. Thus, the understanding of justice includes the major types of justice (distributive, procedural, and recognition) mentioned in the environmental and energy justice literature [17,18].

A complementary approach to the scholarly definitions of a just transition is a perspective based on the joint statements of CSOs and

Table 1
Goals Associated with a Just Transition.

Type of Goal	Description
<i>Sociotechnical transition</i> Building more sustainable industries	Development of the REEE sector and other industries, government policies to support more sustainable sectors
Sunsetting fossil-fuel pollution and industries	Long-term end to the fossil-fuel economy, remediation of pollution, enforcement of regulatory laws, end to mountaintop removal, end to or changes in natural-gas fracturing
<i>Justice and societal change</i> Distributive, recognition justice	Recognition of historical importance of the energy economy and coal-related cultural identities, workers' rights, good alternative jobs, affordable energy
Democracy, procedural justice	Local ownership of REEE (e.g., community solar), improved public participation in decision-making, inclusion of public interest in energy governance

other advocacy groups. This section concludes with a review of three prominent statements: the Empower Kentucky Plan, ReImagine Appalachia, and the National Economic Transition Platform.

Empower Kentucky Plan [19]. In the region of Appalachia that will be the focus on this study, the most comprehensive articulation is the “Empower Kentucky Plan.” Kentuckians for the Commonwealth launched the plan in 2017 after broad participation from citizens and other CSOs, and they gave the plan the tagline “a people’s plan to shape a just transition to a clean-energy economy in Kentucky” [19]. The plan includes the sociotechnical transition goal of the development of renewable energy and energy efficiency (REEE) industries with a range of policy reforms such as a renewable portfolio standard. It includes the corresponding remediation of pollution from carbon-intensive industries, but it recognizes that Kentucky is a “coal-dominated” state and points to choices available even where there is little government support for a just transition. The plan also includes justice-related goals such as the creation of good jobs in more sustainable industries and access to affordable energy and energy-efficiency programs. However, the understanding of justice also includes local ownership of electricity, access to affordable electricity, and affordable energy-efficiency upgrades. There are also goals that could be characterized as energy democracy or procedural justice, including the formation of a state-government environmental justice commission and broader democratic participation in policy decisions.

ReImagine Appalachia [20]. The plan has an industrial transition goal of more employment in cleaner manufacturing, regenerative agriculture, and eco-tourism. The plan does not call for the sunseting of the coal and natural-gas extraction industries; however, it refers to the need to provide coal workers with a “secure future” [20: 3]. The justice aspect of the plan focuses on job creation, union rights, jobs for women and minority groups, and local ownership.

The National Economic Transition Platform [21]. Led by the Just Transition Fund and partner organizations, this example is national in scope but has connections with work in Appalachia. The National Economic Transition Platform emphasizes bottom-up economic development initiatives that are controlled by communities and that provide family-supporting income. It includes sustainable enterprises in food and energy, but it also emphasizes health care and remote work opportunities. Again, the platform does not directly oppose coal but instead emphasizes opportunities for reclamation, remediation, and accountability after bankruptcies. With respect to equity and democracy, the plan calls for “an inclusive, national just transition task force,” investment in underserved and minority communities, and economic development “driven by communities, built from the ground up” [21: 4–5].

In summary, both the scholarly literature and the programmatic statements by advocacy networks identify two main dimensions of

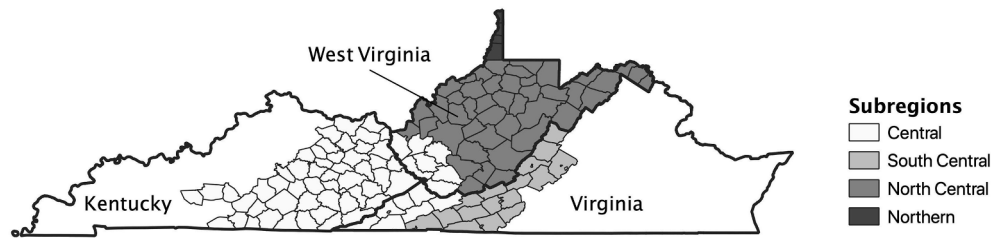


Fig. 1. Appalachian Region of Interest. Source: Authors.

definition of a just transition. For the transition side, there is a goal of building more sustainable industries that are appropriate for the region. The need to sunset fossil-fuel extraction and generation is mostly implicit in the vision statements, but other statements from the organizations and their partners acknowledge the need to move away from these industries [22,23]. For the justice side, the focus is on the distributive justice issue of the development of good jobs, especially in more sustainable industries, and also on energy affordability. There is also some attention to the nexus of energy democracy and procedural justice, such as calls for local ownership of renewable energy and for broader participation in energy policy. We characterize this broad understanding of a just transition as comprising four goals under two main dimensions. (See Table 1.) This characterization of four main goals is also convergent with one developed for energy-transition reforms in another U.S. region [24].

2.2. Appalachia and a sustainable, just transition

In this study, the term “region” refers to a subnational space, although in some cases, a carbon-intensive region may also cut across national boundaries. Most of the work on just transitions has focused on regions where coal extraction is concentrated, and this study will focus on a coal-producing area of central Appalachia in the United States. Although the goal of this study is to develop an approach that can guide comparative knowledge and middle-range social science generalization, it also recognizes the value of learning from analyses anchored in a single geographical region.

The Appalachian Mountains are located in the eastern portion of inland North America from the southern states of Alabama and Georgia to the northeastern states of the New England region and into southeastern Canada. This study focuses on three states (Kentucky, Virginia, and West Virginia) that are classified as part of the central regions of Appalachia and that have historically been centers of coal mining and other extractive industries [25]. (The term “state” is used here, although two of the states are called “commonwealths.”) The Appalachian Regional Commission (a federal-state government partnership) provides definitions of various Appalachian subregions, and the officially designated Appalachian region for the three states of Kentucky, Virginia, and West Virginia is shown in Fig. 1. The subregional and regional categories of the Appalachian Regional Commission cut across state boundaries and do not provide a good framework for analysis. Instead, we focus on the three states because the state governments provide a better basis for comparative analysis.

The state of West Virginia and the Appalachian portions of Kentucky and Virginia have a similar history of extractive economies and environmental destruction. The history is important for understanding the value of studying this region in the context of broader comparative research on just transitions because the history can help to contextualize the region’s weak role of government and unions in just transition initiatives. During the nineteenth century, agriculture faced pressures from population growth, partible inheritance that resulted in reductions in farm size, competition from salt mines with slave labor, clientelist politics, and the domination of local governments by landowning elites [26]. By the 1890s, the construction of railroads opened the region to

logging and widespread deforestation, and by the 1920s coal mining had replaced logging [27]. The transition was characterized by high levels of social conflict and violence that resulted in the dispossession of land and the reduction of traditional agricultural activities [27–29]. The transition also exacerbated poverty and contributed to the mistrust of government that dates back to the corrupt institutions of the nineteenth century.

During the 1960s, President Kennedy recognized the poverty of the region and began an economic development initiative that focused on developing highways and industries under the Appalachian Regional Commission [27]. This approach to an industrial transition did not include sustainability as a primary motivating goal, and the concept of justice was understood narrowly as poverty alleviation via conventional economic development. Other federal government organizations and programs, such as the Opportunity Zones program, have also contributed to economic development in the region [30].

During the half century after the development effort was launched, employment associated with coal mining declined because of changes in global markets and the mechanization of mining. Although the region’s economy became more diversified, the poverty rate, especially in rural areas, remained among the highest in the country [31]. According to a regional poverty researcher, one problem was that the funding from the Appalachian Regional Commission “flowed more toward the urban areas in the region and not toward the really high-need rural parts,” and another problem was that the level of funding was not adequate to address the region’s poverty [32]. In 2015, the Obama administration launched the Partnerships for Opportunity and Workforce and Economic Development (POWER) program in “an effort to ease the economic effects of energy-transition in coal-industry dependent communities in the United States, especially in Appalachia” [33: 1]. Although the program and the broader POWER Plus plan were only partially funded, some of the funding went to the Appalachian Regional Commission to support economic development in the coal-mining areas of Appalachia [33]. The Trump administration continued some elements of the initiative, but the level of funding was never adequate to address the magnitude of the problem [34].

