Future Plan for Wyoming's Coal Extraction Industry

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Preface:

Wyoming is one of the most important states, in context to the coal production as it produces nearly half the coal burnt in USA. However, due to the rise of natural gas energy and renewable sources, the state revenue has been on the decline. This has prompted Mr. Gordon, the governor of Wyoming to devise a plan to keep the use of coal relevant, but also to develop novel techniques to reduce carbon emissions with an aim to tackle climate change (Maher, 2020).

Proposed Plan of Action

In order to fulfill the motives of maintaining the coal extraction in Wyoming without hampering the environment, the primary course of action should be to testing the efficacy of the carbon capture techniques devised by the University of Wyoming. As Governor Gordon plans to invest 25 million $ to fund the development of new technologies to reduce carbon emissions, significant reduction in the carbon emissions can be used to market the same, with a motive to bring it at par to the natural gas or renewable fuels. Although it would be ideal to replace all the coal based power-plants to those utilizing renewable energy like wind and solar energy, a direct transition might result in dire consequences. Coal-fired power plants accounted to 86% of Wyoming's electricity generation providing a net annual revenue of around 1 billion $ (Wyoming Mining Association, 2013) (EIA, 2020). Moreover, the economy of Wyoming is heavily relied on coal, which is indicative from the observation that the three largest tax paying companies in Wyoming are coal companies (Richards, E&E News, 2019). This heavy dependence on coal and the huge amount of reserves available in the State of Wyoming indicates the need for a long-term plan to restore the production of coal.

The two possible strategies to increase the production of coal is to either reduce the emissions of the existing coal fuels or to inspect novel applications of the coal. To reduce the carbon emissions arising out of coal, University of Wyoming has partnered with a number of companies to develop clean coal technology in order to compete with the renewable sources of energy. However, it is prudent that, in the near future, renewable energy sources would be chosen as a viable source, due to the fear of depletion of fossil fuels and lower risk of environmental hazards. It is thus, equally important to explore the other possible applications of coal.

Extensive research has been done to utilize the molecular complexity of coal, the complex chemistry of which can be used as the basis for solar panels, batteries and electronic devices. Researchers are working on processing coal at varied temperatures, in order to tune the optical and electrical properties, which can then be used as per requirements. As per Jeffrey Grossmann of MIT, the advantage of using coal is advantageous because of its inherent cheap nature, combined with simple solution processing that ultimately enables low fabrication costs (Chandler, 2016).

Another possible pathway to be explored by the states is to accelerate its process on exporting coal to other countries by relaxing the restrictions and decreasing the taxes levied on coal. Although this might not be significant at the state level, intended action by the federal government can be help to counter the decreasing demand for coal.

As coal continues to be a major revenue source and source of livelihood for Wyoming, it is important that the huge reserves of coal in Wyoming are utilized to its maximum extent, while focusing equally on making it more environment-friendly. To address the short term goal, that is, to increase the coal production, Wyoming should focus on commercializing the clean coal technologies being developed, in order to drastically cut down on the carbon emissions, by incentivizing the use of such technologies for the coal companies. The budget allotted for marketing the use of such technologies would motivate the consumers to use this cheaper, but less hazardous type of fuel. Exploring alternative applications should be the long term goal for Wyoming, as the adoption of renewable energy sources in the near future is prudent.

Rules and Regulations

Changing government policies, especially pertaining to the environmental restrictions on carbon emissions seem to have a significant impact on the production of coal. An important act, 'Clean Air Act' which was passed in 2009 by the Obama Administration strictly regulated the utilities' greenhouse gases emissions (Nuccitelli, 2019). The emissions from motor vehicles were also made strict under the CAFE (Corporate Average Fuel Economy) Standards, which further ameliorated the need for, either a clean coal technology or stressing on the development of renewable energy power plants. Although Wyoming is the major producer of coal, many large scale renewable energy plants like Chokecherry-Sierra Madre wind project are being developed to increase the share of renewable energy.

Although rapid declines in cost of natural gas, wind and solar have made cleaner alternatives cost-effective, the Trump Administration has announced significant changes to the 'Clean Energy Act', which would give the coal power plants a chance to stay in the business and tackle the threat from other energy sources (Brady, 2019). As per the claims of the current policy makers, the relaxation of these norms would help the current coal-fired power plants, while also minimizing the cost to consumers and preserving the reliability of the electric grid. In spite of all the relaxation in the standards, decline in the coal retirements was not observed.

