A History of Colstrip and Coal-Fired Electricity Generation for the Pacific Northwest

Energy Transitions Laboratory
Western Washington University
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ABOUT THE ENERGY TRANSITIONS LABORATORY

The Energy Trans Lab at Western Washington University is a place where undergraduate and graduate student researchers and faculty work together to enhance our understandings of the energy transition. Our focus is on historical and contemporary changes to energy systems in Washington State and the Pacific Northwest.

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AUTHORS AND INVESTIGATORS

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CREDITS

Cover photo: Colstrip. © Rachel Cernansky (2/24/2011) (public access via flicker)
In 1924, after over 10 years of speculation over the coal reserves of Southeastern Montana—a region once deemed “Where the Enemy Sleeps” by the Crow Indians—the Northern Pacific Railway established Rosebud Mine, one of the West’s first surface mines. At the time, trains ran exclusively on coal-fired steam engines, and coal was largely used to power locomotives. Diesel engines would come to replace steam engines, but Northern Pacific Railway’s mine would find a new home in a different sector. The Railway established a town surrounding the mine that would forever come to be defined by the very resource that engendered it. That town was named Colstrip.

As its name implies, Colstrip is a community that was born out of coal. It continues to be entirely defined by it. In 1980, there were at least 5 active mines within 50 miles of Colstrip.1 Not only was Colstrip a coal town, but it was entirely surrounded by coal towns. Without coal, it is doubtful that there would be any economic activity in Southeastern Montana.

Colstrip has a two-part history. Part One entails its establishment in 1924 solely as a company town for the Railway. Since it remained unincorporated until the turn of the century, no Colstrip census data is available until then. What is known is that was conceived to mine coal for Northern Pacific Railway, and the mine shut down in 1958 because diesel outstripped coal as the main fuel source for locomotives. The transportation industry, once a reliable coal consumer, found a better source of energy. The town’s raison d’être, its only source of jobs and income, was no more. Northern Pacific Railway sold the Rosebud mine after its closure.

Although the Montana Power Company purchased the Rosebud Mine directly after its closure, Colstrip remained little more than a faint wisp of history for nearly two decades. Today’s citizens of Colstrip can thank OPEC, Bonneville Power Administration (BPA) and Puget Sound Energy (PSE) for spurning part two of the town’s history. In the 1960s, BPA forecasted that most of its base-load hydroelectric generation capacity would be consumed by is mandatory preference consumers. Therefore, PSE and the Northwest’s other utilities had to seek alternative base-load power supply (PSE, 2013).

By the end of the decade, PSE had its eye on the Powder River Basin. When the Arab Oil Embargo sent the nation into an energy frenzy and BPA reiterated its former forecast, PSE embarked on a joint venture with Montana Power Company (later subsumed by PPL.

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1 Source: http://mines.findthedata.com/d/s/Montana for all licensed mines within 50 miles of Colstrip. Each mine listing included what resource is mined, and during which period it was active.
Montana) to build Colstrip Generating Station, units 1 and 2.

On July 28th, 1975, the community of Colstrip was officially dedicated, as mining operations resumed in preparation for the construction of Colstrip Station’s first two units. Before the construction of these units were completed, PSE and Montana Power Company already began planning for the next two units, which were completed in the 80s. Colstrip, Part 2 was born with ten times the coal production of Part 1, and ten times its promise. During its 34 years of production to 1958, an average of 1.3 million tons of coal were mined from the Rosebud each year. Today, it produces over 13 million tons each year (Western Energy Company, 2007).

If the rise of coal-fired power plants was a blessing to Colstrip by humankind, the type of coal reserves on which Colstrip sits was a blessing from Mother Earth. Montana’s coal is sub-bituminous, which means that it has a much lower sulfur content than the bituminous coal that pervades the Eastern United States. In 1992, over 80% of “low sulfur” coal reserves were in the West, whereas over 90% of “high sulfur” coal was in Appalachia and the Midwest (EIA, 1993). The SO₂ emission standards set in the Clean Air Act of 1970 dealt a blow to Eastern and Interior coal, sending Powder River Basin coal production through the roof. The midwestern state of Minnesota provides a clear example. Prior to the Clean Air Act, less than half of the coal burned in Minnesota came from the West. In 1977, that share spiked to over 90% (Krohe, 1979). The 1977 amendments to the Clean Air Act strengthened sulfur emissions standards, and the cap-and-trade system established in the Act’s 1990 amendments further shifted the coal industry in Colstrip’s favor. In 2010, sub-bituminous coal toppled bituminous coal as

![Figure 1. U.S. Bituminous and Sub-Bituminous Coal Production](image)

Source: EIA

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2 The EIA deems coal with 0.60 pounds or less of sulfur per million Btu “low sulfur” and coal with 1.68 pounds or more per million Btu as “high sulfur.”
the leader in U.S. coal production, though the
two remain roughly equal (see Figure 1).