For communities historically tied to coal mining, the long-term decline of jobs has meant that many people must engage in retraining, migrate to urban areas, or do both. New jobs for those undergoing retraining include the utility, renewable energy, construction, tourism, and transportation industries [35]. A central challenge for displaced workers is that new jobs with similar income to those in the coal industry require extensive training and new skill sets [36]. Although job loss and relocation entail psychological and social disruptions, those who underwent retraining also indicated some excitement about new opportunities [35]. There is some potential for the transition to be experienced positively, but there are also deep tensions between miners and transition advocates who are outsiders [1,28,37]. The coal industry also actively developed a campaign to support the idea that the region was reliant on coal and to promote the gendered view that associated mining with masculinity [38,39]. Nevertheless, miners also have a long history of conflict with coal companies. In interviews, they have indicated that if other employment with equivalent salaries were to become available that would not require relocation, they would welcome the alternative

[40].

This background helps to contextualize the relatively weak role that state governments have played in providing leadership for a just transition in the region. In West Virginia, both of the two main political parties (the center-to-left Democratic Party and the conservative Republican Party) have failed to embrace the goal of a just transition. The state did have a renewable portfolio standard, but the policy included some types of coal as “alternative” energy, and in 2015, the state government repealed even this weak standard (SB 1, HB 2001). West Virginia is also a state where its governor, Jim Justice, was described as a “coal baron” [41]. By the end of the 2010 decade, the state government was controlled by a Republican Party “trifecta” of the governor’s office and both houses of the state legislature. Although the state’s economy has undergone diversification since the 1950s, economic “development” has also included the expansion of the petrochemical and chemical manufacturing industries, as well as increases in natural gas extraction and pipelines [42]. The changes have resulted in additional burdens of pollution, expropriation of land, and industrial disasters.

The other states, Virginia and Kentucky, have also historically supported their coal-mining and extractive industries, but the situation shifted in Virginia during the 2010–2020 decade. The growth of population in the suburban region of the nation’s capital (Washington, D.C.) and the development of a high-tech economy contributed to the state’s political shift toward the Democratic Party. A Democrat was elected governor in 2018, and in 2020 a Democratic Party trifecta occurred when both houses of the state legislature also shifted to control by the Democratic Party. These changes enabled significant legislative reforms in 2020 that embraced the Democratic Party goals of greenhouse-gas reduction and an energy transition, and the reforms also provided some opening for the long and often frustrated efforts of CSOs to build a just transition for the coal-mining and mountainous western portion of the state. The state of Kentucky tends to be positioned politically between the other two states, and it has had mixed party control of the state government for most of the 2010–2020 decade with three years of a Republican trifecta.

In this context, leadership for efforts to build a more sustainable and just regional economy has fallen largely on the work of civil society and allied actors [43–45]. Their vision of more sustainable and just regional economy and energy system is largely in conflict with the political elites in West Virginia and Kentucky (less so in Virginia after the Democratic Party gained control of the state government). The elites have pursued a strategy of ongoing extraction with the development of natural gas resources and related energy-processing and chemical industries, and they have also pursued a strategy of economic diversification that focuses on conventional tactics such as recruiting corporations. In contrast, civil society and allied actors have called for new models of economic development that are both more sustainable and more guided by local control and democratic participation [27]. Their approach to economic development is consistent with the more comprehensive understanding of a just transition outlined above, and it offers a vision for the region to escape its status as an environmental sacrifice zone and internal colony.

2.3. A theory of just transitions

To date, research on just transitions tends to have a policy orientation with a focus on providing guidance for actors who wish to pursue a just transition. However, a few researchers have discussed causal relationships. Their work suggests that factors for successful just transitions include strong support from both the national and subnational governments, institutionalized partnerships between unions and companies, companies that are headquartered in the country or otherwise amenable to government pressure, and recognition of the declining competitiveness of the coal or other legacy industry.

In a comparative study of just transitions in Germany (Saarland, Ruhr) and the U.S. (Appalachia), Abraham points both to structural

conditions (economic competitiveness of the industry and the governance structure for industrial decision-making) and agency (union and coal company strategy) [2]. These conditions explain an outcome in Germany that achieves at least some of the main elements of a just transition as defined above. Specifically, he found that in Germany a combination of strong government policy, union militancy, and neo-corporatist decision-making brought about policies that accommodated union demands for a just transition. In contrast, in the U.S., there is only “limited corporatism,” and it is focused on the local level. The lack of an industrial policy that involved coordination at the national level of government, industry, and unions facilitated coal-industry tactics to weaken unions. This difference in governance structure is also facilitated by the broader neoliberal, market-oriented political culture of the U.S. The coal industry and allied political leaders also mounted a campaign that claimed that there was a “war on coal” [46]. These factors facilitated a decline in union militancy and a lack of union support for a just transition policy. In 2015, the unions rejected a just transition plan developed by progressive U.S. senators because of their belief that it would not lead to equivalent jobs for coal-industry workers [2,47].

In another comparative study for the coal industry, Harrahill and Douglas focus more on the mechanisms of implementing a just transition, but they also contribute to a theory that explains differential outcomes [3]. They build on Abraham’s work by pointing to the much lower level of institutionalized social dialogue between workers and companies in Australia and Canada in comparison with Germany [2]. The absence leads to a lack of trust in proposals for a just transition, which (similar to the Appalachia case) can fail if the plans and programs do not offer guarantees of equivalent work. In the case of the state of Victoria in Australia, another explanatory factor was the country’s neoliberal governance structure and the control of mines by multinational companies [3,48]. These conditions enabled the companies to close mines with little notice or consultation. Harrahill and Douglas also show that state (subnational) governments can play an important role in developing new industries and job training programs. An example is the successful renewable-energy industry in North Rhine-Westphalia, but the state-level success was backed up by strong federal government support. In the case of Victoria, they show how the state government can compensate to some degree for inaction by the federal government. These findings are especially relevant for the study of Appalachia, where there are different responses from the state governments.

In summary, there is a fairly good picture of the factors that affect the adoption of just transition policies and outcomes. A strong government policy, preferably with federal and state government coordination, must be combined with social dialogue involving the coal companies and the unions. It helps if the coal companies are not multinational organizations that have low accountability to local needs. Declining economic competitiveness of the industry, either in comparison with other sources of coal or other sources of energy, can be important for gaining cooperation from the companies, unions, and citizens. However, there is very little understanding of what happens when these conditions are absent. The situation is approximated by many coal-mining regions in the U.S., where popular opinion is opposed to energy transitions that would reduce coal production [46,49]. Instead, people in these regions would prefer to see policies that ensure a future for coal, such as carbon capture and sequestration [46].

We argue that in such a situation, the main actors who support an industrial transition will be positioned mostly outside the triangle of government, fossil-fuel industries, and associated workers. These actors come largely from a mixture of economic development, alternative industry, and environmental organizations. They form coalitions to help to build the alternative economy associated with the just transition and to remediate or end some of the worst effects of the legacy industry. In this situation, another literature is relevant, the area of sustainability transition studies that focuses on coalitions and the politics of transitions [50–52]. Of the different frameworks that draw attention to the role of CSOs and coalitions in transition processes, the one with the closest

match to the goals of a just transition as defined above is the multi-coalition perspective [24]. Although the focus of the approach is on regional sustainable energy transition politics in general, it is relevant to just transition research because it shows how different types of campaigns and initiatives emphasize the sociotechnical versus societal goals.

