


Spring 5-12-2017

The State of Coal in Wyoming

Sidney A. Smith
ssmit143@uwyo.edu

Follow this and additional works at: http://repository.uwyo.edu/honors_theses_16-17

 Part of the [Energy Policy Commons](#), [Environmental Policy Commons](#), [Legislation Commons](#), and the [President/Executive Department Commons](#)

Recommended Citation

Smith, Sidney A., "The State of Coal in Wyoming" (2017). *Honors Theses AY 16/17*. 55.
http://repository.uwyo.edu/honors_theses_16-17/55

This Honors Thesis is brought to you for free and open access by the Undergraduate Honors Theses at Wyoming Scholars Repository. It has been accepted for inclusion in Honors Theses AY 16/17 by an authorized administrator of Wyoming Scholars Repository. For more information, please contact scholcom@uwyo.edu.

The State of Coal in Wyoming

Sidney Smith

University of Wyoming Honors Project

May 12, 2016

Table of Contents:

Overview of Wyoming’s Coal History.....	3
Actions Taken by the Wyoming State Legislature.....	7
President Trump’s Influence on Coal.....	11
New Uses for Old Coal.....	16
Works Cited.....	20

Overview of Wyoming's Coal History

The State of Wyoming has experienced what some might call a boom and bust economy since its creation. The people of the state have always relied upon natural resources to make up a majority of the economy and this has led to both prosperity and ruin in many cases. One of the first and most spectacular examples of this was the rise and fall of the cattle industry in the 1880s. While the cattle industry had existed in Wyoming for around fifty years at that point, the 1880s experienced enormous growth of cattle populations and by 1886 “there were 1,500,000 head of cattle worth thirty dollars or more per head”.¹ The extreme cold winter of 1887 would ultimately prove fatal for around 15% of the cattle in Wyoming, with the remainder of the cattle being sold for little because of their poor condition. This resulted in huge economic losses for some and the cattle industry in Wyoming never again reached the height that it had achieved in 1886.² This early example of economic rise and fall because of too much reliance on one form of natural resources by the state government. This tale can be seen mirrored today in the state's reliance on natural resources like natural gas, oil, and coal. When the energy sector is doing well Wyoming experiences growth and great economic returns but when the downturn hits many are left unemployed and state programs suffer.

Wyoming's history with coal began in the 1860s when the need for coal became crucial to the railroad industry. Coal mines providing product to the railroad industry opened first in the southern half of Wyoming as it was more accessible at the time. Railroads began to expand across the state, partially to have greater access to coal, which allowed mines in Northern

¹ Larson, T. A. History of Wyoming. Lincoln, Nebraska: University of Nebraska Press, 1990, p. 172.

² Larson, p. 191-192.

Wyoming to begin development in the late 1880s.³ Most of these mines were underground rather than surface mines which requires a large workforce. The drivers of both the railroad and coal industries helped to grow the population and the early economy of the state. According to the report “Coal Trends In Wyoming,” the “population grew 200 percent from 1880 to 1890 largely due to coal”.⁴ The coal industry experienced its first peak in 1919 when production was at a steady point but in the decades after production began to decrease as oil become more widely used and workers migrated to those jobs.

Increased mechanized and workers wanting better pay and safer conditions also contributed to the downturn which is a pattern that would be repeated in the following decades. The industry reached a low point in the 1930s during the Great Depression but started to increase one again in 1945 due to the United States entering World War II.⁵ Coal mined during the early days and up to the 1950s was mainly used to power diesel locomotive engines. When railroad companies began to switch from diesel powered engines to steam powered engines the state experienced its lowest point in coal production. Coals mines went from producing 9.8 million tons in 1945 to 1.6 million tons in 1958. Employment during this time also fell to historic lows. From the start of coal production in the 1860s until the lowest point in 1958 the industry had already experienced two boom and bust cycles, one that lasted around sixty years, from 1860 until 1930, and one that lasted around thirty years, from 1930 until 1958.⁶

³ Foulke, Thomas, David Taylor, and Roger Coupal. *Economic Trends in Wyoming's Mineral Sector: Coal*. 2nd ed. Laramie, WY: University of Wyoming, 2013. p. 4

⁴ Foulke, p. 4.

⁵ Foulke, p. 4-5.

⁶ Foulke, p. 6.