Colstrip, now home to about 2,300, swelled
to nearly 8,000 during the construction days of
the 1970s and 1980s. The Podunk company
town of Colstrip, in a matter of years, became
the second-largest energy producer in the
West and home to the second largest coal-
fired power plant in the West. The generating
station in Colstrip is the largest man-made
structure in Montana. Colstrip was
incorporated in November of 1998, the same
year that all four of its power plants were sold
to a cadre of utility companies, with PPL
Montana as the operator and PSE as the chief
investor. The Rosebud Mine, which supplies
the station with all of its coal and employs 438
Colstrippers (Western Energy Company, 2007),
was purchased by the Westmoreland Coal
Company in 2001. The Western Energy
Company, a subsidiary of Westmoreland, has
operated the mine ever since. The plant and
the mine together support over 3,700 jobs in
Rosebud County (population: 9,233) and $360
million of personal income (PSE, 2013).

Today, the 2,094 MW conglomeration of
colored electricity generators known as
Colstrip Generating Station is owned mostly
by Puget Sound Energy (which has the largest
share) and PPL Montana (see Table 1). North
Western Energy, Portland GE, Avista, and
PacifiCorp also have an ownership stakes
(PSE, 2013). Though the Colstrip plant is
located in Southeastern Montana and is operated by a
(mostly) Montanan company
with Montanan employees
which pays Montana’s taxes
and is powered exclusively
with Montana coal, 1,565 of its
2094 MW of capacity is used
to power Pacific Northwest
homes. Colstrip’s electricity
travels over the utilities’
collectively-owned
transmission lines 250 miles
west to Townsend, Montana before taking its
final journey to the Pacific Northwest’s

<table>
<thead>
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<th>Table 1. Ownership structure of Colstrip.</th>
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<tr>
<td>Ownership</td>
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<tr>
<td>Puget Sound Energy</td>
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<tr>
<td>PPL Montana-Plant Operator</td>
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<tr>
<td>North Western Energy</td>
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<td>Portland GE</td>
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<td>PacifiCorp</td>
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<td>Total</td>
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*The "PPL" in PPL Montana actually stands for Pennsylvania Power and Light, which is headquartered, obviously, in Pennsylvania. PPL Montana is a subsidiary
of PPL Corp., and it is headquartered in Billings, Montana.*
distribution grids using Bonneville Power Authority’s transmission system.

Just as Colstrip exports electricity to the Pacific Northwest, it exports authority over the its future. The neo-colonization of resource-rich lands with coal-dependent communities by energy companies has successfully bred an economic reliance on the fossil fuel industry, but only for the communities directly impacted by the industry. Montana Power Company’s great folly was choosing to outsource 75% of the ownership of the Colstrip Generating station to companies that service regions with little to no economic dependence on the fossil fuel industry.

In the 2012 general election, Representative Jay Inslee was elected governor of the State of Washington on a platform of expanding Washington’s green energy economy (Gallucci, 2012). Inslee co-authored the 2007 book *Apollo’s Fire: Igniting America’s Clean Energy Economy*, wherein he made the case for a swift shift to renewable energy. In the book’s 8th chapter, Inslee argued that the only way that coal could have a future in the United States is if coal plants are designed to sequester all or most of their carbon emissions (Inslee & Hendricks, 2008). On July 11th, 2013, Governor Inslee remarked to the Northwest Power Council that PSE should “lay out a clear… path to an electrical system that is 100% carbon free and renewable,” stating that it should start by setting a date for the completion of its use of coal in electricity generation (Washington Power & Conservation Council, 2013). By the end of 2014, Inslee would publicly and openly state his plans to end “coal-by-wire” electricity imports to Washington.

Following the release of Puget Sound Energy’s 2011 Integrated Resource Plan, The Washington Utilities and Transportation Commission (WUTC) directed PSE to “examine a future without Colstrip in its resource portfolio” (PSE, 2013). The Sierra Club, following the same release, echoed WUTC’s request, emphasizing the risk that future emissions prices or environmental regulations could have on the Pacific Northwest’s low electricity rates. In an attachment to its 2013 Integrated Resource Plan, PSE analyzed the cost-effectiveness of maintaining Colstrip in its portfolio under various scenarios. The study concluded that “continued operation of all four units of Colstrip is the least-cost option” under what PSE considers to be the most likely outcome: moderate to high economic growth, relatively high natural gas prices, and a $0 per ton price on carbon emissions. Figure 5-23, reproduced on the following page from PSE’s 2013 Integrated Resource Plan, displays how various factors could impact its future decisions regarding Colstrip. In case 1, federal environmental compliance costs are low. In case 3, they are high. All three assumptions made by PSE were favorable to continued
operation of Colstrip, a fact noted by WUTC chairman David Danner in an interview with *The Olympian* last February (Shannon, 2014). Danner emphasized that the WUTC does not assume that Colstrip is an unequivocally poor investment, but was skeptical of PSE’s $0 carbon price assumption.