One of the findings of the multicoalition perspective is that there is a tendency for actors and campaigns to become focused on specific goal types and associated initiatives. In terms of the goal types summarized in Table 1, the implication is that CSOs and allied actors will not necessarily frame their actions in broad terms such as a just transition unless they are involved in broad vision statements. Instead, the organizations will tend to focus on one or two of the goal types, such as opposition to fossil-fuel extraction or support for better jobs. To some degree, the differentiation is because the historic missions of many of the advocacy organizations keep them focused on a specific type of issue. The organizations that have focused goals are referred to as “silos.” A few organizations have a broader set of initiatives that bridge across the goals, and consistent with the terminology in political sociology, they are conceptualized as “bridge builders” [53]. A better understanding of this difference in strategy can contribute to general knowledge about the tensions in the different goals associated with a just transition. It can also help researchers to acknowledge the importance of actors who do not specifically embrace the terminology or frame of a “just transition” but nevertheless embrace one or more of the goals defined in both the research literature and the vision statements of CSOs. (The silos versus bridge-builders idea can be related to the bonding versus bridging distinction in network theory for coalition structure, but the specificity or breadth of goals of the actors is distinct from the type of network tie) [54].

In summary, attention to the role of civil society and allied organizations can help to broaden the explanatory framework for just transitions research by including a group of actors that has not received much attention in the literature. This approach may be applicable for the study of just transitions in other areas of the world that have similar conditions of weak support from governments and opposition from fossil-fuel companies and associated unions. In this sense, the approach expands the explanatory framework by bringing attention to an understudied category of actors, and it expands the scope of cases by including the “negative” cases where government support is weak.

Although we draw attention to an under-recognized aspect of actors in the broader study of just transitions, we also note that the needs of regions that are undergoing industrial decline, such as the coal industry in Appalachia, go far beyond the resources that CSOs and allied actors can provide. Their limited capacity to bring about a just transition also varies by goal type, and the goal of providing equivalent, good jobs likely goes beyond even the resources of subnational governments. Thus, we view the roles of CSOs and allied actors not as an alternative pathway to a just transition but more as a source of mobilization to develop support for a just transition. In other words, their work helps to define and motivate what a just transition could be for a region by providing a vision, demonstration projects, opposition mobilizations, and support for political and policy reform.

To develop this perspective for a theory of just transitions, the study asks three empirical questions. The first relates to the first part of this background review, and it provides an empirical application of the definition of a just transition and an analysis of which goal types are more or less prominent. Although the study does not attempt to explain outcomes of success or failure for each initiative, we include a description of outcomes because achieving some kind of successful outcome is an important motivating factor for CSOs and allied actors (both individuals and funders).

1. What is the range of initiatives and outcomes undertaken by CSOs and allied actors that are associated with the goals of a just transition? The expectation is that there will be a full range of initiatives

according to the goal types outlined above and that outcomes vary by type of initiative and by state government.

Second, the study also draws attention to a strategic decision that advocacy actors must consider when allocating their scarce resources to different transition-related initiatives. The decision is to adopt a broad strategy that embraces multiple goal types across initiatives or to focus on specific goal types such as opposition to fossil fuels. This research question builds on the strategic issue identified in the multicoalition perspective of an organizational focus on one type of goal versus bridging across the goals.

2. To what extent are the civil society and allied actors focused on specific types of initiatives and goals (in silos), and to what extent are they integrating across initiatives and goals (bridge builders)? The expectation is that a few organizations will serve as bridge builders but that most will focus on specific issues.

Third, the actors sometimes form coalitions to share resources and to increase the potential likelihood of a positive outcome. Indeed, research on just transitions has indicated that these coalitions are one of the central “pillars” of a just transition [55]. The analysis of these coalitions can help to clarify how they are related to broader goals and categories of initiatives. The analysis of coalition networks can also provide an additional perspective on how the different goals are separated or connected, and it can contribute to a better understanding of the tensions between the goals of just-transition advocacy.

3. Where civil society and allied actors work together in coalitions, what is the relationship between ties between actors and the four goals described in Table 1? The expectation is that the actors will form different clusters with respect to sociotechnical transition goals and societal change goals.

3. Method

3.1. Introduction

This study uses both a comparative method and a network analysis. The unit of analysis for the comparative method is defined as an “initiative” led by CSOs and allied actors, and for the network analysis it is a coalition of actors that work together in an initiative. The comparative method involves the construction of a small-N data set that can be used to answer specific questions such as the ones described in the previous section. This method is situated between detailed case-study or ethnographic analysis and large-N, quantitative methods [56]. Like the case study, the comparative method can be used to develop hypotheses and to identify relationships. However, unlike the case study, the comparative method does not provide detail and an analysis of the unique attributes of each case. Like large-N quantitative research, comparative analysis can suggest associations and possible general causal relationships, but unlike quantitative methods, the comparative method generally lacks the statistical power and the controls to enable more robust causal inferences. Likewise, the network analysis is not used here for causal analysis; instead, it is used to evaluate the relationship between CSOs and allied actors and the different goals associated with a just transition.

3.2. Definitions and analytic strategy

Up to this point, we have used the phrase “CSO and allied actors.” However, we found it necessary to have a second term that was more specific: a transition advocacy actor (TAA). A TAA is defined as a non-state actor that is engaged in an initiative that addresses at least one of the four goal types described above as associated with a just transition. In most cases, the initiatives are led by CSOs, but occasionally businesses

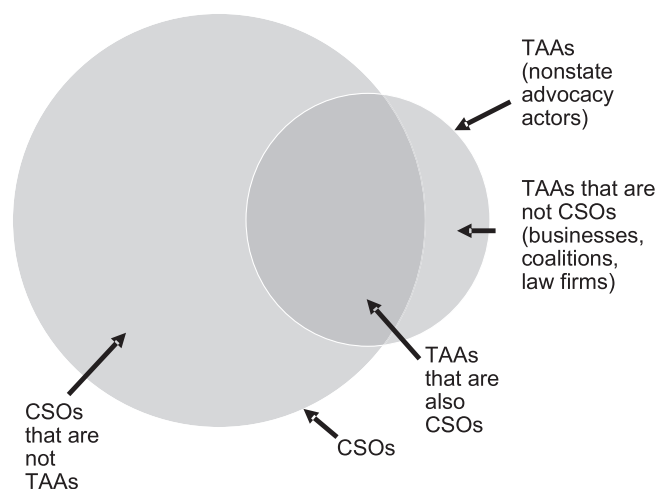


Fig. 2. Distinctions and Overlaps of CSOs and TAAs. Source: Authors.

Table 2
Inclusion Criteria for an Event.

Criterion	Description
Place	The included region is the entire state of West Virginia, the mountainous eastern portion of Kentucky, and the mountainous western portion of Virginia. The region of interest overlaps with but is not identical with the official definition of Appalachia shown in Fig. 1 because it includes more of western Virginia.
Time period	The event takes place between January 2010 and June 2020.
TAA activity	The event is included only if there is evidence of participation by at least one TAA.

or informal networks are involved. Likewise, not all CSOs in the region are interested in environmental, sustainability, equity, or transition policies (See Fig. 2). For theoretical reasons provided in the background section, the analysis of TAAs is limited to collective nonstate actors (i.e., organizations and networks). Individual persons and government actors are not included in the analysis that follows, and foundations are not included unless they adopt an advocacy position in one of the initiatives. Labor unions can be TAAs, but as indicated above, in central Appalachia the coal miner’s union has opposed just transition proposals. Most of the TAAs are environmental, social justice, economic development, and legal organizations.

The study develops a database for charting and mapping TAA activity with respect to a region’s sustainability transition process. This method involves four levels of data collection and coding. We use theory-driven categories as the initial starting point for coding (following the template analysis method), and we use the master coder method for the review of coding [57,58].

The fundamental unit for data collection is an event, which is a single occasion of advocacy by one or more TAAs. An event generally involves one type of action, such as a protest, a petition, a lawsuit, testimony or commentary before a government body, a sustainable economic development project, and or a meeting with stakeholders. Only events that could be categorized as contributing to one or more of the goals of just transition were included. See Table 2 for a summary of the other inclusion criteria. The time period, 2010–2020, provides enough scope with accessible information to develop a large enough data set to identify patterns and to answer the research questions. The period also includes the shift in power in the Virginia legislature, when political opportunities opened for sustainability transition policy.