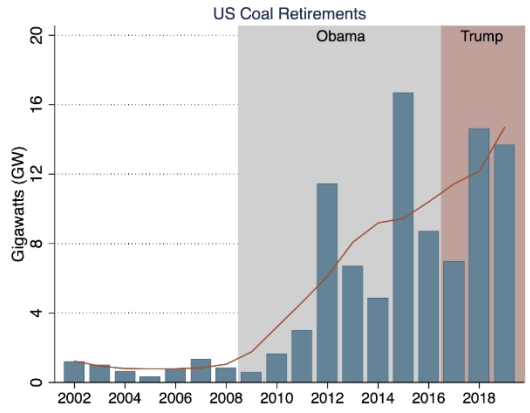

Figure 1: Coal capacity retired in the USA from 2002 to 2019 (Hausfather & Anderson, 2019)

From Figure 1, it can be inferred that Obama-era regulations may not be the culprit to the increasing retirement of coal capacity. The decline in the coal production in the USA can thus be owed to the rapid investment in renewable energy sources and availability of cheaper alternatives such as Natural Gas (for Wyoming).

Wyoming

In Wyoming, there has been a sharp decline in the revenue generated from coal over the past few years. The legislators and delegation in Wyoming endorse the relaxation put forth by the Trump Administration, which would empower the producers without causing economic harm. Being the leading producer of coal, the new regulations would decrease the overall energy costs for households in Wyoming (AP News, 2019). As the companies in Wyoming began to file for bankruptcy, the Department of Environmental Quality (DEQ) is working on tracking around $297 million for reclamation which would ensure that the state will not have to cover the reclamation costs of bankrupt companies.

Overall, based on the relaxations proposed by the current administration, it would provide respite to Wyoming and other coal producing states such as West Virginia, Pennsylvania and Illinois. However, the respite would only be short term, as the other cheaper alternatives would challenge the utility of coal, which would threaten its very existence. Hence, in order to protect the coal industry and the livelihood of its stakeholders, it is important to invest in the development of novel technologies for carbon emission reduction and alternate applications of coal.

Stakeholders

In order to outline the impacts of the proposed plan on the aspects of coal production, the stakeholders are divided into four major sects, the impact to each is assessed hereafter.

1. Legislative Bodies
   Any law governing body, ranging from the Federal Government, State Government, Department of Energy, Department of Environmental Protection, etc. can be included in this subset. The function of these stakeholders is to enact statutes, put forth rules and regulations which would dictate the functioning of the other three stakeholders, with an ultimate aim of doing greater good for all parties involved.
   Effect of proposed plan: The Legislative bodies would play a major role in allocating funds to the vital areas. For instance, as the proposed plan involves two sub-categories that is to improve the existing carbon capture technologies and the other being that of devising new applications of coal, segregation of the budget for research and development is vital. Apart from that, it is crucial that the steps taken should be well studied and implemented accordingly. Unwanted repercussions of the implemented policies could lead to instability in the governing bodies and could force a change in the governing administration. It is crucial for these bodies to work in accordance in order to satisfy the economic and environmental goals put forth. Interests of these stakeholders lies in resource utilization, compliance and sustainable development (Extractives Hub, n.d.).
2. Workforce
   This subset involves the companies producing oil, employees, suppliers, contractors and investors (Extractives Hub, n.d.). To summarize, this type of stakeholders are financially

dependent on the coal industry and its smooth operation, failure of which could have an adverse impact on their livelihood.
Effect of proposed plan: This subset would be the most affected by the introduction of the proposed plan. As the coal production seems to slow down annually, the companies are filing for bankruptcy, which ultimately lead to job cuts amongst the employees and loss of revenue for contractors and investors. Based on the proposed plan, as the technologies undergo rapid change, the employees are expected to constantly update their skillset to the changing environment in order to provide returns to the employers. On the other hand, the employers are expected to look out for emerging technologies which would help in alleviating the environmental problem and expand their business vertical to manufacture other products derived from coal.

