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Planning for the local impacts of coal facility closure: Emerging strategies in the U.S. West

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ABSTRACT

This study considers the contours of the coal transition in the United States from the perspective of local planning responses to coal plant retirements in the U.S. West. Plant closures in the region affect a diverse set of geographies and have developed in a complex, uncoordinated policy environment. The study applies an assessment framework informed by economic geography and community planning scholarship to a dataset of 12 planning documents written by and for local communities experiencing coal facility closures. The findings highlight the absence of effective strategies to address lost local revenues, lack of connections between environmental quality and long-term economic resilience, and a range of levels of acceptance of the coal transition. Together, the plans demonstrate the negative consequences of an uncoordinated, contradictory policy environment for transition planning at the local level and the need for policy interventions to address issues of equity and efficiency in this process.

1. Introduction

Along with many advanced economies, the United States is undergoing a major energy system transition characterized by widespread retirement of coal-fired electricity generation facilities. In less than a decade and half—between 2009 and 2025—the U.S. will retire roughly one-fifth of its coal power plant fleet (U.S. Energy Information Administration [EIA], 2017a). These developments pose immediate challenges for the localities and regions that host coal-fired power plants. For example, affected municipalities need to plan for the loss of coal employment and tax revenue while ensuring thorough decommissioning and remediation of a major industrial facility (Raimi, 2017). The fate of coal-dependent communities is an important challenge for contemporary resource policy. Though they are few, coal-dependent communities have come to symbolize the fate of the industrial economy of the U.S. in national political debates (Grunwald, 2017). In addition, successfully addressing the social, economic, and environmental legacies at coal facilities is a normative priority of policy actors and natural resource scholarship in the “just transition” arena (Newell and Mulvane, 2013).

This paper offers a characterization and assessment of strategies that are emerging to respond to the impacts of coal power plant closures in the continental U.S. West, where approximately ten percent of U.S. coal

plant closures are occurring. Encompassing 12 continental states,¹ the West has a unique history in U.S. energy systems that entails having undergone massive and rapid development of new power plants and mines in the 1970s and 1980s in response to the region's post-war urbanization; national concerns about fuel scarcity and energy independence; and federal mandates for low-sulfur coal (Robertson, 1979; Hayes, 1980; Wilkinson, 1999). Home to many sovereign indigenous nations, featuring high volumes of federally-owned land and mineral resources, and marked by extreme contrasts and spatial distances between fast-growing urban areas and isolated resource hinterlands, the West poses multiple concerns and challenges in energy transitions. The study focuses on the range of approaches in existing transition plans to address the specific social, economic, and environmental context of each community. This analysis is important because community planning responses will be one among several important influences on how local places navigate the economic transition after coal plants close.

The paper's analysis of local transition planning in the region has two components. First, we situate coal plant closures in the region's economic geography to assess the nature of social and economic vulnerability to plant closure impacts. Second, we analyze existing economic transition plans developed for affected communities (n = 12) based on a framework that synthesizes insights from applied economics,

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¹ Idaho, Washington, Oregon, California, Nevada, Arizona, New Mexico, Colorado, Utah, Wyoming, Montana, North Dakota. (Alaska is frequently considered part of the U.S. West, but is not studied in this review.)

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community development and rural sociology literatures. The assessment framework focuses on four strategies important for economic transition in different types of communities—revenue replacement, environmental reclamation, economic development, and acceptance of transition. We deploy this framework to assess if and how the economic transition plans identify and propose goals and actions that reflect critical development strategies that are appropriate to the community's economic context. The organization of the paper is as follows: [Section 2](#) contextualizes the economic geography of coal plant closures in the West; [Section 3](#) provides a conceptual framework for analysis based in the literature; [Section 4](#) shares the results of the analysis of local transition plans. A discussion of recommendations concludes the paper.

2. Context: coal plant retirements in the U.S. West

Between 2009 and 2017, 166 coal-fired power plants retired generators or closed entirely in the United States, reducing national coal-fired power generation capacity by 16% (EIA, 2017a). Facility retirement rates and lower utilization of the remaining fleet explain the sharp decline in U.S. coal demand for electricity generation, which declined by 24% from 2010 to 2015 (from 975 to 738 million tons) (EIA, 2016, 2017b). Coal mining employment fell by a similar share (23%) between 2008 and 2015. An additional 36 plants (12% of the remaining coal fleet) are scheduled to retire by 2025, further decreasing coal generating capacity by 8% (EIA, 2017a).

Both policy and market forces are influencing U.S. coal plant retirement rates. In the U.S. West, coal-fired power plants are closing due to competition from natural gas and renewable energy sources, stagnant overall electricity demand, and environmental regulations (Fleischman et al., 2013; Hourser et al., 2017). New air quality regulations were enacted in 2011 that limit mercury and other air toxics emissions from coal-fired power generators (the MATS Rule) (U.S. Environmental Protection Agency, 2016). Compliance requires expensive, pollution-control upgrades; and thus, plays a role in accelerating the timing of some plant closures, particularly for older, less efficient, and more-costly coal-fired plants (EIA, 2014). States, utilities, and consumers are also pursuing goals for cleaner, low-cost energy that put coal-fired electricity at a market disadvantage (Rabe, 2006). The recent rollback of climate policy and environmental regulations by the Trump Administration (Tollefson, 2017) is unlikely to reverse the fortunes of generating units already scheduled for retirement (U.S. DOE, 2017).

