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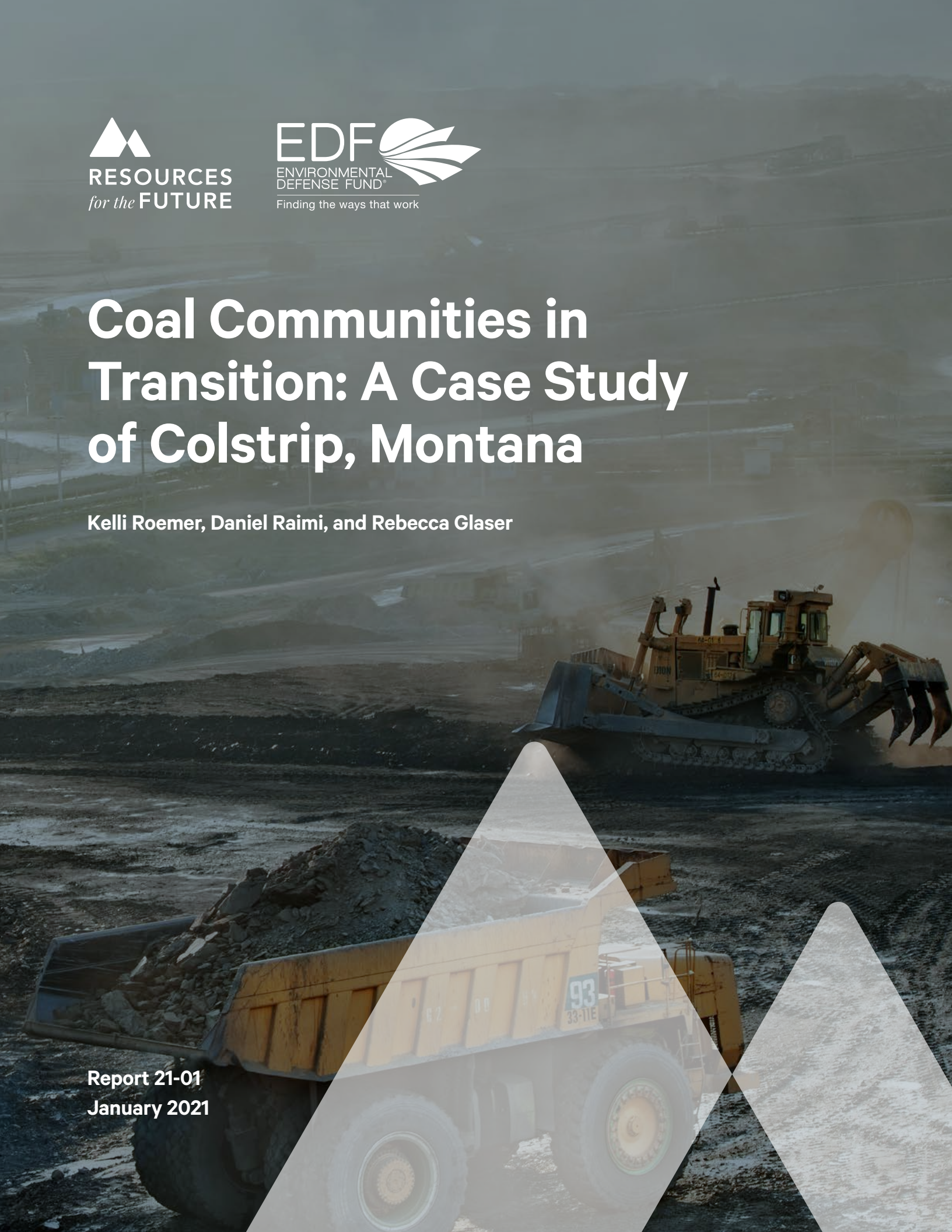
Coal Communities in Transition: A Case Study of Colstrip, Montana

Kelli Roemer, Daniel Raimi, and Rebecca Glaser



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About the Authors

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About the Project

RThis report is one in a series prepared by Resources for the Future and the Environmental Defense Fund that examines 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 first group of reports focuses on existing public policies and programs, grouped thematically as "tools in the toolbox" for policymakers seeking effective strategies to address economic challenges associated with the transition. This report is one of three US-based case studies that provide detailed information on how federal, state, and local actors can work together to support a successful transition. Please visit **www.rff.org/fairness-for-workers** or **www.edf.org/ensuring-fairness-workers-clean-economy** for more information, other reports in the series, blog posts, and more

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Abstract

Colstrip, Montana, is a small, isolated community that was established in the 1920s for the express purpose of mining coal. Later in the 20th century, the town became home to a large coal-fired power plant, which has since been the bedrock of the local economy. In 2020, however, two of the plant's four units were retired, the future of the remaining two units is highly uncertain, and a history of groundwater contamination caused by coal ash poses additional challenges for future economic development. These issues, particularly the uncertainty over the plant's future, have been exacerbated by the complex ownership structure of the plant, which has made it difficult for local leaders to establish a clear transition plan. Although state and federal policymakers have attempted to intervene, transition planning efforts to date have been ad hoc and not well coordinated. Colstrip's experience highlights the importance of providing more certainty for communities in transition. It also suggests the need for more coordination among local, state, and federal stakeholders while providing more robust planning and transition support. Looking forward, isolated, resource-dependent communities like Colstrip will face considerable challenges in an energy transition. Federal and state policymakers can help create better outcomes by striving to provide more certainty along with technical and financial support to facilitate locally driven transition efforts.

Contents

1. Introduction

Colstrip (pop. ~2,440) is a rural community in Rosebud County in the High Plains of southeastern Montana, more than 100 miles east of the nearest large city (Billings, pop. ~110,000). It sits roughly 20 miles north of two Native American reservations, the Northern Cheyenne and the Crow reservations, and at the northern end of the Powder River Basin, the single largest source of coal in the United States and one of the largest deposits of coal in the world.