Puget Sound Energy is not the only Washington utility that imports Colstrip’s electrons. Avista Corp., with its 10.6% share in the Colstrip Generating Station, services 358,000 customers in Eastern Washington and Northern Idaho. In its 2013 20-year plan, Avista stated its intention to maintain a stake in Colstrip. In an interview with *The Spokesman-Review*, however, Avista’s Senior Vice President of Energy Resources, Jason Thackston, admitted that carbon-limiting regulations could alter Avista’s financial calculus to Colstrip’s detriment (Kramer, 2014).

On February 6th, 2015, Washington State Senators Kevin Ranker and Doug Ericksen (the only two senators representing the notoriously environmentalist city of Bellingham) proposed SB 5874 to the Washington State Legislature, officially titled the “Washington state coal generation retirement act.” SB 5874 is designed to incentivize Washington State’s investor-owned utilities, such as Avista and Puget Sound Energy, to wean themselves off of coal-fired electricity generation. SB 5874 establishes the creation of “carbon reduction bonds” which a utility can issue in to cover the costs of shutting down a coal plant. The bond payments would get passed onto the utility’s customers through electricity rates, but such payments would not be treated as revenue. SB

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*Fully described in section 7 of SB 5874.*
5874 gives coal-owning Washington utilities the authority to establish or acquire subsidiaries without commission approval if necessary for retiring a coal plant. The bill then designates acquisition costs as “reasonably and prudently incurred,” thus making them eligible either for inclusion in the utility’s rate base or for the issuance of carbon reduction bonds, at the discretion of the utility. SB 5874 passed 46-3 on March 11th.

The day after SB 5874’s passage, Montana’s Great Falls Tribune reported that Colstrip’s state senator, Duane Ankney, had a bill of his own in the works: Colstrip’s closure would blow a hole in Montana’s budget through foregone tax revenues, so why not charge any utility that closes Colstrip the plant’s future tax revenues the day that they close it? “They have a philosophy they don’t like burning coal,” Ankney announced in his interview with the Tribune, “Well, they’re going to pay for it” (Inbody & Lee, 2015). The following Monday, Senator Ankney introduced SB 402 to the Montana Legislature, entitled the “Montana Energy Accountability Act.”

Section 2 of SB 402, stating the bill’s purpose and intent, reads that the Montana Energy Accountability Act seeks to build a “financial partnership between state and local government units and the owners of coal-fired generating facilities in Montana,” and states that said partnership is built on a commitment to “promoting the financial interest” of Montana. If you think that hearkens back to an age of tariffs and government-backed monopolies, you are not alone. On March 30th, the Institute for Energy Economics and Financial Analysis (IEEFA) reported on the bill in a blog post titled, Montana Legislators Pass Protectionist Bill to Keep Coal Plants Alive.

The IEEFA was not aggrandizing; Ankney’s bill is an unequivocal violation of the Constitution’s Interstate Commerce Clause. It establishes a “coal county impact fee” for any company that prematurely closes a coal plant in Montana. The impact fee is to be paid annually and is derived by applying Montana’s operating levy to the retired coal plant for the following 20 years after the closing company acquired acquisition costs on the plant (by buying more of the plant than it previously owned), or for the following 10 years after the plant’s retirement if the company did not incur any acquisition costs. Mining town sympathizers may find that reasonable; the

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5 SB 5874 5(4)
6 A utility’s “rate base” is the depreciated value of its assets, on which the utility is entitled a return. The state regulatory commission calculates a reasonable rate of return, multiplies it by the rate base, adds the utilities expenses, subtracts the depreciation of its capital, and then divides that number by its yearly output in order to calculate the rate that the utility must charge for its electricity. By allowing the utility to include acquisition costs in its rate base, SB 5874 essentially passes the cost of acquisition onto the utility’s customers.
7 SB 5874 5(3)(a)
8 SB 5874 5(3)(c)
9 http://ieefa.org/montana-legislators-pass-protectionist-bill-to-keep-coal-plants-alive/
10 5(3)(d)
11 5(3)(d)
abrupt closure of such a large employer would do irreparable harm to the community as well as to county and state budgets. The impact fee would give everybody hurt by the plant’s closure time to prepare. However, SB 402 goes a few steps further: the levy is applied to the taxable value of the plant, multiplied by five. For a company that closes its plant without acquiring acquisition costs, the fee applies to double the plant’s taxable value. Under this law, any company that purchases the remainder of a Montana coal plant and shuts it down would have to pay 100 years’ worth of taxes on it, more than twice the average lifespan of a coal plant.