Using a combination of federal data² and informal interviews with regional policy experts, we identified 18 coal-fired power plants that have retired since the year 2009 or have scheduled retirements at one or more generating units (41 generating units in total). Only plants with combined generating thresholds of 75 MW or higher with owners classified as in the electric power sector or independent power producer category were included in the dataset. In many cases, retirement applies only to one of several generating units; any plant where one or more generating unit met the above criteria was included in our dataset. The 18 retiring plants have a combined generating capacity of 11.7 GW, one-third of the capacity that was operating in the West in 2000 (34.9 GW) (Map 1) (see Supplemental Material (SM) for list and details).

2.1. Regional factors

The physical and political geographies of the U.S. West's energy systems strongly influence dynamics of the coal transition in the region, particularly because they together imply highly complex policy and stakeholder landscapes. Coal-fired power plants in the West include

smaller facilities generating power near industrial and municipal consumers. These facilities may use coal transported by train from remote regions or local coal resources. In North Dakota, an agricultural state, lignite mines fuel small plants that contribute to the Midwestern electricity grid and local agricultural processing facilities. In addition, western states such as Arizona, Wyoming, and Montana are home to large mine-mouth facilities that export electricity to report urban centers in other states—typical of the “coal-by-wire” remote.

In the 1970s, the quest for energy independence and the demand for low-sulfur coal to address acid rain impacts in the eastern states encouraged a national energy policy focused on the rapid and extensive development of the vast coal resources of the Interior West and Northern Great Plains. National ownership of the coal resource made it possible to use federal policy to encourage rapid development of the new strip mines, railroads, mine-mouth power plants, and transmission lines in the 1970s and 1980s (Gerking and Hamilton, 2008). Federal-industry partnerships also played an important role in enabling the rapid development of a coal-based electricity infrastructure in the region. This infrastructure focused on using the resources of remote interior regions to meet the fast-growing energy needs of the region's booming metropolitan areas, located in a few interior cities (Phoenix, Denver, and Salt Lake City) and coastal hubs (Seattle, Portland, and Los Angeles).

In less than two decades, the West witnessed the build-up of a vast infrastructure that moves coal from the region's strip mines to power plants around the country via railroad; and electricity from interior coal-fired power plants to urban centers, especially on the West Coast. The result is one of the world's most spatially-extensive electricity grids; all of the U.S. West is a single electric interconnection (Map 1).

Shortly thereafter, the West was one of the leaders in the national movement to deregulate electricity markets, a disruptive event that shifted ownership and regulatory responsibility from states to market and private actors (Joskow, 2000). Subsequent energy market crises encouraged ‘re-regulation’ in several states where deregulation had produced adverse consequences. Yet the legacy of deregulation remains, primarily in the form of a continued role for outside investors (as owners of independent power producers and investors in publically-traded utilities) in the overall energy market of the region.

As a consequence of this history, neither the policy nor the stakeholder environment guiding transitions in the West is straightforward. Coal-fired power plant closures are occurring amongst a diverse array of ownership interests and political jurisdictions. Thirty-two unique entities have ownership in one or more of the 18 western coal plants that have retired or plan to retire generators. Among the 32 are 13 investor-owned utility companies, four independent power producers, four cooperatives, and a variety of public owners, including eight municipalities, the state of Arizona, and the Federal Bureau of Reclamation (Headwaters Economics, 2017a). A generator unit may have multiple owners, with the ownership portfolio varying across plant assets. For example, Montana's Colstrip facility has four units. Two units are owned by Talen Energy (an independent power producer (IPP)) and Puget Sound Energy (PSE, a regional investor-owned utility (IOU)). Ownership of Units 3 and 4 is divided among six entities: PacifiCorp (IOU), Avista (IOU), Portland General Electric (IOU), Talen Energy (IPP), PSE, and NorthWestern Energy (IOU) (Haggerty et al., 2017). The service territories of Colstrip's utility owners—and thus the range of stakeholders in facility planning—are diverse and include large metropolitan areas (Seattle, Washington, and Portland, Oregon) as well as rural areas of three states. An ownership base remote from the plant location is characteristic of the large coal-by-wire facilities across the West. The various types of plant owners have different incentives that come to bear on decision-making about end-of-life processes. For example, investor-owned utilities in the Western states typically work in a rate-of-return model overseen by elected or appointed state regulators, while independent power producers are more directly accountable to financial markets. Cooperatives and municipal entities operate under

² EIA-860 Monthly Electric Generator Inventory (<https://www.eia.gov/electricity/data/eia860m/>).

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