Events were classified into three higher order, hierarchical units. First, an initiative is a cluster of events for which the actors share the same goal. An initiative is an analytic (or etic) category constructed by

the researcher, but it may overlap with the emic category of a campaign, which TAAs sometimes use. An initiative has a shared and specific aim, such as supporting or opposing a bill or a group of closely related bills in the state legislature, stopping a proposed fossil-fuel development project, or obtaining remediation from pollution from an existing fossil-fuel project.

Second, initiatives were classified into “initiative groups” based on a group of related goals. For example, initiatives in opposition to pipelines formed one group, and those in support of citizen science another. Categories of initiative groups are used mainly for presentation purposes to help summarize the 98 initiatives.

Third, initiative groups were classified according to the primary goal type as described in Table 1. In some cases, initiative groups could be classified as relevant to more than one goal. For example, community or shared solar farms can involve equity benefits by providing access to some of the benefits of solar ownership for those who cannot own rooftop solar, and they can provide democracy benefits in cases where there is local ownership of solar shares. However, the REEE goal was considered primary because the equity and democracy goals were not always evident.

Although the goal types are analytic categories constructed by researchers based on the literature described above, the etic categories also align fairly well with the goals articulated in broad vision statements for a just transition (emic categories). Many of the TAAs that were active in the initiatives were also participants in or signatories of the programmatic statements. However, for specific initiatives, we do not require that the TAAs frame their actions as contributing to a just transition. Indeed, the frame of a just transition, like other bridging frames, tends to more visible in the broad vision statements.

3.3. Data collection

Events and initiatives were identified through an iterative process with a team of paid undergraduate and graduate student researchers. First, the entire set of blogs and articles on the website of Appalachian Voices, one of the central connecting organizations in the region, was reviewed to develop a preliminary list of events that met the inclusion criteria and to develop the list of participating TAAs. Second, the senior researcher reviewed the website and/or social media pages of each TAA found in the first step to identify additional events and TAAs. For some TAAs, this part of the data collection involved reading dozens of blog pages or newsletters for the ten-year period. Third, the donation records of the active foundations in the region were reviewed to identify additional TAAs and initiatives. Fourth, as cases were developed on the initiatives, new organizations and initiatives that came to light were added to the data set.

For each initiative, the following information was gathered: relevant background information such as the political context; the events and TAAs involved; the incumbent organizations (coal and gas companies, utilities) where relevant; and outcomes. The information was gathered in a summary document (256 pages) of 98 initiatives categorized into groups of initiatives and the goal types. Some initiatives (N = 22) were multistate or multilevel (state and federal government), and others were restricted to the states (Kentucky, N = 19; Virginia, N = 16; West Virginia, N = 41).

3.4. Analytic strategy

For question 1, a spreadsheet was developed with the 98 initiatives as the rows and the TAAs as the columns. Only TAAs that participated in two or more initiatives in the data set were included in the analysis. This threshold was the most inclusive and manageable because of the high number of TAAs that participated in only one initiative. A TAA was coded as either 0 or 1 for absent or present in an initiative even if it participated in multiple events within the initiative. The senior author coded the data set, and a graduate student checked and confirmed the

coding. The check generated five errors, which were corrected.

Research for question #1 also tracked outcomes for each of the 98 initiatives. Although the team has experience with formal analysis of outcomes in similar data sets, quantitative or other formal analysis to identify causal relationships was not attempted because of the differences across the initiatives. However, we recognize that the topic is important for both researchers and TAAs, and a summary analysis is given to indicate the initiatives that had positive outcomes from the perspective of the TAAs and the ones that did not.

For research question #2, an additional spreadsheet was developed from the same data set that classified TAAs as active or not active for each of the four goal types. This method identified which TAAs participated more in initiatives across goal types (bridge builders) and which ones remained with one main type of goal (silos). The analysis uses frequency counts and a Venn diagram to assess the siloization dimension of TAA action, and it advances the analysis of siloization by providing a quantitative metric.

For research question #3, a separate data base was developed for events where there was a clear coalition or coordinated action by multiple TAAs. Events were coded by initiative, initiative group, and goal type, and the TAAs in each coalition were coded as 1 if present and 0 if not present. The coding identified 55 coalition events. Some initiatives included more than one event with a coalition, and some initiatives had no coalition activity. To keep the analysis focused on the most active and locally oriented TAAs, only TAAs that participated in 2 or more coalitions are included. For the network diagram, three initiative groups had only one coalition event, and to enhance readability, they are included with the most proximate initiative group. (Cooperative reform is included with utility governance under the democracy goals, black lung disease reparations with just transition under the equity goals, and private governance with coal extraction opposition under the fossil-fuel opposition and remediation goals.)

The network analysis and measures of centrality were generated in R using the *ggraph* and *igraph* packages. The layout of the network uses the stress majorization optimization strategy to minimize the stress function over the positions of nodes to create an aesthetically appealing network. We also analyzed various measures of centrality, including degree, betweenness, and eigenvector centrality. (See the Appendix.) The social network analysis is used to complement the comparative analysis of the relationship between TAAs and goal types [59].

3.5. Methodological limitations

As noted above, the comparative method based on the construction of a small-N data set has strengths and weaknesses in comparison with ethnography and large-N quantitative research. The study does not provide a full historical or ethnographic contextualization, which we see as a complementary endeavor that can address the uniqueness of each initiative. We have suggested some points of entry into the substantial literature for the region, but the method is set up as a contribution to the general social scientific study of just transitions. Thus, the goal is to construct data sets that make it possible to answer specific research questions that advance the general study of just transitions.

A related decision is that the source of information (described above) is based on publicly available records as described above. Again, there is an opportunity for complementary research that can operate at the more detailed level of communities with interviews and ethnography. This study focuses on formal organizations and their connections rather than on individuals, neighborhood networks, or government actors, and the data will tend to be biased toward the organizations that have the resources to have a presence in the public sphere. For example, in the analysis of coalitions for the third research question, deeper ethnographic methods would reveal additional coalitions and events.

Although the construction of a data set can enable the identification of patterns and answers to specific research questions, there are limitations with respect to causal inferences. We identify organizations that

Table 3
Summary of Groups of Initiatives.

Goal Type	Initiative Group	N_i
Democracy		22
	Citizen Science	7
	Electricity Cooperative Reform	3
	Fossil-fuel governance	8
Equity and Jobs	Utility governance	4
		19
	Black lung remediation	3
	Just transition policy	4
REEE Development	Ratepayer advocacy	4
	Sustainable economic development	8
		11
	Distributed and community solar	8
Fossil-fuel Opposition and Remediation	Other REEE advocacy	3
		46
	Coal mining opposition	13
	Coal pollution remediation	11
Total	Natural gas infrastructure opposition	7
	Natural gas (fracking) siting opposition	6
	Powerline opposition	2
	Power plant remediation	5
	Private governance	2
		98

tend toward the silo strategy and those that tend toward the bridge-builder strategy, but we do not attempt to develop a causal analysis of why the differences occur. In the discussion section, we develop some hypotheses that could be examined in future research, but this type of analysis would be a separate study. Likewise, we tracked the outcomes of the initiatives but again only develop explanatory hypotheses. It would be necessary to delve into each case through process tracing to find out what specific TAA actions were associated with outcomes and what structural conditions also enabled or limited outcomes. Thus, we describe the relationships as associations rather than as causes and effects.

4. Results

4.1. The scope of initiatives related to just transition goals

In response to the first research question, the analysis confirmed the expectation that in the aggregate, TAA initiatives include all four goals identified above as comprising a just transition. This section examines the range or scope of initiatives by providing a brief description of the initiative groups and a general overview of outcomes. Using the method and definitions outlined above, the events were classified into 98 initiatives (N_i), 17 groups of initiatives, and the four goal types. (See Table 3.) The frequency counts provide a picture of what types of just transition goals are salient in the initiatives of the TAAs. About half of the initiatives are focused on opposition to the effects of the fossil-fuel industry and remediation of its negative effects. Clearly, the goal of fossil-fuel remediation and sunseting is primary.