In the next few decades coal production began to increase once again due to new regulations that made Wyoming coal more desirable as an energy source. The National Environment Policy Act of 1969 created limitations on the “amount of nitrogen oxide, sulfur oxide, and particulate (ash) emitted to the atmosphere”⁷ which was ultimately very beneficial to coal operations in the state. Wyoming’s coal has a low sulfur content and had become more desirable to power companies in the Midwest through this regulation. The increased need for cleaner coal led to the third boom in the coal industry. From the 1970s onward coal production increased steadily, even astronomically at some points. In 1973 Wyoming was already producing 14 million tons which by 1981 would increase to 102 million tons. Even though mines were now mostly on the surface and less of a workforce was needed, employment after two decades of stagnation finally shot up from a few hundred employed to around 6,000.⁸

While the amount of coal being produced increased, prices varied from the 1970s to the 2000s with industry experiencing high and low points that led to the Wyoming economy as a whole experiencing similar ups and downs. When layoffs occurred during this time due to increased mechanization and lower prices, only a few hundred workers would lose their jobs at a given time. While in other states this might not have huge effects because of Wyoming’s small population a few hundred workers losing their jobs could have serious repercussions in those communities. From the 2000s onward the coal industry would face two periods of instability. Economic downturn and layoffs occurred as the result of lower prices for coal in 2009 until 2010

⁷ Foulke, p. 8.

⁸ Foulke, p. 9.

but didn't last long as production began to increase once again.⁹ This did not last long though as prices fell in 2015 leading to layoffs in March of 2016. Two of Wyoming's largest coal mines, which are also the two largest mines in the United States, were forced to lay off 15% of their workforce.¹⁰ This downturn has led to major problems for the state as they depend on revenue generated by the coal industry. The coal industry currently contributes \$1 billion annually to the state government. The state has been forced to cut \$248 million their budget which has led to reduced funding for the Department of Health and education.¹¹

Coal has never been a consistently profitable resource for the state but continues to dominate the economy and provide a large portion of employment for Wyoming residents. There is a hope by many in Wyoming and its state legislature that the coal industry as is can be rebuilt and maintain a greater stability through a change in the way it is currently regulated. Nationally, President Trumps has began removing regulation in an effort to revive the coal industry in Wyoming and across the United States. Looking at the history of the many boom and busts that the coal industry has experienced it seems highly unlikely that just changing regulation will be able to provide such stabilization. Through the following sections I will discuss how the state has responded to the coal crisis and actions that they have recently taken. I will then discuss what has been done on a national scale to aide the coal industry. Finally I will discuss how a coal mine in Wyoming has attempted to solve the coal problem.

⁹ Moore, Michael. "Wage Records in Wyoming: Employment and Earnings by Age, Gender, County, & Industry, 2000-2015." *Wyoming Labor Force Trends* 53, no. 10 (October 2016). October 16. Accessed February 26, 2017. <http://doe.state.wy.us/lmi/trends/1016/1016.pdf>, p. 3.

¹⁰ Wilkinson, Todd, and Wendy Beckett. "THE GREAT DISCONNECT." *Sierra* 102, no. 1 (January 2017): 34-37. *Academic Search Premier*, EBSCOhost (accessed February 24, 2017). p. 1.

¹¹ Wilkinson, p 35.

Actions Taken by the Wyoming State Legislature

The state of Wyoming is highly concerned about the current state of the coal industry as it is greatly tied to the economic well-being of the state. Much of the current discussion on coal in the state focus on blaming either regulation or the climate change movement for the problems coal faces. Climate change itself is heavily denied both by those working for coal companies and state legislatures. To this end there has been a movement to stop climate change from being taught in school around Wyoming. The Science Standards Review Committee has even briefly stopped from adopting national science standards for Wyoming school districts because the standards mentioned climate change.¹² This type of denial is ultimately incredibly unhelpful to the coal industry as it does nothing to actually promote growth or find new markets it instead tries to move the state backward. This serves to illustrate one problem the coal industry has moving forward. Without a change in the way the coal industry currently operates there will not a stabilization of the industry. The state legislature and the governor have both recently taken actions to aid the coal industry some of which move backwards and some of which will allow the industry to move forward.