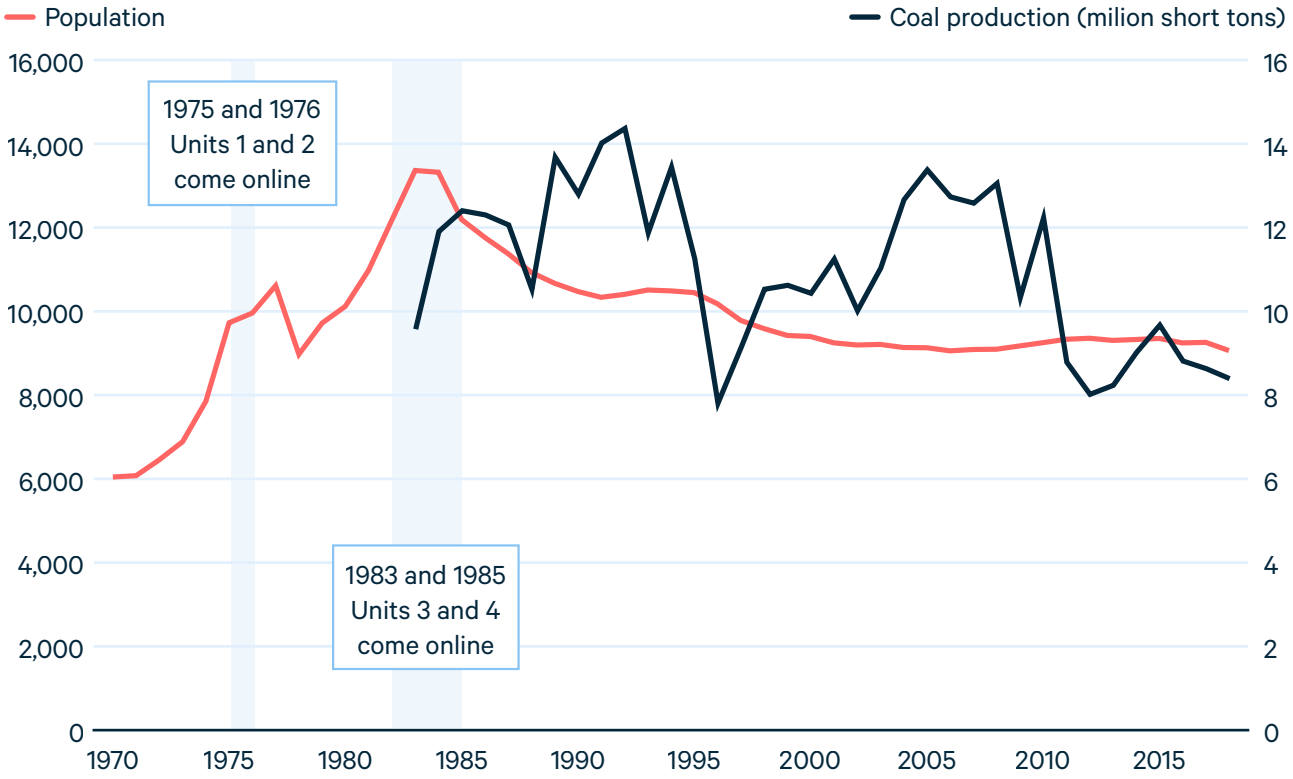
As its name implies, Colstrip was born from coal.[1] Established in the early 1920s by the Northern Pacific Railway Company to provide fuel for locomotives (City of Colstrip 2020a), the townsite was sold in 1959 to the Montana Power Company (MPC) as diesel replaced coal as the fuel of choice for locomotives. For nearly a decade, coal production was idled, but it resumed with the construction of the Colstrip Steam Electric Station in the late 1960s.

In the 1970s, a variety of factors, including federal Clean Air Act regulations on sulfur dioxide emissions and concerns about energy security, drove a rapid and extensive development of low-sulfur coal resources in the Interior West, which displaced higher-sulfur coal from Appalachia and the Midwest (Robertson 1979; Gerking and Hamilton 2008). Colstrip was one of the dozens of locations identified for construction of mine-mouth generating plants and high-voltage long-distance transmission lines (US Bureau of Reclamation 1971). In 1975 and 1976, Colstrip Station's Units 1 and 2 began operating with a combined capacity of 614 MW. Units 3 and 4 came online in 1983 and 1985, with 1,480 MW of generating capacity. With a total capacity of 2,094 MW, Colstrip Station became the second-largest coal-fired power plant in the western United States and the largest in Montana.

During construction, Rosebud County's population more than doubled, rising from roughly 6,000 in 1970 to more than 13,000 in the mid-1980s. Following the completion of Units 3 and 4, population abruptly dropped by several thousand, settling just below 10,000 residents in the 2000s. Coal production from the Rosebud mine, which provides all of the plant's fuel, has varied since the 1980s, but in recent years, output has hovered near its lowest levels in decades (Figure 1).

1 It is unclear why the town is named "Colstrip" rather than "Coalstrip," though the word "coal" is derived from the Middle English word "col."

Figure 1. Rosebud County Population and Rosebud Mine Coal Production



Data sources: US Census; EIA (2020a). Note: Coal production data available only from 1983 through 2018.

In recent years, as coal-fired power has come under increasing pressure from low-cost competitors, including natural gas, wind, and solar, Colstrip Station has become less competitive, leading to a reduction in power production and associated coal mining. In 2010, Colstrip Station generated more than 16,000 gigawatt-hours (GWh) of net electricity, its highest level, but annual production declined to roughly 13,000 GWh from 2016 to 2019 (EIA 2020b). At the Rosebud mine, employment hovered near 400 workers from 2005 through 2016 but dipped to a low of 320 in late 2017 (MSHA 2020).[2] Colstrip represents an outsized share of the coal industry in Montana. As of 2017, the power plant employed nearly 80 percent of Montana's coal power plant workforce, while the Rosebud mine employed more than 35 percent of the state's coal miners (Nowakowski 2018).

This year, following a legal settlement related to the installation of emissions control technologies under the Clean Air Act (Section 1.3), Units 1 and 2 shut down, reducing the plant's capacity by 29 percent. The future of the plant's remaining two units is highly uncertain, as we discuss in the sections ahead.

2 More recent mine-level employment data are not available at the time of this writing.

1.1. Transition Challenges for Colstrip

For rural and remote coal-reliant communities like Colstrip, a shift away from fossil energy implies major social and economic transitions. Rural communities often have limited capacity, networks, and resources to navigate shocks such as the closure of a major employer. When these shocks occur, communities may experience a structural shift in employment and economic opportunity. The isolation and distance from population centers limits opportunities to participate in the knowledge and service-based sectors, which are increasingly concentrated in urban locations (Rasker et al. 2009). In addition, the loss of local tax revenue can affect government's ability to provide services and maintain relatively low tax rates for residents (Haggerty et al. 2018).

The town of Colstrip and Rosebud County are heavily reliant on coal for employment, economic activity, and public revenues. In 2017, the taxable value of all property across Rosebud County was roughly $95 million, $76 million of which was accounted for by the power plant, coal mine, and associated property. Units 1 and 2 represented $22 million of this taxable value, meaning that the closure of these units erased roughly 24 percent of the county's property tax base (importantly, subsequent increases in the local property tax rate may mean that county revenues would not experience such a sharp drop). As shown in Figure 2, power plant property makes up an even larger share of the local tax base for Colstrip schools (Wagner 2018). However, state tax laws known as "equalization" mean that revenues raised from property taxes in other counties would help offset revenue shortfalls in Colstrip, limiting local losses (Montana Office of Public Instruction 2020).