3. Customers
   Customers are those who use the service of coal derived products, mainly those using energy generated from coal as fuel.
   Effect of proposed plan: The only aspect in which the plan affects the customers is the affordability. The customer is free to rely on the type of fuel to be used for his daily chores, with the ultimate concern being that of minimum cost.
4. Subordinates
   Any party which is involved with the coal mining process apart from those mentioned in 1-3 constitute subordinates. These stakeholders are surrounding communities (both population and governments), media and ngos.
   Effect of proposed plan: Every stakeholder has effect of varied magnitude based on the type of its attachment. For instance, the media remains unaffected whereas NGOs could play an important role in generating awareness amongst the public. On the other hand, surrounding communities can study the effects of this plan and then implement a similar plan which would benefit their community in the best possible manner.

Wyoming as a Precedent

Apart from Wyoming, the other major states producing are West Virginia, Pennsylvania, Ohio, Kentucky and Illinois. Wyoming produces the vast majority of sub-bituminous coal, whereas the other states produce bituminous coal (eia, 2011). Sub-bituminous coal is known to have lower CO_2 emissions as compared to bituminous. As Wyoming is the largest coal producing state in the country, successful implementation of the plan would suggest that it would be comparatively easier for those states having a lower production capacity.

The technologies used for the Wyoming model would cater to the sub-bituminous coal and thus would require technical and modular modifications for the other states. The rest of the coal producing states should thus plan on investing a fixed amount of coal revenue into devising newer technologies. As the proposed plan also involves using coal for varied applications, a joint alliance between the states would serve a healthy purpose of multi-disciplinary collaboration and aggregation of funds. Being the leader in coal production, it can be estimated that any economic or production plan as mentioned here can serve as the basis for other states.

Analyzing the change in revenue generated post the implementation of this facility should also take into account the rate of severance taxes imposed by every state. From Table 1, it can be observed that the severance taxes vary drastically for every state, and thus, the key parameter for

the other states to consider is the PBT (Profit Before Tax) in order to chalk out a plan to invest in the relevant sectors.

Table 1: Severance taxes imposed on coal per state

	Wyoming	Pennsylvania	West Virginia	Illinois
Severance tax	7%	-	2.5%	5%

Risks associated

As the proposed plan involves introducing new technologies to increase the coal production, it exposes the relevant stakeholders to newer, unprecedented risks. From 2018 to 2019, the coal production dropped by around 10%, with a similar projected drop in 2020. The major reason for the decline can be attributed to the rise in renewable sources of energy and bankruptcy of the major coal producers in the state (Fredregill, 2020).

Financial risks: When novel technologies are implemented to reduce the carbon emissions, additional budget needs to be allotted for the equipment to be installed. Assuming that the decline in coal as an energy source keeps on declining even after the improvement, further layoffs can be expected to offload the rising costs. Similar to the case of 400 coal miners losing their job in a single day (Richards, E&E News, 2019), many employees face a threat of losing their job and thus affecting their livelihood. Based on the plan, if the companies tend to develop other applications of coal, the risk of developing those products effectively in accordance to the EPA rules would prove to be tough, while managing the effective marketing of these newly derived products. If the product fails to garner attention, the companies might be forced to look out for other tools which would enable them to recover their already decreasing revenue.

Revenue risks: Coal constitutes to roughly 1 billion $ in revenue for Wyoming, and is the second largest source of tax revenue for the state.

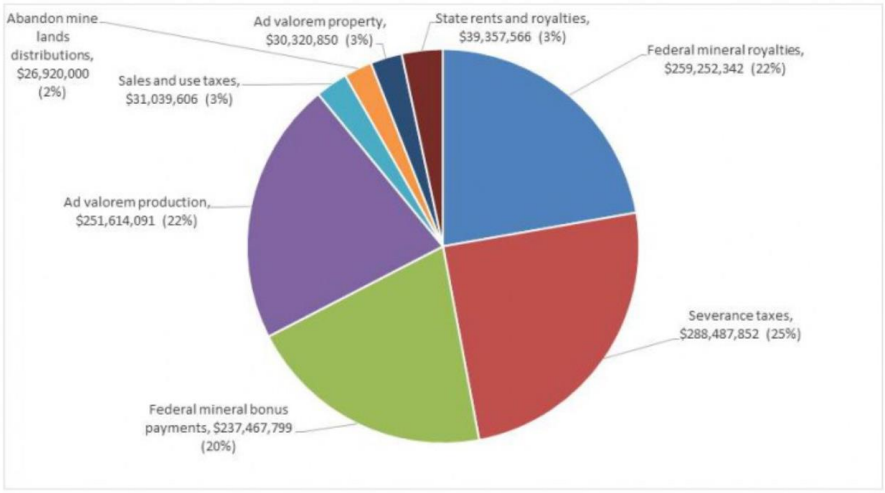

Figure 2: Revenue generated from Coal in Wyoming (Wyoming Mining Association, n.d.)