After the mass layoff in 2016 Governor Matt Mead came out and said he was “doubling down” on coal and would help them find a path forward. Mead’s proposed solution is to construct a shipping port and export Wyoming coal to Asian markets. Currently there are several port proposals in both Washington and Oregon that Wyoming could potentially use but the most likely one would be the Millennial Bulk Terminal located in Longview, Washington. Mead has been meeting with representatives from countries like Japan and India for several years to

¹² Wilkinson, p. 37.

discuss coal exportation. Wyoming coal is highly desired in the Asian markets because of its low sulfur content which makes it cleaner than coal from other areas. The construction of the port would cost about \$680 million and would be able to ship 44 million tons of coal annually.¹³ Cloud Peak Energy, a company located out of Gillette, Wyoming, has an agreement in place to ship 7 million tons of coal from its mines located in both Wyoming and Montana. An economic study recently conducted on the creation of the port revealed that shipping the coal overseas would increase gas emissions, coal dust from train transportation would not impact air quality, and pollutants from trains engines would increase cancer risk rates for those living along the train tracks. Those impacts are seen as substantial by some groups in Washington where there has been a lot of push back and it is unclear whether or not the port will be cleared for construction.¹⁴

The port would be economically beneficial for the state of Washington as they would gain an estimated 2,650 jobs and \$5.4 million in tax revenue.¹⁵ Mead has put a lot of pressure on this project but it is unclear how helpful a port will be for the state of Wyoming. The port itself would be controlled by a Washington company so Wyoming companies would not have control over how much coal they would be able to ship. The agreement in place of 7 million tons to be shipped is only a very small amount of the around 400 million coal produced every year in Wyoming. Even if Wyoming companies could ship at full capacity of 44 million that is still too

¹³ Neary, Ben. "Gov. Matt Mead expects Wyoming will get access to coal ports." The San Diego Union-Tribune. August 23, 2016. Accessed May 12, 2017. <http://www.sandiegouniontribune.com/sdut-gov-matt-mead-expects-wyoming-will-get-access-to-2015nov07-story.html>.

¹⁴ Olson, Erik. "Washington state finishes study of proposed port for Montana and Wyoming coal." The Billings Gazette. April 28, 2017. Accessed May 12, 2017. http://billingsgazette.com/business/features/washington-state-finishes-study-of-proposed-port-for-montana-and/article_9bf98c2e-07c4-59ec-81a2-18b9b46f565d.html.

¹⁵ Bridges, Mike, and Mike Wallin. "The working class outside the Seattle bubble needs Longview's coal-export terminal." The Seattle Times. May 04, 2017. Accessed May 12, 2017. <http://www.seattletimes.com/opinion/the-working-class-outside-the-seattle-bubble-needs-longviews-coal-export-terminal/>.

small an amount to make a large difference. There are other ports that could also be utilized if built in the future but as it stand the port construction idea would provide a small amount of revenue but not to the extent that it is needed.

The state legislature has also taken actions in the last few years to help support the struggling coal industry. Some of the actions taken have be huge steps backwards for the state and for the coal industry. The legislature authorized a fund of \$1 billion to be given to the Wyoming Infrastructure for port shipment projects after a request from Mead. The fund would help to construct ports in the Northwest with revenue from the ports to cover repayment.¹⁶ The state benefiting most from this scheme would be Washington rather than Wyoming. The WIA would be investing a large amount of money in another state and it could potentially be a long time before repayment occurs. Again it is uncertain that Wyoming will be able to generate enough revenue from shipping ports to revive the coal industry, especially at the cost of state money going towards construction in another state.

Some members of the state legislature tried to pass bill this session that would have hurt industry in Wyoming more than it helped. The first of these failed bills attempted to make renewable energy sources less desirable. Senate file 71 would have penalized power companies that used renewable resources and would have essentially placed a tax on wind-generated power.¹⁷ These types of bills serve to penalize emerging industries which is overall unproductive. It is not really helpful to the coal industry but does have the effect of hurting emerging industries.

¹⁶ Associated Press. "Wyoming Legislature approves bill to support coal port bonds." The Billings Gazette . March 09, 2015. Accessed May 12, 2017. http://billingsgazette.com/news/state-and-regional/wyoming/wyoming-legislature-approves-bill-to-support-coal-port-bonds/article_ae750dad-88f5-5722-990d-27b86d1d89fb.amp.html.