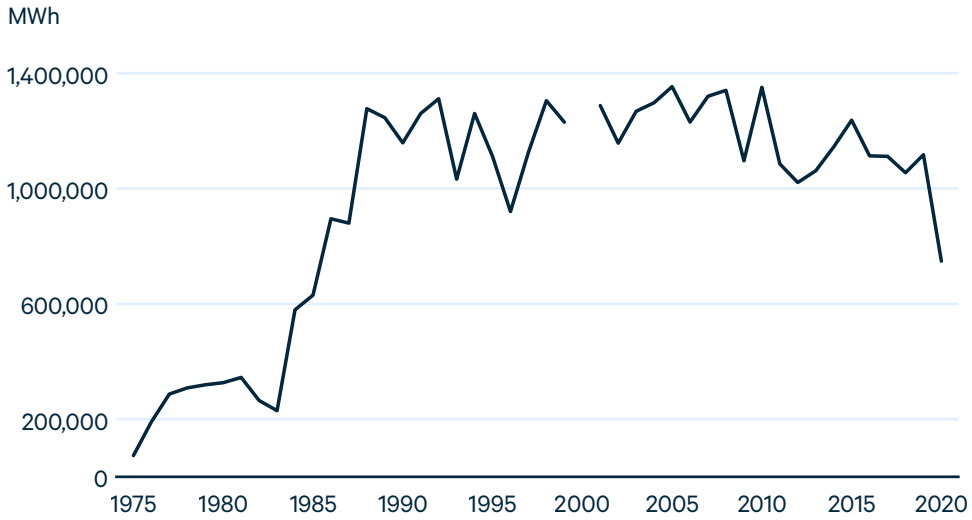
Figure 2. Local Taxable Property Values, 2017

Data source: Wagner (2018).

Local governments will experience other major changes in revenue due to the closure of Units 1 and 2. Lower coal production driven by the closures will reduce the federal and state royalties and taxes that have flowed to Rosebud County for years. The state estimates that these will include annual losses of roughly $460,000 in federal mineral royalties and $900,000 in state coal taxes, though the ultimate level of losses will depend on coal prices, which form the base of the tax (Wagner 2018). For context, total revenue from all sources for Rosebud County in 2018 was $12.6 million (Montana Legislature 2020). However, these losses could be partly offset by an increase in payments in lieu of taxes (PILTs), which could rise by roughly $750,000.[3]

The closure of Units 1 and 2 has dramatically affected Colstrip's electricity output. As shown in Figure 3, monthly power generation fell by 33 percent in the first half of 2020, reaching its lowest level since 1985.

Figure 3. Colstrip Power Plant Average Monthly Net Electricity Generation



Data source: EIA (2020b). Notes: No data available for year 2000. 2020 data are preliminary, January through May only.

Another potential challenge relates to water infrastructure. The town's fresh water comes from the Yellowstone River and is transported via a 30-mile pipeline constructed by Montana Power in 1974. Ownership of the water rights has changed over the years, but today, the water rights and infrastructure are shared by the City of Colstrip and the power plant's six owners (City of Colstrip 2020b). If the plant's remaining two units are retired, the ownership, operation, and maintenance of this infrastructure would be a key concern, leading community leaders to seek a long-term agreement that would expand the water rights to the city (Colstrip City Council

3 A recent analysis prepared for Montana's Financial Modernization and Risk Analysis study estimates that the county's annual PILT payment could increase by more than $750,000 (Haggerty 2020).

Chambers 2018). However, such an arrangement would not necessarily address who pays for the maintenance and operations of the infrastructure, an issue that has arisen in other natural resource–dependent communities (e.g., Raimi and Newell 2016; Smith et al. 2019).

1.2. Complex Ownership Structure Adds to Uncertainty

The complexity of Colstrip Station's ownership portfolio has created additional challenges for the community as it navigates closures and uncertainty. Because the plant's six owners face varying regulatory, economic, and social conditions, they each have different incentives that affect their decisionmaking. The varying approaches taken by plant owners have exacerbated the uncertainty over when and whether Units 3 and 4 will close, making it difficult for local stakeholders to plan for a potential transition (Haggerty et al. 2018).

To understand this dynamic, it is useful to review the history of the plant's ownership. In 1972, the Montana Power Company partnered with utilities in Washington and Oregon to develop Colstrip's mines and generating facilities (Haggerty et al. 2017). Along with MPC, Seattle-based Puget Sound Electric (PSE) was an original partner in Units 1 and 2. The construction and ownership agreement for Units 3 and 4 involved six entities with varying levels of investment: MPC, PSE, Washington Water and Power, Portland General Electric (PGE), Pacific Power and Light, and Basin Electric (Coal Transportation Agreement 1981). Over time, companies have invested and divested from Colstrip, and some have changed names.

In 1997, Montana deregulated its electricity sector (Martin and Everts 2002), which enabled MPC to sell its generating assets to Pennsylvania Power and Light (PPL) and divest its ownership of the town. Until that point, Colstrip was a true "company town." It was officially incorporated in 1998, technically becoming the state's newest town despite its decades of history[4] (City of Colstrip 2020a). In 2015, Talen Energy, an independent power producer operating plants in multiple US power markets, acquired PPL's assets, including Colstrip Station (Brown 2015), and is the plant's operator.

When Units 1 and 2 were retired, six entities retained ownership shares in Colstrip's remaining units: Talen, PSE, PGE, Avista Corporation, PacifiCorp, and NorthWestern Energy (NWE). Each of these companies, with the exception of Talen, is an investor-owned utility.

Colstrip Station obtains all its fuel from the Rosebud mine, previously owned by Westmoreland Mining Company, which filed for bankruptcy in 2018. In 2019, the company emerged as Westmoreland Mining, LLC, which was created by Westmoreland

4 For company towns such as Colstrip, divestiture of ownership and services could exacerbate challenges of resource dependency (Commander 2018). Though an important aspect of Colstrip's situation, the impact of MPC's divestment is not the focus of this report.

Mining Company's first lien creditors (Lutey 2019). A coal supply agreement has been in effect between Colstrip Units 3 and 4 owners and Westmoreland Mining Company since 1998 and was recently renewed through 2025 (Westmoreland Mining, LLC 2019), creating at least one point of certainty for the community.

1.3. Closing Units 1 and 2 Highlights the Risk of Future Closures

The closure of Units 1 and 2 was driven by a mix of ad hoc legal efforts and market factors. In March 2013, the Sierra Club and the Montana Environmental Information Center sued the plant's owners,[5] alleging that they had violated the Clean Air Act by undertaking major repairs without obtaining permits that would have required installation of additional pollution controls. In July 2016, the parties entered into an administrative order on consent (AOC) requiring Units 1 and 2 to cease operations by July 1, 2022 (Montana DEQ 2012). In June 2019, Talen announced that Units 1 and 2 would be permanently retired two years early because of financial challenges, citing an inability to renegotiate fuel costs with the Rosebud mine operators (Talen Energy 2019).

