Investigating Appalachian Cultural Involvement in Renewable Energy Initiatives

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Introduction

The region of Appalachia has historically found itself in the epicenter of energy production on the East Coast of the United States. Coal mining is deeply entrenched in the history of this part of the country, but with the decrease in coal usage due to the rise of renewable alternatives, as well as the global focus of achieving "Net Zero Emissions by 2050" (IEA, 2023), Appalachians are finding themselves in a position requiring evolution. According to findings presented to the Appalachian Regional Commission by Pennsylvania State University's Dr. Amy Glassimer and colleagues, the problem lies in the fact that "an almost singular reliance on fossil fuels has stunted the growth of renewable energy industries in the US" (2007). Appalachians remain insistent on utilizing "clean coal" as a source of renewable energy. However, there is great potential for the application of wind and solar energy technologies in the region. The aim of this thesis is to look into the impacts of cultural involvement on renewable energy initiatives in Appalachia.

There are many actors at play when discussing a question of socio-technical origin, and this can be seen in the question I am pursuing. Residents have a say in the development process, and as constituents to politicians, influence their voting records on renewable and non-renewable energy initiatives. The local, state, and federal governments all have different regulations, as well as incentives, that factor into development plans for renewable energy sources. Renewable energy development firms provide proposals for development, with a focus on profiting from the resources of the region. Even the UVA Climate Collaborative has a say in these development processes, attempting to partner with these local communities "to co-create climate adaptation and mitigation strategies that are based on cutting edge research and are actionable" (UVA ERI, 2023). However, my research will focus on the impact of the citizenry most of all, and how their

culture and political ideologies currently are providing a barrier to the adoption of modern day renewable energy technologies.

All of this builds to my research question: *How do Appalachian cultural and political ideologies influence the acceptance of renewable energy development within the region?* Knowing the history of fossil fuel development within the region, and looking at past failed renewable projects in Appalachia, it is evident that the culture promoting coal mining has a strong negative influence on renewable energy development. Additionally, the distinct conservative political leaning of the region currently stands as another barrier to development, with conservatism focusing less on environmental issues and more so economic ones. A 2023 UVA thesis argues that renewable energy development may damage Appalachia economically and culturally by leading to unemployment of coal miners, causing an exodus from the region (Owen, 2021). This same mentality is the one presumably adopted by the citizens of the region leading to a reluctance to accept the necessary introduction of renewable energy to the region.

Background and Significance

Appalachia is a socio-economic region consisting of 206,000 square miles covering the central and southern sections of the Appalachian Mountains on the east coast. This region experienced economic prosperity and opportunity through the coal industry, an industry that continues to decline in size. Between 2005 and 2020, coal industry employment fell by 54% (Bowen et al., 2021). Additionally, with growing awareness of climate change, fossil fuel development and utilization will continue to fall. Transitioning to cleaner sources is imperative to help mitigate the effects of climate change and to reach NZE (IEA, 2023).

Coal mining has been a staple of the Appalachian economy for over a century. It is an industry that "provides good-paying jobs, often in places with otherwise limited economic opportunities" (Skousen, 2021). Coal mining also makes up the backbone of the Appalachian economy, with mine service and supply businesses supporting the mining firms, and these employees and the miners supporting the local economy themselves (Skousen, 2021). Thus, we can see that coal mining has had a beneficial impact on the Appalachian region's economy for decades. It follows then that the Appalachian people would have an attachment to the industry that has brought them some prosperity, and would indeed be slow to accept the transition from this source of energy that has proven to be a steady source of income for them over time.

However, as renewable energy has become a viable source of energy supply over the past 3 decades, we find that Appalachia is ideally positioned to be able to tap into this growing sector. Having advanced energy infrastructure due to the prevalence of coal mining within the region, as well as having a population skilled in manufacturing, Appalachia is poised to both be a region for the development of renewable energy sources, as well as a hub of manufacturing for renewable energy technologies (Glasmeier, 2007). Additionally, when transitioning from coal to renewable energy sources, abandoned coal fields have the potential to be good locations for renewable energy development projects, such as solar or wind farms. However, this transition to clean energy in Appalachia will be hampered by "mining-impaired lands and waters" and "economic and human health problems" resulting from the heavy development of past fossil fuel and coal sources (Skousen, 2021).