¹⁷ Richards, Heather. "Bill would penalize utilities for wind-generated electricity for Wyoming customers." Casper Star-Tribune Online. January 12, 2017. Accessed May 12, 2017. http://trib.com/business/energy/bill-would-penalize-utilities-for-wind-generated-electricity-for-wyoming/article_fa25328e-aa4b-561f-9955-0995b9118e23.html.

The other failed bill that is important to mention is a severance tax reduction on the coal industry. House bill 104 would have reduced the severance tax from seven percent to six percent costing the state around \$30 million in revenue.¹⁸ Though the bill did not pass it does show the willingness of some of the legislature to aide the coal industry, even if it is at the expense of the state. Neither of these bills passed which shows that most legislatures want to move forward and help the state rather than prohibit new industries or give unhelpful tax breaks.

There have been some really positive steps forward by the state legislature that could potentially be very helpful to the coal industry. These steps include funding for carbon-capture research and an economic diversification council. The legislature has agreed to give \$15 million in funding to construct a facility at the Dry Fork Station coal-fired power plant that will be used in a carbon-capture research competition. The competition, created by NRG COSIA Carbon XPrize and funded by various entities, challenges teams across the United States to find uses for captured carbon and offers prizes of \$2.5 million to five finalist.¹⁹ Teams will be able to use the Dry Fork facility to do this research which could potentially help the coal industry to be cleaner and more productive. Pledging state funding towards such a facility shows that there is a push in Wyoming to come up with different and better ways to use coal as an energy product.

The second major move forward was the Economically Needed Diversity Options for Wyoming (ENDOW) proposed by Mead which seeks to diversify the economy. Mead has appointed members to a council that seeks to develop a 20-year plan, due by August 1st, 2018, to

¹⁸ Richards, Heather and Hancock, Laura.

¹⁹ Gruver, Mead. "Teams looking to convert carbon to use planned lab at plant." The Washington Times. October 08, 2015. Accessed May 12, 2017. <http://www.washingtontimes.com/news/2015/oct/8/xprize-teams-to-be-among-1st-at-wyoming-carbon-cap/>.

provide a sustainable and diversified economy. The council will be provided with 2.5 million in funding with another \$1.5 million going towards workforce development. The representatives that worked on the bill noted that without a diverse economy the state of Wyoming does not have a bright future.²⁰ While there is no way to know what the council will decide to put in their plan at this time it is a more hopeful move by the state. It seems the state government has realized that reliance on coal and energy industries is dangerous. By expanding the industries that influence the state's economy, Wyoming can have more sustainability in times of hardship for the coal industry.

President Trump's Influence on Coal

President Donald Trump has only been in office a short few months but he has already began making moves that he believes will help revitalize the coal industry. Energy has become a highly polarized issue in politics nationally as Democrats seek to establish more environmental protections, sometimes at the expense of industry, while Republicans seek to remove barriers to energy production, sometimes at the expense of the environment. During Trump's campaign one of his most repeated promises was to bring back thousands of coal jobs to Americans that have been disappearing due to a variety of factors. His administration believes that the reason these jobs are disappearing is because of increased regulation that occurred during Obama's administration. To fix what he sees as a regulation problem Trump has already signed several executive orders that attempt to increase coal production through lessened regulation which will

²⁰ Murphy, Matt. "ENDOW bill moving through Wyoming Legislature." Casper Star-Tribune Online. February 08, 2017. Accessed May 12, 2017. http://trib.com/news/state-and-regional/endow-bill-moving-through-wyoming-legislature/article_3b23bc91-f011-5d00-8fd2-7588c09f8bca.html.

then bring coal jobs back. It is debated whether or not such a scheme will achieve the ends it intends too.