There were four main initiative groups identified for the democracy-oriented initiatives. Citizen-science projects focused on lay monitoring of pollution with the goal of using the knowledge to trigger enforcement action by the regulatory agencies and responses from industrial corporations. The reform program for the rural electricity cooperatives included changes to governance such as open elections, open meetings, and transparent records. Most of the initiatives with respect to the governance of the fossil-fuel sector and electricity industry involved participation in the state legislature or in state governments' regulatory processes. Two of the fossil-fuel governance initiatives were opposition to bills that criminalized protest at energy infrastructure sites. With respect to the utility governance initiatives, efforts focused on strengthening the state government regulatory commission and the role

Table 4
Initiative Groups and Outcomes.

Initiative Groups	Outcomes
<i>Democracy-related initiatives</i>	
Citizen science	Several initiatives had outcomes of enforcement actions.
Electricity coop. reform	Reform candidates ran for cooperative elections.
Fossil-fuel governance	Two states approved criminalization of protest despite TAA opposition. Regulations were weakened for coal and natural gas extraction despite TAA opposition. TAAs failed to gain approval for legislation for mountaintop removal. Under the Trump administration, there were roll-backs of federal government protections. TAA victories included legislation to support plugging of drilling sites and surface owner rights, and a court order for the U.S. Environmental Protection Agency to review its rules.
Utility governance	Most bills were not approved. In Virginia, there were some successes, especially in 2020 after the Democratic Party trifecta.
<i>Equity-related initiatives</i>	
Black lung remediation	Not successful.
Just transition policy	Not successful.
Ratepayer advocacy	Generally, not successful.
Sustainable economic development	Successful cases of small-scale enterprise development and job training, but generally at a demonstration-project stage.
<i>REEE initiatives</i>	
Distributed and community solar	Some successes with enabling legislation in Virginia and some community solar demonstration projects. However, defeats included the roll-back of net metering in Kentucky, the repeal of net metering in West Virginia, and the rejection of a power purchase agreement bill.
Other REEE advocacy	Property-assessed clean energy legislation was supported in Kentucky and Virginia but not in West Virginia. Significant REEE legislation was approved in Virginia in 2020.
<i>Fossil-fuel opposition & remediation</i>	
Coal mining opposition	In some cases, permits were not granted. There were mine closures, but closures were partially due to changing economics.
Coal pollution remediation	Several cases of litigation by TAAs resulted in fines, but clean-up remained an ongoing problem.
Natural gas infrastructure opposition	Three project proposals were withdrawn, but four were completed.
Natural gas (fracking) siting opposition	Some counties blocked fracking plans, and some remediation was achieved; however, a federal court ruled against the authority of local governments to ban fracking waste. An agreement with TAAs was reached for limited drilling in the George Washington National Forest.
Powerline opposition	One project was terminated; the other was completed.
Power plant remediation	There were some clean-ups, fines, and plant closures.
Private governance	One bankrupt company agreed to end mountaintop removal mining in West Virginia. Some large banks agreed to end financing for mountaintop removal.

of citizen participation in regulatory processes.

Initiatives with an equity or distributive justice goal included four groups. With respect to workers' rights, regional TAAs were active participants in both state and national campaigns to ensure ongoing compensation for mine workers with black lung disease and to oppose attempts to undermine funding. TAAs also developed initiatives and plans for a just transition in their states, such as the above-mentioned Empower Kentucky plan, a Green New Deal coalition in Virginia, a proposal for a Just Transition Board for the state of West Virginia, and a campaign to gain federal government support for the reclamation of landscapes destroyed by mining. There were also various ratepayer protection initiatives and locally oriented economic development initiatives. The latter sought to create enterprises and jobs that represented a less environmentally damaging future for the regional economy.

Of the initiatives oriented toward support for the development of

REEE in the region, much effort was dedicated to supporting the emerging solar industry and to enabling the growth of distributed and community solar. TAAs often focused on battling efforts by utilities to weaken distributed solar energy such as the roll-back of net metering in Kentucky and West Virginia. TAAs also supported legislation to authorize and strengthen power-purchase agreements, property-assessed clean energy, and energy-efficient buildings. In Virginia, after the Democrats gained control of the governor's office and both branches of the legislature in 2020, TAAs were active in legislative reform campaigns that led to a goal of 100% carbon-free electricity by 2050 for the state's utilities, energy efficiency standards, support for distributed solar and offshore wind, and a goal to participate in the regional cap-and-trade program of the northeastern states.

Approximately half of the initiatives involved opposition to fossil-fuel development and attempts to gain remediation from its effects. With respect to coal, there were initiatives to stop proposed new sites and expansions of existing surface mining sites, and another group of initiatives sought to gain remediation for communities with landscapes polluted by mining and coal-processing industries. Some of natural-gas pipeline opposition initiatives attracted large coalitions of organizations, whereas the initiatives opposed to hydraulic fracturing technologies (fracking) tended to be more locally based with some support from CSOs and environmental law actors. There were also two initiatives to stop new power-line development, and TAAs also sought remediation for the pollution associated with electricity generation, mostly the hazards generated by coal ash. Private governance initiatives included an agreement with a coal company to end mountaintop removal in the region and agreements with some banks to stop funding mountaintop removal.

To answer the second part of the question, the data set also tracked outcomes. (See Table 4.) As indicated above, the primary purpose is to identify hypotheses for causal relationships. Of the patterns identified, the Democratic Party trifecta in Virginia in 2020 significantly opened political opportunities for state-government reforms. The difference between Virginia and the mostly hostile state governments in Kentucky and West Virginia points to the importance of political party and government support, which is unsurprising in the polarized political context of the U.S. Without party support, the TAAs often battled industry-led roll-backs of pollution protections and existing support for REEE, and the TAAs often lost battles in the state legislature. In venues outside state government policy reform, the TAAs' opposition to fossil-fuel infrastructure development (pipelines, power lines, coal and gas extraction) met with mixed results but some important successes (such as the decision not to build the Atlantic Coast pipeline). Likewise, TAAs were sometimes successful in getting the state government to enforce pollution violations, but often only after litigation initiated by the advocates or after the publicity from citizen science and other action. However, the fines were not always significant, and remediation was often limited.

4.2. TAA specialization

The results for question 2 confirmed the expectation that a relatively small number of TAAs are engaged in bridge building across goal types and associated initiatives. The first analysis of the siloization question is at the initiative level and coded as the presence or absence of a TAA in at least one event in an initiative. The data set had 70 TAAs in the 98 initiatives. Given the limited resources of TAAs, few could be involved in multiple initiatives. The mean level of presence was 6 initiatives, and the highest was the Sierra Club, which was present in 53 out of 98 initiatives. (The Sierra Club has chapters in the three states.) Only three TAAs other than the Sierra Club participated in 20 or more of the 98 initiatives (Appalachian Voices, Kentuckians for the Commonwealth, and Ohio Valley Environmental Coalition). Together with the Sierra Club, their participation accounted for 32% of total TAA participation. Another 8 TAAs were involved in 10–20 initiatives (22%, Appalachian Citizens Law Center, Appalachian Mountain Advocates, Chesapeake Climate

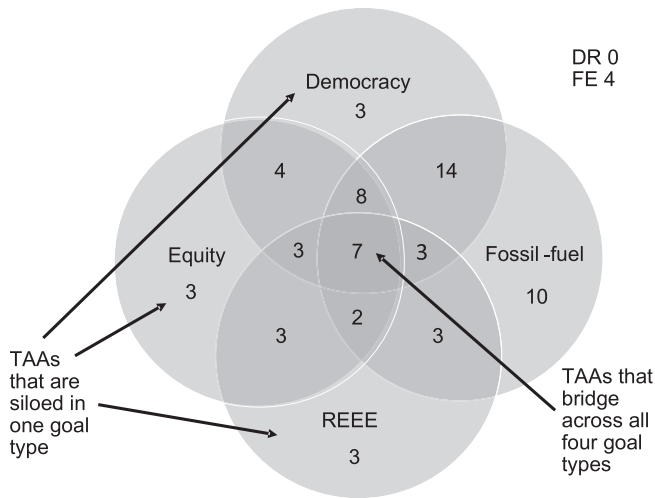


Fig. 3. Number of TAAs Active in Each Goal Type. Source: Authors.