Despite these hurdles, the potential for renewable energy development in Appalachia should not be overlooked. Yet that is exactly what has been happening for the past decade, as seen by voting records of Appalachian representatives. During the Obama administration, West

Virginia Senators and Representatives in Congress failed their constituents by pursuing pro-coal agendas and neglecting climate change (Van Nostrand, 2022). With the coal industry shrinking, they are hanging onto the past as opposed to looking toward the future of the energy industry. Some progress has been made recently in the climate arena, but there is still a heavy focus on coal and natural gas, and cleaning those processes up as opposed to switching to new sources. Additionally, during this same time period, the West Virginia legislature pushed through policies regarding renewable energy that failed to incentivize or achieve any renewable gains. These policies instead promoted fossil fuels as "alternative energy sources," essentially removing any incentive to switch to clean energy (Van Nostrand, 2022). These representatives of the Appalchian people reveal to us the extent of reliance on fossil fuels and coal in the region. It seems that culturally, Appalachia is stuck in the past, refusing to give up their economic safety found in coal mining, at the expense of falling behind the curve on sustainable energy production, and continuing to harm the environment. By attempting to find loopholes in definitions of renewable energy, such as pursuing "clean coal," we see the reluctance of the people to accept the necessary change to renewables that has become a global objective.

Finally, there has been a political realignment within Appalachia, from Democratic to Republican, over the past 30 years (Graham, 2023). According to Graham, one reason for the realignment was that "Environmentalism as an issue was adopted by the Democratic party, which isolated Appalachians and drove them to withdraw their support for the party" (2023). As the differences between the Republican and Democratic parties' values and agendas increased, the share of Appalachian votes going to democrats fell from 50% in 2000 to just 20% in 2020 (Graham, 2003). This reduced share of democratic votes could derail legislation, subsidies, and

incentives for increased renewable energy development, posing a major problem for the future in this area if the parties remain so at odds with each other.

Methodology

To collect evidence, I intend to break my question into multiple distinct topics to be researched. First, I will do more in depth research on Appalachian culture, followed by the political ideologies of the region. Then, I will research the history of energy development within the region, investigating both renewable and non-renewable sources. I intend to follow this with research on the views of the Appalachian people on renewable energy, as well as government programs and incentives. Finally, I will research STS scholars' writings on renewable energy, to see how my research can build upon what has already been discussed. One such document I plan to build upon describes how mainstream acceptance of renewables has led to further marginalization of Appalachian communities (Owen, 2021).

I plan to analyze this problem through the SCOT framework. This framework argues that rather than technology shaping society, the opposite is true. The Appalachian region's lagging acceptance of clean energy sources follows this logical system. The clean energy technologies are not successful within the region because the Appalachian society is shaping them through their opinions on environmentalism, and their loyalty to coal. This loyalty and resistance to change can be seen in the voting records of Congress members from West Virginia during the Obama administration, in which pro-coal policies were pursued, and climate change was neglected (Van Nostrand, 2022). These decisions have a tangible negative impact on the efficacy of both current and emerging clean energy technologies, and as Congress members are elected to

a voice for the views of their constituents, it follows that Appalachian society's opinions on renewables are shaping these technologies.

I believe that through my research, I will gain an understanding of the current political and cultural climate of Appalachia. This climate will have strong roots in the history of the region, specifically in regards to coal mining over the past century. The political and social climate in Appalachia is a barrier to the development of renewable energy; case studies of failed development projects attest to this fact. By assessing the state of renewable development via the SCOT framework, we can draw conclusions on the ways in which a variety of factors - social, political, historical, and cultural - serve to influence the progress of renewable energy projects in the region. Today, we live in a very global world. The 2050 NZE target is a global one, and though Appalachia can pride itself in its history of coal production, their help is necessary to achieve this goal. By discovering how exactly the historical, cultural, and socio-political climates of the region influence the development of renewable energy technologies, I hope to be able to understand how the people of the region can be reasoned with to take their place as a contributing producer of renewable energy. With the potential for development in Appalachia, they can maintain their cultural identity as energy producers, just in a way that is more sustainable, and aligned with global objectives.