The future of Units 3 and 4 is unclear and, as noted above, complicated by the owners' different decisions over when to exit the plant. One key driver of these varying timelines is differing regulatory and policy environments for plant owners based in Oregon and Washington, states that are seeking to phase out coal-fired power.

In March 2020, the Washington Utility and Transportation Commission (WUTC) approved the acceleration of depreciation of Avista Corporation's ownership share of Colstrip Units 3 and 4 through December 31, 2025.[6] WUTC has also approved PacifiCorp's accelerated timeline for exiting ownership of Units 3 and 4, from 2046 to 2027 (PacifiCorp 2019). To meet the requirements of Oregon's SB 1547, PGE will fully depreciate Units 3 and 4 by the end of 2030 and remove them from its portfolio by the end of 2034 (PGE 2019). PSE will need to exit ownership of Units 3 and 4 to comply with Washington State's Clean Energy Transformation Act, which requires all electric utilities in the state to eliminate coal-fired electricity by 2025.[7]

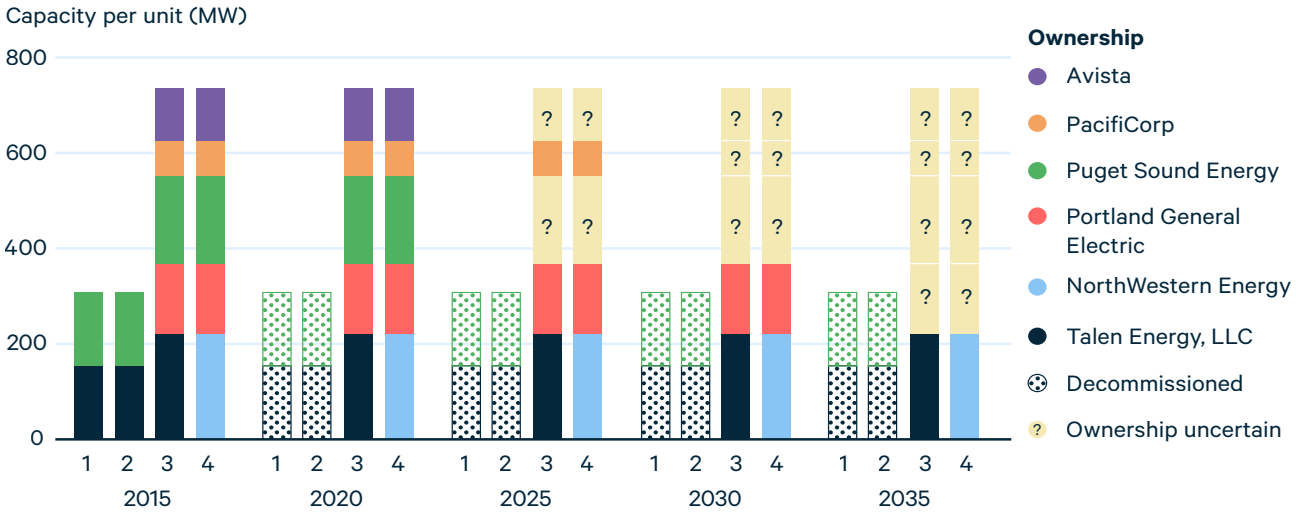
Figure 4 illustrates the complex, shifting, and uncertain nature of Colstrip's ownership structure. The stippled areas represent the closure of Units 1 and 2, and the gray areas with question marks indicate the ownership shares that are expected to be divested by various companies in the years ahead.

5 Sierra Club and MEIC v. PPL Montana LLC, et al. (2013).

6 Avista Corporation, US Securities and Exchange Commission Form 8-K, 2020.

7 An Act Relating to Supporting Washington's Clean Energy Economy and Transitioning to a Clean, Affordable, and Reliable Energy Future, SB 5116, State of Washington Legislature (2019).

Figure 4. Colstrip Ownership Shares, 2015–2035



Data sources: Avista Corporation, US Securities and Exchange Commission Form 8-K, 2020; Pacificorp (2019); PGE (2019); Talen (2019); WUTC (2017, 2019).

It is possible that buyers will emerge to take on the shares vacated by these exits. However, the long-term uncertainty surrounding coal-fired power in the United States, along with the specific challenges facing Colstrip, dim this prospect.

In 2019, NWE filed an application with the Montana Public Service Commission for preapproval to acquire PSE's 25 percent interest in Colstrip Unit 4 for $1 (Larson 2019). Talen, which had first right of refusal to purchase assets divested by PSE, sought to purchase half of PSE's 25 percent share of Unit 4. The sale to NWE and Talen, where each firm would pay $0.50, needed approval from both the Montana Public Service Commission and WUTC. Arguing that the sale would not be in the best interest of the public, WUTC staff recommended that PSE's request to sell Unit 4 be denied, followed by PSE's cancellation of the sale in late October 2020 (WUTC 2020b).

This situation highlights the central challenge faced by the community: planning for the future becomes all but impossible when there is deep uncertainty over not only *whether* the plant is retiring, but *when*.

1.4. Uncoordinated and Limited Transition Planning Efforts Have Created Challenges

No federal or Montana state law mandates advanced planning for the social and economic impacts of power plant or mine closure (though there are requirements for environmental remediation planning). New policies, such as those beginning to be

implemented in Colorado[8] and New Mexico,[9] include funds to support local transition activities, such as planning, workforce development, and reporting requirements for plant owners. In the absence of centralized transition planning in Colstrip, a variety of actors—including community stakeholders and some plant owners—are taking measures to support the community in navigating the transition.

After the closure of Units 1 and 2 was announced in 2016, three distinct proposals emerged to address Colstrip's future. These efforts covered a wide range of approaches, reflecting the differing priorities of local and regional stakeholders, from a traditional comprehensive economic development strategy process aimed at economic diversification (SEMDC 2017), to a plan for local stakeholders to press for new federal efforts to maintain the viability of coal-fired power and mining nationwide (Taimerica Management et al. 2017), to a plan focused on job creation driven by cleaning up a legacy of local groundwater pollution (Northern Plains Resource Council 2019).

In parallel—though not in coordination—with those planning efforts, some plant owners have established funds to support transition efforts as part of their negotiations to exit ownership of Colstrip Station. The first of these efforts emerged in 2017 during rate case negotiations between WUTC and PSE.[10] The resulting settlement required PSE to contribute $10 million for community transition planning and prompted the creation of the Colstrip Community Impact Advisory Group (CCIAG), which was convened "to develop a community transition plan to address future closures at the Colstrip Generation Plant" and included state and local officials, community leaders, and labor and economic development organizations (Montana Governor's Office 2017).