The first of Trump's executive orders relating to regulation and coal came on January 30th of this year and stated that "Unless prohibited by law, whenever an executive department or agency (agency) publicly proposes for notice and comment or otherwise promulgates a new regulation, it shall identify at least two existing regulations to be repealed".²¹ While this is not specific to any one department it does have the effect of limiting departments like the Environmental Protection Agency (EPA) from creating new regulations. This essentially makes it very hard for the agency to add any new regulations relating to the environment which can be seen as indirectly helping the energy industry and coal in general.²² In another executive order aimed at protecting energy over regulation, the EPA and the Army Corps of Engineers are asked to review and reconsider the 2015 Waters of the U.S. rule. This rule "allows the federal government to regulate pollution in a vast number of rivers, streams, lakes and other waterways that flow into the nation's major bodies of water".²³ While this does not mean that the rule will immediately be repealed it does mean that there is a potential for many waterways to either be removed from protection or not added to those already under the protection of the EPA. Proponents of the order argue that it allows for more economic growth, especially for energy industries, but those opposed say it threatens the drinking of "1 out of 3" Americans.²⁴

²¹ Exec. Order No. 7, 3 C.F.R. 1 (2017).

²² Bastasch, Michael. "Trump's Executive Order to Repeal Regulations Targets EPA." The Daily Signal. January 31, 2017. Accessed April 01, 2017.

²³ Worland, Justin. Time (2017): n. pag. Print. Time. Time, 28 Feb. 2017. Web. 09 Apr. 2017.

²⁴ Worland.

Trump also recently signed off on a congressional action that reversed the Stream Protection Rule which would have protected waterways from coal waste from surface mining. This rule was passed under Obama's administration in the last days of his presidency as was heavily opposed by the Republicans. The Congressional Research Service laid out the costs and benefits of this rule in January before it was repealed. The costs outlined included "\$52 million in annual compliance costs for the coal industry as a whole, of which roughly half was expected to be borne by mining operations in Appalachia. The rule could endanger up to 590 coal mining jobs in the region, the report estimated, though the losses would be partly offset by engineers and biologists that companies would need to hire to comply with its terms".²⁵ These costs are significant but benefits would have also been significant, including cleaner drinking water, reduction in the probability of health problems due to contaminants, and "replanting of trees also required by the rule would increase carbon storage and reduce emissions".²⁶ The coal industry has been declining for several years and while the rule would have hurt the industry it is unclear whether or not the removal of the regulation will stimulate the industry in any measurable way.

The next Obama-era regulation that was repealed through executive order was the Clean Power Plan which main provisions would have taken effect in 2022. The Clean Power Plan was designed to reduce carbon emission from coal-fired power plants. Since the law was technically never in effect its hard to know what its total impact would have been on the coal industry.

Similarly there is no guarantee that this move will improve the economy or help the coal industry

²⁵ Tabuchi, Hiroko. "Republicans Move to Block Rule on Coal Mining Near Streams." The New York Times (2017): n. pag. The New York Times. The New York Times, 2 Feb. 2017. Web. 9 Apr. 2017.

²⁶ Tabuchi

in any way.²⁷ In the same week Trump also signed another executive order lifting a temporary ban for federal coal leases on public lands. Companies can now mine coal on public lands but it is unlikely to happen soon as licensing takes time so many unemployed miners wouldn't see those jobs for years. While Trump's administration viewed this as a great win for the coal industry most experts believe that access to coal is not the biggest problem facing the industry.²⁸ At most The last important component of Trump's energy policy is the preliminary budget recently released by his administration. While this budget is not in any way binding it does provide some insight into what is important to the administration and some of the changes wanted by the administration may show up in the final federal budget. While Trump's budget calls for cuts to many agencies, the EPA would be cut the most, at 31%, which would greatly hinder any enforcement of regulations that are still existing. These cuts could potentially eliminate fifty programs and 3,200 jobs. It would also cut funding to the Office of Research and Development by half and discontinues funding for international climate-change programs. The Department of Energy would also see a cut of 6% under this plan. This would include cutting \$900 million from the Office of Science, eliminates several programs, gives the Yucca Mountain storage facility for nuclear waste \$120 million in funding.²⁹ All the cut programs would mean lose of jobs and less environmental protections.

²⁷ Casselman.

²⁸ Fears, Darryl. "Trump promised to bring back coal jobs. That promise 'will not be kept,' experts say." The Washington Post. March 29, 2017. Accessed April 11, 2017. https://www.washingtonpost.com/news/energy-environment/wp/2017/03/29/trump-promised-to-bring-back-coal-jobs-that-promise-will-not-be-kept-experts-say/?utm_term=.b66293965351.

²⁹ Soffen, Kim, and Denise Lu. "What's getting cut in Trump's budget." The Washington Post. March 16, 2017. Accessed April 11, 2017. https://www.washingtonpost.com/graphics/politics/trump-presidential-budget-2018-proposal/?utm_term=.8a706a0f0b29.