Opponents of SB 402 largely echoed the concerns of the protectionism criers, arguing that its passage would violate interstate commerce laws. Ankeny’s fellow Republican, Senator Fred Thomas, also worried it would spook investors, signaling that Montana’s government may penalize them for the actions of their home state. [Dennison, 2015]. Senator Thomas was unable to convince his colleagues, however: SB 402 passed 28-19 in the Montana Senate before falling two votes shy of passage in the House.

Regardless of which legislation passes, either in this session or the next, Colstrip Generating Station’s days are numbered. Increasing regulation on fossil fuel dependent power plants and time’s toll on the facilities will force its cadre of owners to make significant capital investments in the coming years in order to keep it online. Given WUTC’s growing skepticism in Avista’s and PSE’s relationship with Colstrip, it is doubtful that the two would be able to recover the necessary investments through their rate base. Furthermore, carbon pricing becomes more likely by the day, and PSE’s own analysis shows that Colstrip is not viable under most circumstances involving any reasonable price on carbon.

The bigger question raised by Colstrip, its history, and the surrounding controversy is the broader question of the role played by communities like Colstrip in America’s transition to a renewable-only future. Colstrip is an archetype of the coal-dependent community, one of many across the United States. The Colstrip Generating Station’s closure is arguably more eminent than most, due to its outsourced ownership by companies headquartered in distant climate-conscious communities, but the same is not true for the vast majority of such plants. Company towns are the last refuge for the undereducated, middle-class worker: In Colstrip’s county, Rosebud, 20% of the population is below the poverty line. Thanks to the mine and power station, Colstrip’s median household income is $74,473. After Colstrip Generating Station closes, these workers, many of whom may have been born to Colstrip miners or power station
workers, will likely never have a secure, high-paying job again.

Market forces, at the behest of federal environmental regulations, will ultimately lead to Colstrip’s demise, but they also lead to its emergence. The 1970 Clean Air Act and its successive amendments made Montana’s coal more attractive, bringing stable, high-paying jobs to sub-bituminous coal miners in Montana (and Wyoming), arguably at the expense of bituminous coal miners in Illinois, Kentucky, and West Virginia. It was not the fault of the workers in those states, or even of the government or coal companies, that they lost their jobs. Communities that are built on single, exhaustible resource industries live on borrowed time, beholden to the very market forces that brought them into existence. That is the tragic irony of Colstrip’s success and forthcoming dissolution. I do not have the answer to winning Colstrip and its peers in Appalachia over to the transition, but perhaps the recognition of this perpetual industrial disequilibrium will put the bust they will experience in perspective with the boom they have experienced.

Lastly, the transition cannot coexist with the rhetoric that good employment and climate change action are at war with one another. When faced with criticism over his protectionist legislation, Montana Senator Ankney defended himself by saying that he was trying to ensure a future for good-paying jobs in Colstrip. This shibboleth is repeated all over the country in discussions about the energy transition, particularly by defenders of the fossil fuel industry. Rarely do proponents of the energy transition respond honestly about the adverse effects that the transition will have on the economies of coal- and oil-dependent communities, and until they do, this adversarial rhetoric will persist. If the energy transition is to include members of these communities, the discussion must shift from how to promote renewables to how we can support negatively-impacted communities throughout the inevitable shift to renewables.

Green energy has a lot to offer American workers, particularly during the peak of the energy transition. If the manufacturing of solar panels and wind turbines occurs in the United States, then those jobs will be well-paid and less hazardous than mining or coal plant jobs. Even if the bulk of manufacturing occurs overseas, the installation of these units (and the upkeep of the infamously high-maintenance turbines) will provide similarly steady, high-paying jobs for blue collar workers. A meta-analysis by Wei, Patadia, & Kammen (2010) studied the production, maintenance, and fuel extraction of different electricity-producing technologies to calculate the average job-year per GWh that the technology provides over the life of one

\[12\] Described as “full time employment for one person for a duration of 1 year.”
facility. A coal plant offers 0.11 job-years per GWh, whereas wind turbines offer 0.17 (55% more) and the most conservative estimate of solar PV was 0.23 (109% more). In fact, a coal plant has the lowest job-years per GWh, matched only by natural gas.

Skeptics of the energy transition speak in the language of jobs, and the proponents of it have the vocabulary necessary to speak that language. To paraphrase Yoram Bauman, an environmental economist and the co-founder of CarbonWA, we cannot wait for the progressive takeover of the world to tackle climate change. All that we need to do now, is reach out.

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Greenpeace’s study had solar PV at 0.87 job-years per GWh.


City of Colstrip. About Colstrip. Webpage, Colstrip, MT.