The approved CCIAG draft plan provides for the establishment of a seven-member board tasked with distributing the community impact funds provided by PSE to projects that support workers and enhance local economic development. The CCIAG plan includes two funds: $7.5 million for issuing grants and short-term loans supporting worker assistance, economic diversification, and tax base replacement; and a $2.5 million endowment, the proceeds from which would be used for future grants and loans (CCIAG 2018).

A second effort, the result of a partial settlement between Avista Corporation and WUTC, requires the company to contribute $3 million to a Colstrip Community Transition Fund, to be shared among the town, Rosebud County, and the Northern Cheyenne Tribe (WUTC 2018). As of this writing, it is not yet clear how this fund will be administered and distributed.

Looking forward, additional planning and funding will likely be needed to support any effective transition initiative. For example, one effort in Washington State (the

8 Just Transition from Coal-Based Electrical Energy Economy, HB19-1314, Colorado General Assembly (2019).

9 Energy Transition Act, SB 489, New Mexico Legislature (2019).

10 WUTC v. PSE, UE-170033 and UG-170034, before the Washington Utilities and Transportation Commission (2017)

Centralia Coal Transition Fund) offers $55 million to support local transition efforts (State of Washington 2011); in New Mexico, $50 million has been set aside to support environmental remediation, severance pay, and job training in and around one community where a large coal-fired plant is slated to close.[11]

In addition to securing transition funds, the City of Colstrip will need to address the impacts of potential revenue losses outlined above. The concept of "right-sizing," or aligning public resources with changing population levels, is one strategy to maintain fiscal health in cities experiencing decline (Hummel 2015). For right-sizing to be effectively implemented, residents, local leaders, and planners would need to agree to the difficult proposition that the city will shrink (Ehrenfeucht and Nelson 2011). Though the CCIAG plan identified the impacts of plant closure, right-sizing strategies, such as participatory budgeting, have yet to play a prominent role in public discussions in Colstrip (CCIAG 2018; Just Transition Fund 2020).

One option that could, in theory, enable the continued operation of the Colstrip plant in a carbon-constrained future would be the addition of carbon capture, use, and storage (CCUS) technology. However, a study commissioned by the US Department of Energy and completed in 2018 (but only made public in 2020) found that deploying CCUS would require roughly $1.3 billion of upfront investment and more than $100 million in annual operating costs (Leonardo Technologies, Inc. 2018). Despite the availability of federal tax credits for CCUS deployment, these high costs led the study authors to conclude that undertaking such a project may not be financially viable.

11 *Energy Transition Act,* SB 489, New Mexico Legislature (2019).

2. Policy Interventions to Support Colstrip

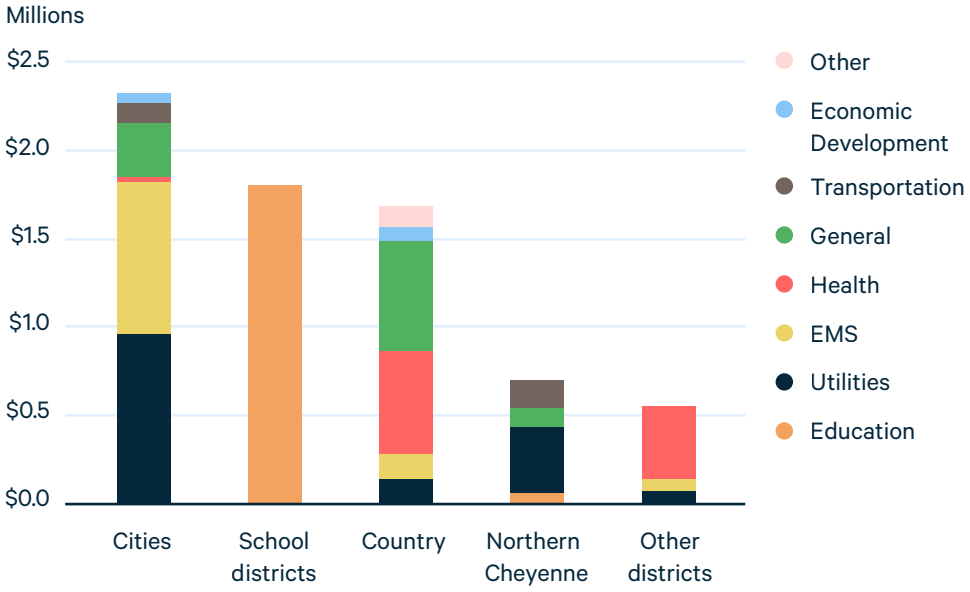
For several decades, state and federal funds have been directed toward Colstrip and the surrounding region to support economic development planning, infrastructure, and other key services. In addition, several pieces of legislation have been proposed and enacted that have considerable bearing on the future of the plant, mine, city, and region. This section provides an overview of some of these interventions, including state and federal efforts, over roughly the last 10 years.

2.1. State Interventions

Montana has taken a variety of initiatives to support the Colstrip region. Some of the clearest efforts have come from the Montana Coal Board, which was established in 1975 to allocate funds raised from the state's severance tax on coal production. The board is tasked with supporting "local governmental units that have been required to expand the provision of public services as a consequence of large-scale development of coal mines and coal-using energy complexes or as a consequence of a major decline in coal mining." (Montana Code Annotated 2019). The seven-member board meets quarterly to consider applications and award grants for infrastructure planning, health care, and other local services.

In the past decade, the board has awarded more than $7 million to governmental entities in Rosebud County: the cities of Colstrip and Forsyth, local school districts, Rosebud County, the Northern Cheyenne Tribe, and other taxing units such as fire districts (Montana Department of Commerce 2020). Grants to cities have primarily supported utilities and emergency services (including law enforcement), followed by grants to school districts. Grants to Rosebud County have primarily supported health programming and general expenses such as building construction. Across all grants, just $130,000 (1.9 percent) was awarded to projects with an explicit economic development focus (Figure 5).

Figure 5. Montana Coal Board Grants to Rosebud County Governments, 2009–2020



Data source: Montana Department of Commerce (2020). Notes: Data through March 2020. EMS includes fire and law enforcement.

Along with funding direct support from the coal board, the state has considered and enacted numerous pieces of legislation with significant bearing on Colstrip's future. These bills have focused on aspects of the state's coal transition: addressing or managing remediation and timing of power plant closure, linking that process to social and economic transition efforts, and preventing an early closure. Table 1 identifies these bills, notes whether they have been enacted, and provides a brief description. The discussion that follows provides additional detail.

To ensure public and environmental health for long-term rural economic development (BenDor et al. 2015; Haggerty et al. 2018; Hibbard and Lurie 2013), and in light of the many uncertainties surrounding the future of Colstrip, state legislators have enacted several bills focused on the decommissioning, remediation, and environmental reclamation of coal mines and power plants. For example, the 2017 Coal-Fired Generating Unit Remediation Act (SB 339) required Colstrip's operators to submit an environmental remediation plan and outline the standards and extent of the cleanup they planned to pursue. In 2019, SB 264 amended the act to include labor standards, including prevailing wage standards, for workers carrying out these activities.