From Figure 2, it can be observed that the coal producers are levied with a huge amount of royalties and payments which form a major chunk of the net revenue for the state. Citing the financial risks mentioned in the report, closing down of the companies would drastically lower the revenue, thereby ultimately affecting the budget for the coming year. Assuming that the coal

retirements maintain the same trend, a 10% decrease in the revenue can be expected. Moreover, based on the proposed plan, as newer technology and application development is an integral part, additional budget needs to be allotted to R&D, which would further cause a burden on the state to reinvest the revenue in a systematic way.

Environmental risks: As new technologies for reducing carbon emissions are being developed, failure to achieve the targets would result in further polluting the environment. In addition to this, as newer applications for coal are being developed, there might be a possibility that these products could violate the existing EPA standards. Thus, although these applications may find purpose in the industry, it could further degrade the environment, while violating the norms put forth by the legislative body. Further effort is necessary to reduce the risks, which would involve monitoring the outputs in a timely manner.

References

AP News. (2019, 06 19). *Wyoming delegation supports Trump coal plant rule*. Retrieved from AP News: https://apnews.com/0b33b92a29954bab83ce9f452af0a0a2

Brady, J. (2019, 06 19). *Trump Administration Weakens Climate Plan To Help Coal Plants Stay Open*. Retrieved from NPR: https://www.npr.org/2019/06/19/733800856/trump-administration-weakens-climate-plan-to-help-coal-plants-stay-open

Chandler, D. L. (2016, 04 26). *Scientists have found a surprising new use for coal*. Retrieved from World Economic Forum: https://www.weforum.org/agenda/2016/04/scientists-have-found-a-surprising-new-use-for-coal/

eia. (2011, 08 16). *Subbituminous and bituminous coal dominate U.S. coal production*. Retrieved from TODAY IN ENERGY: https://www.eia.gov/todayinenergy/detail.php?id=2670

EIA. (2020, 02 20). *Profile Analysis*. Retrieved from Wyoming: https://www.eia.gov/state/analysis.php?sid=WY

Extractives Hub. (n.d.). *Mining Industry Stakeholders*. Retrieved from Mining Industry Overview: https://extractiveshub.org/topic/view/id/21/chapterId/266

Fredregill, I. (2020, 01 20). *Wyoming Coal Decline Could Continue, but Developments Might Help Industry's Future*. Retrieved from Cowboy State Daily: https://cowboystatedaily.com/2020/01/20/wyoming-coal-decline-could-continue-but-developments-might-help-industrys-future/

Hausfather, Z., & Anderson, L. (2019, 12 05). *Trump's War on Coal*. Retrieved from The Breakthrough Institute: https://thebreakthrough.org/issues/energy/trumps-war-on-coal

Maher, K. (2020, 02 15). *Wyoming Makes a Case for Coal*. Retrieved from The Wall Street Journal: https://www.wsj.com/articles/wyoming-makes-a-case-for-coal-11581782401

Nuccitelli, D. (2019, 06 21). *The Trump EPA strategy to undo Clean Power Plan*. Retrieved from Yale Climate Connections: https://www.yaleclimateconnections.org/2019/06/the-trump-epa-strategy-to-undo-the-clean-power-plan/

Richards, H. (2019, 11 19). Retrieved from E&E News: https://www.eenews.net/stories/1061587029

Richards, H. (2019, 11 19). *Beyond coal and oil: Wyo. faces crisis*. Retrieved from E&E News: https://www.eenews.net/stories/1061587029

Wyoming Mining Association. (2013). *Economics*. Retrieved from Wyoming Mining: https://www.wyomingmining.org/economics/

Wyoming Mining Association. (n.d.). *Severance Tax Benefits*. Retrieved from https://www.wyomingmining.org/economics/