Overall Trump's energy policy seems very focused on removing regulation and the ability of the EPA to create more environmental regulations. What his administration has not done though is to create legislation that would make coal mining more feasible and thus create the jobs that were promised. However it is still very early in his term and legislation to create jobs or added tax breaks for coal companies could be promoted by the administration at a later time. Most experts believe that even with reduced regulation or favorable legislation the coal industry will still continue to decline.³⁰ The biggest reason for the decline of the coal industry is the increased use of natural gas as an energy source over coal. In the earlier 2000s half of all energy was created by burning coal, but by 2016 natural gas had surpassed the amount of coal being used, which had fallen to one-third of all energy produced. New technologies of hydraulic fracturing, or fracking, developed in the 1990s which led to an increase in production of natural gas. Natural gas is a cheaper energy source than coal and "gas-fired power plants are cheaper to build and operate than coal-fired ones".³¹ The shift from coal to natural gas has not been driven by regulation but rather the free market. Further if Trump continues to remove regulations on things like fracking which would lead to an increase in natural gas production the coal industry could be further displaced by natural gas. Moreover renewable energy sources are also becoming more widely used and are taking an increasing share of the market.³²

Trump's removal of regulations will stabilize the coal industry at the point that it is at currently and really only slow the inevitable further decline. This creates a problems for Trump's

³⁰ Casselman.

³¹ Casselman.

³² Casselman.

policy of bringing coal jobs back. The only people who will really benefit from removal of regulation are people who are already employed and the coal companies who will be able to produce and sell slightly more coal in the future. Coal jobs that have ceased to exist will not be returning. The biggest problem for mining jobs currently is increased automation of the coal industry.³³ People will most likely continue to lose jobs to automation regardless of the policies put forth on the nation level. There is no real way to solve the problem of loss of coal jobs without looking for new ideas and new ways to use coal.

New Uses for Old Coal

The traditional use for coal has been as an energy source which is mined, shipped, and burned in a coal-fired power plant. While using coal for energy is not going away anytime soon, there are other uses for coal that would be more economically stable and have a lower impact on the environment. One of these is manufacturing products from mined coal. Products made at a facility could include activated carbon which is used for water filters and air purifiers, carbon-fibers that can be used to manufacture a variety of light-weight products, and silicon metal “used to produce silicones and silanes, which are in turn used to make lubricants, water repellents, resins, cosmetics, hair shampoos and toothpastes”.³⁴ While coal products are nothing new, they are not always looked at as an option when companies are seeking to develop a coal mine.

A Wyoming company seeking to use coal as a feed stock for manufacturing products rather than an energy source is Ramaco Carbon, LLC. Ramaco is a relatively new coal company that has mines in Virginia, West Virginia, Pennsylvania, and Wyoming. The Wyoming mine is

³³ Fears.

³⁴ "Uses of coal." World Coal Association. Accessed April 12, 2017. <https://www.worldcoal.org/coal/uses-coal>.

located in the northern part of the state between Sheridan and Ranchester. Named the Brook Mine, it encompasses 14,500 acres of public and private land, much of which was previously mined from 1914 until 1940.³⁵ When the mine was originally purchased in 2011 the coal was intended to be used for energy production. Coal prices were still high at that time and coal provided forty percent of the nation's energy. The coal industry declined dramatically in the years after that, especially in Wyoming, so the company chose to rethink their strategy. While coal has already been used to make a wide variety of products "there hasn't been an integrated facility in the U.S. to create those products at scale"³⁶. Ramaco decided that the most effective use of their coal would be to create products on a large scale and the Wyoming iPark and Carbon Advanced Materials (iCAM) were born.

The Wyoming iPark will sit on the Brook Mine land and will work in partnership with many different entities including "Massachusetts Institute of Technology Grossman Group for Advanced Materials, Oak Ridge National Laboratory, Duke University, Southern Research Institute and Western Research Institute".³⁷ These groups will hold space within the iPark compound and will use the mined coal for research purposes, experimentation and development of products, and some manufacturing. The CEO of Ramaco, Randall Atkins, has expressed interest in using mined coal for a variety of products. Atkins was recently quoted in The Sheridan Press saying,

³⁵ Ramaco. Brook Mine Overview. Sheridan, WY: Ramaco Wyoming, LLC, 2015. February 2015. Accessed April 12, 2017. <http://www.ramacollc.com/upload/Brook%20Presentation%20-%20WEBSITE%20February%202015.pdf>.