Table 1. Recent Montana Legislation Addressing Coal Facility Closure

Bill No.	Year	Status	Description
SB 339	2017	Enacted	Establish Coal-Fired Generating Unit Remediation Act
HB 22	2017	Enacted	Appropriate money to assist, intervene, plan for closure of coal-fired generation
HB 585	2017	Enacted	Provide loans to owner of coal-fired generating units
SB 338	2017	Not enacted	Propose Coal-Fired Generating Unit Mitigated Retirement Act
SB 191	2019	Enacted	Allow counties to establish coal trust fund
SB 201	2019	Enacted	Revise requirements to hold mining permit
SB 264	2019	Enacted	Revise laws related to coal-fired generation remediation activities
HB 292	2019	Enacted	Increase funding to coal board
HB 467	2019	Enacted	Authorize securitization for energy infrastructure
SB 33	2019	Not enacted	Allow NWE to purchase additional 150 MW share of Unit 4 of Colstrip Station for $1
SB 331	2019	Not enacted	Revise electric utility cost recovery for certain coal-fired generating units and transmission

Proposed and enacted legislation has also addressed the need for long-term planning in Colstrip, consistent with recent research emphasizing the importance of providing more certainty about closure dates to facilitate transition planning (Roemer and Haggerty, forthcoming). However, as discussed in Section 1, considerable uncertainty remains about the timing and owner obligations of closing the plant. In 2017, HB 22 enabled state officials to represent Montana's interests in the settlement negotiations between PSE and WUTC, focused on decisions about decommissioning, remediation, and power replacement. That same year, SB 338—which was not enacted—would have required plant owners to file a retirement plan, allow for the development of a transition agreement, and create a retirement planning and grant program and account. In 2019, HB 467 authorized securitization for energy infrastructure, allowing electric utilities to raise revenue through bonds, lowering the costs of retiring or replacing assets. This approach, which has garnered interest in numerous states (Bodnar et al. 2020), could provide substantial revenue to support transition efforts in and around Colstrip.

Other legislation has focused on the economic impacts for affected communities. In 2019, HB 292 increased the share of the state's coal severance tax that is allocated to the coal board. In 2019, SB 191 allowed Rosebud and Big Horn counties to establish a coal trust fund, addressing a common challenge for resource-dependent counties, which often have limited fiscal autonomy and capacity to collect, save, and distribute natural resource revenues (Newell and Raimi 2018; Haggerty 2019).

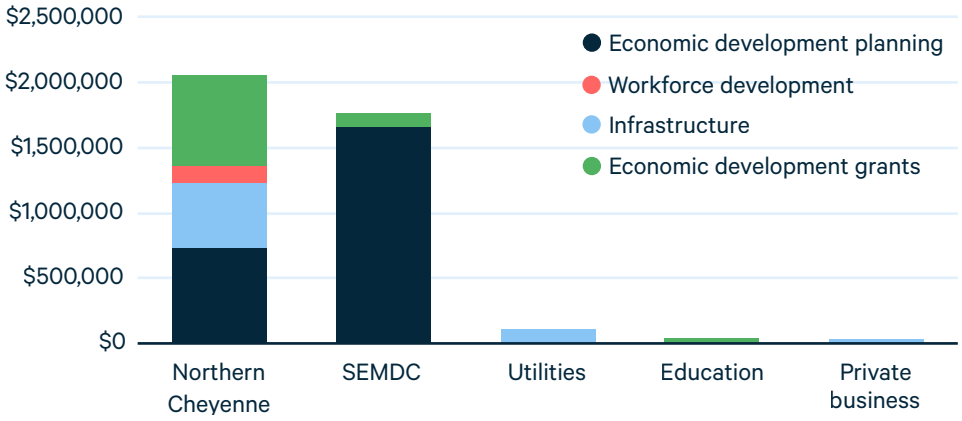
Finally, in contrast to efforts aimed at managing the closure of Colstrip, some recent legislation has sought to prevent or limit the decline of coal in Montana. In 2017, HB 585 allowed the state's Coal Severance Tax Trust Fund, which was originally designed to support infrastructure and economic development needs, to potentially provide loans to facilitate the continued operation of coal-fired power generation in Montana. In 2019, the "Save Colstrip" bill (SB 33) would have allowed NWE to purchase an additional 150-MW share of Unit 4 of Colstrip Station for $1 (Cates-Carney 2019). The proposal, which was not enacted, would have given NWE more control over the retirement date of Unit 4, which it has expressed interest in operating through 2045 (NWE 2019).

2.2. Federal Interventions

Along with those significant efforts at the state level, the federal government has provided consistent, if modest (roughly $4 million total from 2001 to 2018), support for regional economic development (Figure 6). The US Economic Development Administration has awarded annual grants to local and tribal entities for the continuation of their comprehensive economic development strategies as well several small grants for infrastructure projects. The USDA Rural Business-Cooperative Service has also been involved in the region, primarily through Rural Business Development Grants and the Rural Energy for America Program.

These funds have flowed primarily to the Northern Cheyenne Tribe and the Southeastern Montana Development Corporation, the regional economic development planning organization. The majority of the funding ($2.4 million) has supported economic development planning, economic development grants to businesses and other local entities ($850,000), and infrastructure development ($640,000).

Figure 6. Federal Economic Development Funds for Rosebud County, 2001–2018



Data source: USASpending (2020). Note: SEMDC = Southeastern Montana Development Corporation.

In addition to these grants, the federal government has provided funds to Colstrip and other Montana coal communities through the Partnerships and Opportunity Workforce and Economic Revitalization (POWER) Initiative. In 2017, the state Department of Labor and Industry was awarded $2 million, which has been distributed across worker retraining programs operated by local unions and higher educational institutions (Montana Department of Labor and Industry 2020). However, deploying these programs has been slowed by restrictions on eligibility, particularly the requirement that workers must be unemployed to enroll in a retraining program.

3. Local Environmental Issues and Opportunities

Like all coal-fired power plants, Colstrip generates significant quantities of waste products, particularly coal combustion residuals (CCRs), often referred to as "coal ash." CCRs are typically stored in "dry" landfill-type structures or "wet" ponds, which, if not constructed and managed properly, can contaminate local water resources.