Action Network, Coal River Mountain Watch, Kentucky Resources Council, West Virginia Environmental Council, West Virginia Highlands Conservancy, and West Virginia Rivers). In other words, of the 70 TAAs, participation was concentrated, with 12 TAAs accounting for more than half of all TAA participation. Three of the TAAs also focused on tracking legislative and regulatory initiatives (Kentucky Resources Council, Virginia Conservation Network, and West Virginia Environmental Council).

A pattern of concentration also emerged for participation across the four goal types (democracy, equity, REEE support, and fossil-fuel opposition and remediation). The goal of fossil-fuel opposition and remediation accounted for 51% of the TAA activity across the initiatives. The other initiatives accounted for the much lower percentages by goal type: democracy, 22%; equity and jobs, 15%; and support for REEE, 12%.

Fig. 3 provides a visualization of initiative participation by goal type. Here, each of the 70 TAAs is placed in a category based on participation in one or more initiatives classified by the associated goal type. There were 15 possible categories: 1 category of participation in all four goal types, four categories for combinations of three goal types, six categories for combinations of two goal types, and four categories for one goal type only. At the center of the diagram is the subset of highly bridging TAAs, that is, the 7 TAAs that participated in initiatives across all four goal

types. The next ring is TAAs that participated in initiatives across three goal types, then two goal types, and finally the outer ring one goal type only or highly siloed TAAs. (Two of the 15 combinations involve intersections that are not shown in the two-dimensional space: the intersection of democracy and REEE goals (DR) and the intersection of the fossil-fuel opposition and equity goals (FE). These two combinations are shown in the margin as DR and FE.)

The subset of 7 TAAs that participated in all four goal types and that appear at the center of Fig. 3 overlapped completely with the subset of 12 TAAs identified above as having high participation across the initiatives. The diagram also shows the importance of the fossil-fuel initiatives because 51 of the 70 TAAs were involved in initiatives involving the goal of fossil-fuel sunseting or remediation, either with that goal alone or in combination with initiatives representing other goal types. There was also a relatively high degree of importance of participation in the democracy initiatives, but only in combination with other goal types.

This approach to examining the breadth of TAA participation in diverse goal types also makes it possible to derive an empirical measure of goal siloization for the field of TAAs in a region. This measure compares whether TAAs participated in 1 or 2 goal types (tending toward a silo strategy) or 3 or 4 goal types (tending toward a bridge-building strategy). Of the 70 TAAs, 23 (33%) were involved in initiatives that involved three or four goal types (the inner subsets of Fig. 3). In other words, about one-third of the TAAs showed, through their participation in initiatives, a relatively broad or bridging approach to the range of goals identified above for a just transition. This finding is consistent with the general trend in the literature described above toward a more comprehensive view of a just transition rather than the classical view that focused on employment opportunities for workers and communities affected by downsizing of the legacy industry. However, the analysis also indicates that the majority of TAAs are engaged in only one or two of the goal types.

4.3. Coalition structure

In response to the third research question, a review of all events in the data set indicated that there were explicit coalitions or partnerships in 55 events. These events occurred in a subset of the initiative groups; thus, not all initiative groups are included in this data set. Fig. 4 shows the relationships, and details are in the appendix. There are two types of nodes in this network: TAAs are in black, and the initiative groups are in

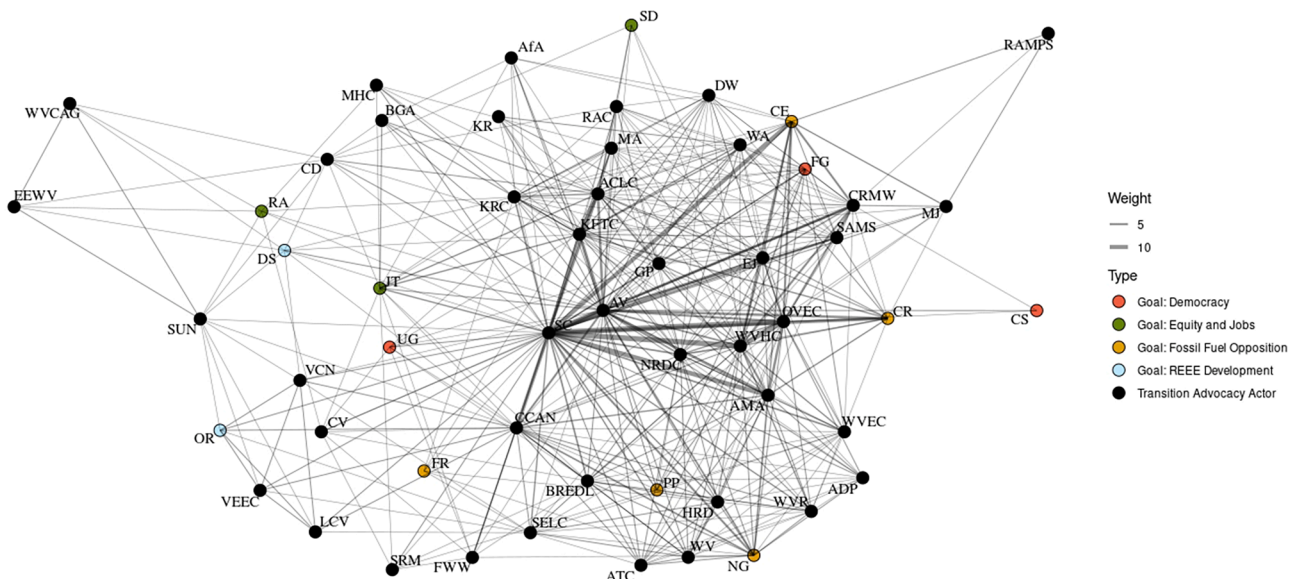


Fig. 4. Network of Coalition Relationships and Initiative Groups. See the appendix for the key to abbreviations. Source: Authors.

color (categorized by color into four goal types). The key to the abbreviations appears in the appendix.

The width of the edges (connecting lines) is weighted by the number of coalition events shared by two nodes. For any pair of TAAs, a heavier line (higher “weight”) indicates that there were more ties. For a TAA connected to an initiative group type, the weight represents the number of coalition events that the TAA participated in for the initiative group.

The figure provides a visual representation of the differences between the goals. The most numerous connections are on the right side of the diagram, where goals related to fossil-fuel remediation and opposition are located (CE, coal extraction; CR, coal remediation; NG, natural gas infrastructure opposition; and PP, power plant pollution opposition and remediation). In the upper center and upper left portion of the diagram, the equity-related goals are visible (SD, sustainable development; RA, ratepayer advocacy; and JT, just transition). In the lower left portion of the diagram, the goals related to support for REEE are evident (DS, distributed and shared solar; and OR, other renewable energy). Opposition to natural-gas fracking (FR) appears in the lower-left quadrant; it is the only fossil-fuel-related goal that appears on the left side of diagram.

Democracy-related goals are connected with the other goals. Citizen science (CS) in this dataset generally involves grassroots monitoring of pollution from fossil-fuel sites, and it is close to coal remediation (CR). Fossil-fuel governance initiatives (FG) are between coal extraction (CE) and coal remediation (CR). In contrast, utility governance initiatives (UG) are closer to the REEE initiative groups.

In the appendix, we include three measures of centrality. Eigenvector centrality differs from degree centrality because it considers the fact that not all vertices are equivalent. As such, this measure highlights nodes that are connected to important nodes. The top four organizations in Section 4.2 (Sierra Club, Appalachian Voices, Kentuckians for the Commonwealth, and Ohio Valley Environmental Coalition) were also in the top six organizations for Eigenvector centrality and top seven organizations for degree centrality.