³⁶ Czaban, Kristen. "Ramaco Carbon plans research, manufacturing facility for coal products." The Sheridan Press, February 27, 2017. Accessed April 12, 2017. <http://thesheridanpress.com/ramaco-carbon-plans-research-manufacturing-facility-coal-products/>.

³⁷ Czaban.

“We intend to use or reuse every molecule produced,” Atkins said, adding that those working at the facilities will filter out the various elements in coal and use them to make a variety of products. “We believe there is value in every molecule and we intend to extract it.”³⁸

The Western Research Institute, located on the University of Wyoming’s campus, was one of the first groups to express interest in working with Ramaco. They plan to work on carbon-fiber research at the iCAM. Their ultimate goal is to develop carbon-fiber for five dollars a pound, down from the current twelve dollars a pound.

While using coal to create products instead of energy is more profitable for Ramaco at this point in time, it will also be helpful to the communities surrounding it. The company predicts that at full development of the project around 3,000 employees will be needed. There will be several types of jobs created, including mining labor, construction and site development, some in the research facility, and many light-manufacturing jobs in the industrial park.³⁹ Several coal companies in northern Wyoming, located primarily in Gillette, have gone bankrupt or have laid-off many of their employees. This could be a way to revitalize the area and provide new jobs for those that have lost theirs. While the mining permit application for the Brook Mine was filed in 2014, the mine is still experiencing some push back from other companies and is not yet open. Still, the project is expected to begin sometime in the next few years. Another benefit to the project is that because the mine sits on land currently mined during an era where no reclamation

³⁸ Czaban.

³⁹ "Coal CEO Looks For New Ways To Revive The Industry." Interview by Peter O'Dowd. Here & Now. April 4, 2017. Accessed April 12, 2017. <http://www.wbur.org/hereandnow/2017/04/04/coal-industry-ramaco-carbon>.

was required after mining was complete, reclamation efforts after mining is completed at the new Brook mine will leave the land better off than it was.

Though Ramaco is not seeking to mine coal for energy production they may benefit in some ways from policies initiated by the state and federal government. Some of the regulation removed at the federal level addresses coal-fired power plants and would have had no effect on Ramaco's future plans. The removal of the Stream Protection rule may have some effect on how the company decides to operate in terms of dumping coal waste. The removal of regulation may lead to a slight increase in profits and production but will not have the substantial effect that the federal government purporting it to. The mine and adjacent research and manufacturing facilities are meant to withstand regulation and should therefore be in operation for many decades. On the state level some actions taken could have an effect on this project. The ENDOW initiative could provide some support to the mine or include it in its diversification strategy for the state. Other actions like funding for a port in the Northwest will have no effect on this mine because they do not plan on shipping it. Coal will always be an important part of Wyoming's economy but the key to stability in the state will be a diversification in how coal is used.

Works Cited

Associated Press. "Wyoming Legislature approves bill to support coal port bonds." The Billings Gazette . March 09, 2015. Accessed May 12, 2017. http://billingsgazette.com/news/state-and-regional/wyoming/wyoming-legislature-approves-bill-to-support-coal-port-bonds/article_ae750dad-88f5-5722-990d-27b86d1d89fb.amp.html

Bastasch, Michael. "Trump's Executive Order to Repeal Regulations Targets EPA." The Daily Signal. January 31, 2017. Accessed April 01, 2017.

Bridges, Mike, and Mike Wallin. "The working class outside the Seattle bubble needs Longview's coal-export terminal." The Seattle Times. May 04, 2017. Accessed May 12, 2017. <http://www.seattletimes.com/opinion/the-working-class-outside-the-seattle-bubble-needs-longviews-coal-export-terminal/>.

"Coal CEO Looks For New Ways To Revive The Industry." Interview by Peter O'Dowd. Here & Now. April 4, 2017. Accessed April 12, 2017. <http://www.wbur.org/hereandnow/2017/04/04/coal-industry-ramaco-carbon>.