Colstrip's network of CCR impoundments, which in the past mostly consisted of ponds, exceeds 800 surface acres (Northern Plains Resource Council 2019), and numerous legal proceedings have documented an extensive legacy of groundwater contamination. Although small amounts of contamination were anticipated by the Montana Department of Environmental Quality (DEQ) when the ponds were permitted in the 1970s, the extent of groundwater pollution has substantially exceeded those expectations, and previous efforts to prevent the spread of contaminated water have failed (Montana DEQ 2020). In 2008, Colstrip's owners settled a lawsuit brought by 57 individuals over water contamination associated with ash ponds, paying out $25 million to the plaintiffs (Halstead-Acharya 2008). In 2012, the owners entered into an AOC with DEQ that requires the remediation of this pollution (Montana DEQ 2012).

The remediation process has required extensive study of local hydrogeology and produced reports documenting the spread of the pollution, finding that the plume has spread under parts of Colstrip and numerous nearby creeks (Montana DEQ 2020). For example, a 2019 report carried out as part of the AOC found that the levels of boron, cobalt, lithium, and molybdenum at nearby monitoring locations were substantially higher than background levels (Hydrometrics, Inc. 2020).

The AOC requires that Colstrip's owners take numerous actions to reduce future leakage, monitor groundwater conditions, and address contamination where it is detected. This includes the addition of new synthetic liners to CCR impoundments and the installation of evaporation systems to reduce water volumes at ash ponds, limiting the risk of future leakage. In addition, the owners are required to install capture systems and pumping equipment at sites where the plume is detected. As of early October 2020, the Montana DEQ has provided conditional approval to multiple aspects of the cleanup plan, and public comments are being collected (Montana DEQ 2020).

3.1. Environmental, Health, and Economic Impacts of Air and Water Pollution

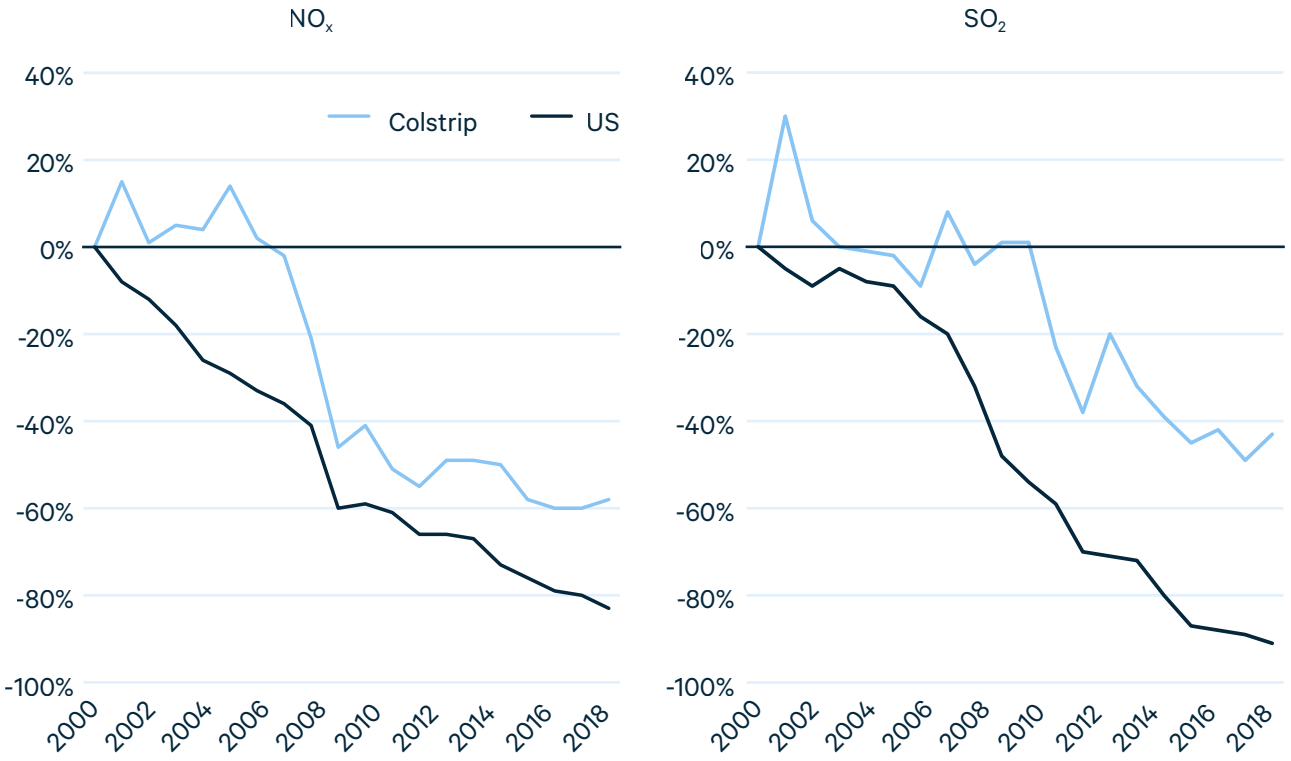
Groundwater contamination in Colstrip not only affects local ecosystems through its connection with streams, it also poses a potential risk to the health of Colstrip's residents and economy. As noted above, some of the plume extends beneath homes

in Colstrip, and failure to halt further spread could contaminate groundwater under additional homes (though, as noted above, Colstrip's municipal water is supplied via a pipeline from the Yellowstone River).

In addition to risks associated with water, air emissions from coal-fired power plants contribute to respiratory and cardiovascular illness, causing large morbidity and mortality impacts around the world (Rauner et al. 2020). In the United States, modern coal-fired power plants include equipment to reduce these pollutants considerably, but they do not eliminate all emissions of concern, including nitrogen oxides (NOx), a precursor to ozone formation and fine particulate matter (PM), and sulfur dioxide (SO2), also a PM precursor (e.g., Henneman et al. 2019).

In Colstrip, pollution controls and reduced output have contributed to declines in these pollutants since 2000. However, SO2 and NOx emissions from the Colstrip plant have lagged reductions seen nationwide (Figure 7).

Figure 7. Nitrogen Oxides and Sulfur Dioxide Power Plant Emissions



Data source: EPA (2020a).

Additional data from the Environmental Protection Agency's Toxic Release Inventory database indicates that emissions of other chemicals of concern have declined considerably over roughly the past decade. In particular, air emissions of chromium and chromium compounds, which can increase risk of cancer and other diseases and have been the largest contributor to health risks from Colstrip's air emissions,[12] declined by more than 75 percent from 2007 to 2018 (EPA 2020b).

Unfortunately, we are not aware of any studies that have examined the specific effects of water contamination or air emissions on the health of Colstrip residents. But in general terms, health risks—whether from water pollution, air pollution, or other sources—are often reflected in economic outcomes such as property values. A substantial body of research demonstrates that polluted sites considerably reduce the value of nearby property (Gamper-Rabindran and Timmins 2013; Guignet et al. 2016; Haninger et al. 2017; e.g., Zabel and Guignet 2012). And studies that demonstrate reduced property values because of pollution may underestimate the true health risks for residents, particularly if people do not have full information about the extent of local pollution (Hausman and Stolper 2020).