Betweenness centrality quantifies how often a node acts as a bridge between two other nodes. The measure indicated again that the Sierra Club was the most highly ranked TAA, and it connects across all quadrants and goal types. However, two national organizations (Greenpeace and the Natural Resources Defense Fund) were also among the top four on this measure. The Natural Resources Defense Fund was involved in two large anti-pipeline coalitions and in some litigation cases. Greenpeace was only involved in two initiatives, but one of the initiatives involved a large coalition at the national level. Probably the most insightful relationship from betweenness centrality is Kentuckians for the Commonwealth, which ranked third on this measure. In Fig. 4, Kentuckians for the Commonwealth links the fossil-fuel goals on the right side with a group of Kentucky-based organizations on the upper left side and upper center, which are more connected with equity goals.

In general, national organizations tend to be on the periphery of the network (clockwise from the upper right 1:00 position, DW, Defenders of Wildlife; WA, Waterkeepers Alliance; ATC, Appalachian Trail Commission; FWW, Food and Water Watch; SRM, Sunrise Movement; LCV, League of Conservation Voters; SUN, Solar United Neighbors; and BGA, BlueGreenAlliance). The Sierra Club, located at the center of the network, is both a national organization and a chapter-based state organization in all three states. Overall, the network analysis also speaks to the importance of local or regional organizations in facilitating bridging ties between other groups.

In summary, the network analysis provides additional evidence of siloization of goals through the lens of TAA coalition composition. It does not show a clear split between sociotechnical and societal change goals because the democracy-related initiatives are positioned closer to their industry focus. However, the diagram does show that REEE, equity, and fossil-fuel goals are largely located in different quadrants of the diagram.

5. Discussion

Although the study should be of interest to researchers and political actors who focus on Appalachia, the goal is to contribute to the general analysis of just transitions. With respect to the first research question, we provide an analytic strategy to ground broad theoretical discussions of the different goals of just transitions in the concrete initiatives of TAAs. We show that the four goal types identified in the background literature can be used to guide the classification of a wide range of initiatives that contribute to efforts to build a just transition in the region. We also show that this type of analysis can be used to identify which goal types are salient across the range of initiatives undertaken by TAAs in a region. In this study, the most salient goals are fossil-fuel remediation and opposition, but the priorities could be different in other regions.

With respect to the second question, we show that a relatively small number of TAAs provide a bridging function across multiple goal types, and we develop an analysis of the extent to which the aggregate TAA activity in a region tends toward a silo or bridge-builder strategy. This portion of the analysis highlights an important strategic decision that TAAs and funders make with respect to the wide variety of possible initiative types to support with limited resources.

With respect to the third research question, we show that ties between TAAs in coalition activity for initiatives tend to cluster according to the main goal types. Within the sociotechnical goals, there is differentiation between fossil-fuel remediation and opposition and REEE development. Visually, the two sociotechnical goal types are located in different areas of Fig. 4, and both are located in different areas from the equity-related goals. However, the democracy-related goals are split and are more closely related to either fossil-fuel remediation and opposition or REEE support than they are to each other. Thus, we suggest that although the different goal types of a just transition can be envisioned as complementary and in some sense synergetic, in practice there is often specialization that is reflected not only in specialized organizational priorities but also in clusters of inter-organizational ties.

In summary, the study suggests a way to develop a systematic picture of the role of TAAs and CSOs in a region that is a candidate for just transition initiatives. The analytic strategy is portable across different regions and can be used for comparative analysis. The study also raises several questions for future research.

One area for future research is the question of why TAA activity in this region is so focused on fossil-fuel opposition and remediation. Comparative analysis would be needed to answer the question convincingly. One hypothesis is that in regions where government and union support for a just transition is lacking, environmental threats are also more salient. Under those conditions, TAAs tend to focus on more oppositional actions, including stopping new site developments and gaining remediation from existing sites.

Another area for future research involves developing a better understanding of the conditions for more and less successful outcomes. The study opens up the question of the extent to which different types of initiatives are likely to generate more favorable outcomes and the need to understand the causal conditions that link tactics and initiative types to outcomes. One hypothesis is that where control of the government by a sympathetic party is lacking, successful legislative initiatives may be restricted to those with conservative frames such as surface owners' rights and pollution remediation where health risks are evident. Another hypothesis is that if there is an independent judiciary with a regulatory system that supports remediation, litigation may be a good pathway to some successful outcomes. There are opportunities for additional analysis of outcomes, either with quantification in a larger data set that would include other regions or with more detailed case studies.

Another area for future research is the explanation of why some actors adopt a bridge-builder strategy and why some operate with more siloed goals. One hypothesis is that formal nonprofit organizations with a relatively large size (staff and funding) and geographical scope (local chapters and national umbrella) would be more likely to engage in

bridge building. Another hypothesis is that the longevity of an organization, an established niche in the nonprofit sector, and legal status may lead to mission lock-in that limits willingness to engage in a wide range of initiatives with diverse goals. For example, an organization may have an established mission to preserve freshwater river resources, which may restrict its interest in mission expansion to REEE or economic development initiatives and may motivate restricted participation in pollution-remediation initiatives. A third hypothesis is that the priorities of funders and relationships to funders could affect a silo versus bridge-builder strategy. For example, funders may encourage a broad conceptualization of a just transition, avoid funding of more militant protest activities, encourage economic development projects, and so on. Finally, structural conditions would likely affect the breadth of organizational goals. For example, in regions where there is opposition to just transition policies from unions, outcomes for initiatives that involve job creation and economic development may be more difficult to achieve, and TAAs may tend to focus their efforts elsewhere.

A related area of future research is the relationship between geographical scope and support for different goal types. In Fig. 4, national organizations appear throughout the circumference of the diagram, and a few appeared in a more central position toward the fossil-fuel goals. Different types of initiatives may be better suited for different levels of spatial scale. Sustainable development may be targeted geographically even if funding is from regional or national sources, whereas other initiative types require action at the state or federal government levels. Thus, an area of future research would be to map goals and initiative types onto organizations according to the geographical scope of both.

As a contribution to energy social science research, we do not venture into the normative evaluation; however, the research has potential implications for TAAs and funders for an examination of what types of initiatives and goals make sense given limited resources. One choice involves the selection of initiatives based on organizational capacity and resources required. Some initiatives (job creation and legislative change) require significant resources with political party support, whereas others (litigation for pollution remediation) may be accomplished with fewer resources. The spatial scale at which initiatives can be addressed also would affect the selection of initiatives based on capacity.

A second choice regarding initiative types involves which types of underlying goals should be supported. Initiatives that are focused on sociotechnical transition goals can be accommodated to a more conventional model of capitalist economic development that involves the sunseting of one industry and the sunrise of another. If this strategy is pursued, democracy-oriented goals may be restricted to a procedural justice orientation that results in improved governance of the transition. Although this orientation is laudable, some of the democracy and equity initiatives include glimpses of a vision of democracy that involves deeper structural changes in the organization of industries and the development of a democratic politics of energy governance. These tensions are well recognized by experts on the region's politics and by actors in the region's political fields [1]. They also point to the value of considering initiatives that address deeper issues of institutional power, inequity, and democracy:

1. Empowering citizens to conduct grassroots research that can help to trigger remediation and regulatory intervention.
2. Strengthening the public participation and democratic governance of the utilities and electric cooperatives.
3. Diversification of the energy industry to include the development of countervailing industrial power from third-party owners, retail competition, and the REEE industry.
4. Local ownership and control over energy, such as through distributed renewable energy and shared solar generation and the creation of locally owned small businesses and nonprofit organizations that provide job creation for a more sustainable regional economy.

5. Support for the rights of local governments and landowners to limit the effects that companies can have on the destruction of nearby landscapes.
6. Strengthening the regulatory apparatus for the remediation of pollution caused by mineral extraction, transportation and transmission of energy, generation of electricity, and disposal of energy-related waste.