Czaban, Kristen. "Ramaco Carbon plans research, manufacturing facility for coal products." The Sheridan Press, February 27, 2017. Accessed April 12, 2017. <http://thesheridanpress.com/ramaco-carbon-plans-research-manufacturing-facility-coal-products/>.

Exec. Order No. 7, 3 C.F.R. 1 (2017).

Fears, Darryl. " Trump promised to bring back coal jobs. That promise ‘will not be kept,’ experts say." The Washington Post. March 29, 2017. Accessed April 11, 2017. <https://www.washingtonpost.com/news/energy-environment/wp/2017/03/29/trump-promised-to-bring-back-coal-jobs-that-promise-will-not-be-kept-experts-say>.

- Foulke, Thomas, David Taylor, and Roger Coupal. Economic Trends in Wyoming's Mineral Sector: Coal. 2nd ed. Laramie, WY: University of Wyoming, 2013. p.
- Gruver, Mead. "Teams looking to convert carbon to use planned lab at plant." The Washington Times. October 08, 2015. Accessed May 12, 2017. <http://www.washingtontimes.com/news/2015/oct/8/xprize-teams-to-be-among-1st-at-wyoming-carbon-cap/>.
- Larson, T. A. History of Wyoming. Lincoln, Nebraska: University of Nebraska Press, 1990, p. 172.
- Moore, Michael. "Wage Records in Wyoming: Employment and Earnings by Age, Gender, County, & Industry, 2000-2015." Wyoming Labor Force Trends 53, no. 10 (October 2016). October 16. Accessed February 26, 2017. <http://doe.state.wy.us/lmi/trends/1016/1016.pdf>, p. 3.
- Murphy, Matt. "ENDOW bill moving through Wyoming Legislature." Casper Star-Tribune Online. February 08, 2017. Accessed May 12, 2017. http://trib.com/news/state-and-regional/endow-bill-moving-through-wyoming-legislature/article_3b23bc91-f011-5d00-8fd2-7588c09f8bca.html.
- Neary, Ben. "Gov. Matt Mead expects Wyoming will get access to coal ports." The San Diego Union-Tribune. August 23, 2016. Accessed May 12, 2017. <http://www.sandiegouniontribune.com/sdut-gov-matt-mead-expects-wyoming-will-get-access-to-2015nov07-story.html>.
- Olson, Erik. "Washington state finishes study of proposed port for Montana and Wyoming coal." The Billings Gazette. April 28, 2017. Accessed May 12, 2017. <http://billingsgazette.com/>

business/features/washington-state-finishes-study-of-proposed-port-for-montana-and/
article_9bf98c2e-07c4-59ec-81a2-18b9b46f565d.html.

Ramaco. Brook Mine Overview. Sheridan, WY: Ramaco Wyoming, LLC, 2015. February 2015.
Accessed April 12, 2017. <http://www.ramacollc.com/upload/Brook%20Presentation%20-%20WEBSITE%20February%202015.pdf>.

Richards, Heather. "Bill would penalize utilities for wind-generated electricity for Wyoming customers." Casper Star-Tribune Online. January 12, 2017. Accessed May 12, 2017.
http://trib.com/business/energy/bill-would-penalize-utilities-for-wind-generated-electricity-for-wyoming/article_fa25328e-aa4b-561f-9955-0995b9118e23.html.

Soffen, Kim, and Denise Lu. "What's getting cut in Trump's budget." The Washington Post. March 16, 2017. Accessed April 11, 2017. https://www.washingtonpost.com/graphics/politics/trump-presidential-budget-2018-proposal/?utm_term=.8a706a0f0b29.

Tabuchi, Hiroko. "Republicans Move to Block Rule on Coal Mining Near Streams." The New York Times (2017): n. pag. The New York Times. The New York Times, 2 Feb. 2017. Web. 9 Apr. 2017.

"Uses of coal." World Coal Association. Accessed April 12, 2017. <https://www.worldcoal.org/coal/uses-coal>.

Wilkinson, Todd, and Wendy Beckett. "THE GREAT DISCONNECT." *Sierra* 102, no. 1 (January 2017): 34-37. *Academic Search Premier*, EBSCOhost (accessed February 24, 2017). p. 1.

Worland, Justin. Time (2017): n. pag. Print. Time. Time, 28 Feb. 2017. Web. 09 Apr. 2017.