To the extent that air and water pollution harms the health or quality of life for Colstrip residents, some of these effects are likely reflected in lower property values. Of course, the closure of the power plant—without a new source of local employment and prosperity—would severely damage the local economy and reduce property values. As suggested in Section , these effects could be far more consequential than any reductions caused by pollution.

In sum, reduced air pollution from the Colstrip station has likely reduced public health risks, but the continuation of some of these air emissions coupled with the legacy of groundwater contamination poses ongoing concern for the local environment and local public health.

3.2. Economic Potential of Remediation

Access to a healthy environment, including clean water, is a prerequisite for long-term economic growth. Recognizing this reality, state legislators, plant owners, and other stakeholders have examined options for addressing the groundwater contamination in Colstrip. In addition to the long-term necessity of managing this legacy, cleaning up groundwater in Colstrip in the near to medium term will require considerable resources, offering potential economic benefits for community members.[13]

12 Chromium and chromium compound emissions accounted for more than 97 percent in 2007 and 84 percent in 2018 of air emissions' health risk, as measured by their Risk-Screening Environmental Indicator scores (EPA 2020b).

13 For explorations of a "restoration economy" or a "new natural resource economy," where environmental remediation boosts economic activity nationwide, see BenDor et al. (2015) and Hibbard and Lurie (2013), respectively.

In the short to medium term, plant decommissioning and environmental remediation efforts would offer business and employment opportunities. In the medium to long term, benefits would include reducing community health risks and enhancing property values, along with continuing (though more modest) employment opportunities associated with site cleanup and monitoring. One recent report (Northern Plains Resource Council 2019) assesses two options for pond closure and groundwater remediation, estimating that Talen's plan would cost roughly $400 million through 2069, while a "Doing It Right" plan would cost $925 million over the same period.[14] Intuitively, the authors estimate that a higher level of investment would lead to more local jobs and higher incomes throughout the duration of cleanup and monitoring, which would likely provide ancillary benefits to the community as a whole.

One key question is whether employment opportunities generated from remediation activities would support workers displaced from jobs at Colstrip Station or the Rosebud mine. Although some activities (e.g., earth moving, project management) would be well matched to the skill sets of some plant and mine workers, other jobs (e.g., groundwater modeling and monitoring) are not a clear match. It is unclear whether and to what extent state policymakers would be able to ensure that remediation jobs benefited the local workforce and community.

14 Note that this analysis was produced before Talen's final remediation plan had been approved.

4. Discussion and Key Insights

For isolated rural communities such as Colstrip, the decline of coal poses enormous challenges and raises questions about the future viability of the community. The town, which was purpose-built for producing coal, is overwhelmingly reliant on its mining, processing, and use. At the same time, the waste products generated from burning that coal have created significant environmental degradation that poses another long-term challenge to Colstrip's public health and economy.

Colstrip is not a unique case. Other cities and towns, particularly isolated communities in the West such as Craig, Colorado, and Mercer, North Dakota, face similar challenges from the closure of coal-fired power plants and mines. Additional cities and towns, less isolated but still heavily reliant on coal, oil, or natural gas to sustain local economies, may face similar—albeit less acute—challenges in the years and decades ahead.

To help support communities in transition, we offer several key insights from the Colstrip experience for policymakers, community leaders, and other stakeholders:

- **Deep uncertainty makes planning difficult, if not impossible, for communities in transition.** For Colstrip, this uncertainty stems from complex ownership structures and competing priorities for policymakers in Montana and nearby states. In the absence of certainty, some state and local efforts have focused on maintaining the status quo rather than proactive planning, ultimately hindering the ability to facilitate a successful transition (see Section 2.1).
- **Future climate policy can support planning efforts** in communities like Colstrip by aiming to provide some indication about the timeline of emissions reductions, thereby informing decisions about the timing of plant or mine closures. In addition, state and federal policymakers could support local planning efforts directly, by providing funds and technical assistance that takes advantage of existing economic development resources.
- This case demonstrates that funding for transition planning often emerges from ad hoc, uncoordinated processes playing out in boardrooms and state utility proceedings and among local stakeholders. **Planning efforts would be enhanced if communities, regulators, plant operators, and others coordinated their activities and funding decisions with clearly defined goals**, similar to the approach recently established in Colorado and New Mexico.
- **In the absence of certainty and coordination, much of the responsibility for transition planning, including the need to find funding to support these efforts, falls on the local community**. However, not all communities have the capacity or inclination to take a proactive planning approach, reducing the likelihood of developing and implementing a successful transition strategy. Policies that build local capacity, such as technical assistance or grants to support planning processes, could increase communities' ability to plan proactively.

- Isolated communities in transition may face a declining population and shrinking tax base in the years ahead. If so, local stakeholders need to **consider how to right-size government services and develop new, if more modest, drivers of local employment and prosperity.**
- **Environmental remediation activities, including cleaning up polluted groundwater and reclaiming mines, have the potential to provide short- and medium-term employment opportunities.** However, absent more detailed information on the benefits associated with different levels of remediation, it is unclear what the "right" level of investment should be to carry out these activities. Additional research to better characterize the environmental, health, and other benefits of remediation would help inform these decisions.

5. Conclusion

Socioeconomic vulnerability to the decline of the coal industry varies widely, but in the US West, it is associated with rural communities in remote, isolated geographies. For communities like Colstrip, Montana, the decline of the coal industry poses acute economic impacts, including structural changes in employment and significant declines in revenue that threaten the viability of the town's critical institutions, services, and infrastructure. In Colstrip, transition planning efforts led by local stakeholders have been hamstrung by uncertainty about whether and when the plant will close, which is exacerbated by the plant's complex ownership structure.

Although the state of Montana has a clear set of policies addressing planning for coal plant decommissioning and environmental remediation, it has not provided substantial resources or a framework that facilitates planning for the social and economic impacts of closure. This is in stark contrast to recent state policies enacted in Colorado and New Mexico. Federal grantmaking has provided some support for economic development planning and workforce retraining in the region, but these efforts have been modest, and some grants have come with restrictions that limit their effectiveness in supporting worker retraining.

By characterizing the transition process under way in Colstrip, this case study highlights the challenges facing communities whose economies depend on coal. It illustrates the need for a planning framework that can enable workers, communities, governments, and businesses to coordinate their efforts in planning for the future and identifies some of the roadblocks to that coordination.

Policy interventions aimed at mitigating the social and economic impacts of an energy transition—whether away from coal or any other energy source—can support workers and communities by providing additional certainty over funding and timelines. In addition, policy efforts can support workers and communities by coordinating regional resources to plan for transitions that are region- and context-specific, including the potential for linking environmental remediation activities with local economic development and employment opportunities.

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