This vision of the connection between a regional energy transition and deeper societal change is evident in some of the initiatives identified in this study. For funders and TAAs, one of the decision criteria for the selection of which initiatives to support would involve the choice between initiatives that are more politically feasible within existing structures versus initiatives that involve deeper societal change.

A third choice is the breadth of goals that funders and TAAs want to highlight. If funders were to highlight more the value of bridge-building and the explicit use of a just transition frame with multiple goal types, this priority would likely build public awareness of the value of just transitions and help to motivate political and policy change. Thus, the empirical analysis of siloization and bridge building could help funders to reconfigure requests for proposals and funding priorities. Moreover, the choice involving breadth is not binary; it can involve a combination of goal types in more limited and specific configurations. For example, when supporting sustainable economic development initiatives, funders could do more than support sustainable business development. They might also focus on equity and democracy synergies such as support for cooperatives, nonprofit organizations, and for-profit businesses with employee ownership or unionized labor.

6. Conclusion

This study contributes to the literature on just transitions for carbon-intensive regions in several ways. First, whereas much of the previous literature has focused on government-led initiatives, we argue that the literature should also include regions where government and union leadership is largely absent (or even opposed, as in the U.S. at some times and places). In this situation, we suggest that nongovernmental actors (TAAs) can play a significant role in educating, defining, showcasing, and building political will for a just transition. But we also suggest that even where government support is evident, the role of TAAs deserves greater attention. Second, the study develops an analytic strategy for the initiatives and coalitions of TAAs in a region. This approach can be used for comparative analysis across world regions. Third, the study builds on and extends the multicoalition perspective to provide a new way to measure the siloization of goals and the breadth of TAA participation. Finally, the study provides a model of how to bring the analysis of coalitions, which appears in sustainability transition studies generally, into the study of just transitions.

Although we focused on one carbon-intensive region in one country, the analytic strategy can be used to assess and compare initiatives for a just transition in other regions. Through additional comparative analyses across regions, it would be possible to build a broader understanding of how the range and concentration of initiatives and goals for a just transition vary and to develop causal insights into outcomes, siloization of goals, coalition structures, and the emphasis on different types of just transition goals. Thus, the study opens up possibilities for more research on the problem of understanding the trajectories of just transitions and on the practical problem of where to allocate very limited resources (for governments, funders, and the TAAs themselves) to achieve the greatest effects.

In summary, although governments throughout the world recognize the need to reduce greenhouse-gas emissions, and although the coal industry in several countries has undergone reduction due to competition from other energy sources, the prospect of bringing a sustainability transition to a carbon-intensive region is inherently contentious because of the disruption that the transition entails to lives, livelihoods, and

Table A1
Summary of Information Associated with Fig. 4.

Acronym and name	Scope	Ties	DEM	EQ	REEE	FF	Betweenness Centrality	Degree Centrality	Eigenvalue Centrality
ACLCL Appalachian Citizen's Law Center	Regional (KY)	48	1	5		4	0.36341	0	21
ADP (Allegheny Defense Project)	Regional	16				2	0.143062	0	12
AfA (Alliance for Appalachia)	Regional	9				1	0.071657	5.833333	7
AMA Appalachian Mountain Advocates	Regional	55		1		10	0.524217	6.833333	18
ATC (Appalachian Trail Commission)	Regional (National)	23				2	0.171305	5.311111	14
AV Appalachian Voices	Regional (Virginia)	98	4	4	2	14	0.704306	27.66667	31
BGA (BlueGreen Alliance)	National	9		2			0.073084	3.111111	6
BREDL Blue Ridge Environmental Defense League	Regional	30	1	1		2	0.218455	12.47778	17
CCAN Chesapeake Climate Action Network	Regional (VA)	52	1	1	3	5	0.37297	27.93333	24
CD Coalfield Development	National (WV)	11		2	1		0.067145	22.23016	9
CRMW Coal River Mountain Watch	WV	40	3			6	0.364405	19.31667	19
CV Clean Virginia	VA	7	1	2			0.055426	6.944444	6
DW Defenders of Wildlife	National	20	1			1	0.145055	11.7746	16
EEWV Energy Efficient West Virginia	WV	5		1	1		0.002293	0	3
EJ EarthJustice	National	35	1			5	0.309049	5.044444	18
FWW Food and Water Watch	National	10	1	1		2	0.080937	23.57143	6
GP Greenpeace	National	18	2				0.128494	63.91825	17
HRD Highlanders for Responsible Development	VA	26				3	0.194058	0.611111	14
KFTC Kentuckians for the Commonwealth	KY	58	2	3	1	7	0.425995	61.30317	23
KR Kentucky Riverkeeper	KY	9				2	0.07618	1.444444	6
KRC Kentucky Resources Council	KY	28	1	2	1	2	0.203517	7.207937	17
LCV League of Conservation Voters	National	10			2		0.055948	0	6
MA Mountain Association	KY	21	2	1			0.14632	12.09683	16
MHC Metropolitan Housing Commission	KY	7		2			0.059207	0	5
MJ Mountain Justice	Regional	10				4	0.083015	12.75	7
NRDC Natural Resources Defense Council	National	46	1			4	0.327743	49.93413	26
OVEC Ohio Valley Environmental Coalition	Regional (WV)	71	4	1		12	0.654198	37.94048	25
RAC Rural Action	Ohio (Regional)	18		1			0.122942	47.33016	16
RAMPS Radical Action for Mountains' and Peoples' Survival	WV	3				1	0.009395	0	2
SAMS Southern Appalachian Mountain Stewards	VA	26	1			4	0.22478	2.216667	16
SELC Southern Environmental Law Center	Regional (VA)	20			1	3	0.136037	41.1119	15
SC Sierra Club	National, 3 state chapters	153	6	4	3	24	1	100.2738	38
SRM Sunrise Movement	National	6		1		1	0.048315	0	5
SUN Solar United Neighbors	National	10		1	2		0.028856	40.53333	8
VCN Virginia Conservation Network	VA	11			3		0.067996	0	7
VEEC Virginia Energy Efficiency Council	VA	10			2		0.055948	0	6
WA Waterkeepers Alliance	National	24	1			2	0.174618	2.892857	16
WV Wild Virginia	VA	26				3	0.194058	6.830952	14
WVCAG West Virginia Citizens Action Group	WV	5		1	1		0.002293	0	3
WVEC West Virginia Environmental Council	WV	22	2			2	0.19934	3	15
WVHC West Virginia Highlands Conservancy	WV	73	3			11	0.634344	2.5	26
WVR West Virginia Rivers	WV	23				3	0.198676	0	14

lifestyles. The achievement of a just transition is part of the broader problem of the politics of sustainability transitions and the growing recognition among researchers and advocates alike that conflicts over attempts to make industries more sustainable are likely to be deep. This study suggests the importance of including the role of civil society and allied transition actors as part of the analysis, and it also suggests the need to recognize the importance of their advocacy role in developing the political will needed for both initial and continuing support of efforts to define, implement, and maintain a just transition.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix: Coalition analysis details

The table above provides a description of the information that is

presented visually in Fig. 4. The table tracks TAAs that have been involved in coalition events (defined above). Only TAAs that were involved in 2 or more coalitions are included in the analysis in Table A1.

Scope indicates the primary geographical focus of the organization, which is determined by examining the scope of active campaigns and programs. A secondary designation follows where relevant. For example, "national (regional)" indicates an organization that is involved in national issues in the federal government (e.g., the federal government RECLAIM Act) but also has a specific mission or interest in the Appalachian region. The designation "Regional (KY)" indicates an organization with a multistate focus in Appalachia but an additional focus on one of the three states in the study (e.g., Kentucky). The three states are KY = Kentucky, VA = Virginia, WV = West Virginia.

The column "Ties" indicates the number of dyadic ties to other TAAs in the data set of coalitions. The next four columns represent the level of coalition participation by goal type: DEM = democracy, EQ = Equity, REEE = Renewable energy and energy efficiency support, and FF = Fossil-fuel remediation and opposition.

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