Literature Review

Appalachian energy development, specifically in the form of coal mining, began with small-scale mining in the 1700s for primarily residential use (Skousen, 2021). This continued until the mid 19th century, when industrial mining operations were created to fuel the expansion

of the transcontinental railroad. This expansion of transportation infrastructure led to a more interconnected country, and with that came even greater demand for coal produced within Appalachia (Skousen, 2021). The compounding effect of these increases in demand cemented the coal mining industry as a steady source of Appalchian employment, which in turn helped it form the backbone of the economy of the region for the duration of the 20th century. To quote Dr. Jeff Skousen of West Virginia University, "Appalachian coal mining has influenced the region's landscapes, forests, water, and people over more than two centuries."

During the 20th century, coal production continued to increase, now for the purpose of meeting the growing electricity needs of the nation, no longer for the purposes of supporting the development of the railroad and the industrial revolution. However, this transition to coal mining for the purposes of electricity production benefited the industry, leading to a decrease in the volatility of coal production over time in the region, and an increase in the quantity produced, especially during the second half of the 20th century (Skousen, 2021). Recently, during the 21st century, a decline in coal demand, associated with climate change initiatives, and thus a decline in coal production has led much of the region into periods of economic hardship, as it once was such an integral part of the economy. In its stead, however, there has been an increase in natural gas production, as well as some interest in solar and wind energy (Skousen, 2021).

Despite the promise of burgeoning interest in renewable energy sources, the political climate of the region sometimes stymies developmental progress, as can be seen by various political voting records of the region. Additionally, a regional shift in political attitudes has occurred over the past 30 years, leading to a far more conservative political base in Appalachia now than when coal production began its initial decline (Graham, 2023). Graham believes this realignment coincides with the Democratic party's adoption of environmentalism, at a time when

the Appalachian economy was beginning to stall due to the heavily decreased demand for coal. As such we can see how voters would begin to feel alienated from the party. In 2011, EPA policies, specifically the implementation of the Mercury and Air Toxics Standard in West Virginia, “resulted in the closure of several coal plants, as utilities determined that the cost of compliance was too great to justify additional investment in emission reduction measures" (Van Nostrand, 2022). In a region with a declining working age population, lower wages and salaries, and higher poverty rates than in the majority of the United States (Skousen, 2021), continued loss of jobs in the coal industry spells economic trouble. Residents can quickly become resentful of renewable energy by association, believing it to be the cause of the loss of livelihoods and general economic disrepair the region is currently experiencing. In actuality, though renewable energy technologies did play a small role in this decline of West Virginia coal production, it was “the impact of the shale gas revolution [that] was the biggest driver of decline” (Van Nostrand, 2022).

Within this economic landscape, ripe for righteous outrage, the political narrative of the “war on coal” was developed by the coal industry itself, claiming that the Obama administration's environmental regulations were the primary culprit for the decline in coal production, and the associated economic decline (Van Nostrand, 2022). This narrative further fueled the political realignment that had already been ongoing for 15 years, and helped cement the political state of the region today as one that is anti environmental regulation, and to a lesser extent, anti renewable energy. With the transition to renewable energy being a necessary reality, initially the plan for West Virginia was to use natural gas as an intermediary between coal production and renewables, which tracks with its increase as coal production was declining. Recently, the Institute for Energy Economics and Financial Analysis has concluded that this

transition strategy is no longer feasible, as wind and solar technology are now “the least-cost option across much of the United States” (Van Nostrand, 2022).

This further places the Appalachian economy in a precarious position, with urgency needed to make up for lost time developing renewables when they pursued natural gas development instead. However, I argue that through the Social Construction of Technology framework, the political and social climate of the region pose large barriers for the development of these technologies.

Discussion and Results

The Appalachian region has a distinct cultural landscape that has been influenced by the prevalence of coal production in the region for the past century and a half. There is also a distinct conservative political leaning that accompanied the decline in coal demand in the late 20th and early 21st centuries, as well as the subsequent decline in economic conditions within the region. These poor economic conditions, the cultural harm stemming from a decline in coal demand (and thus a shortage of jobs in a population that has long considered themselves coal miners), and the extremely conservative political opinions of the region all combine to slow and prevent the acceptance of renewable energy development within Appalachia. Using various recent cases of renewable energy developmental failure in Appalachia, we can better see how society has a direct impact on the efficacy and utilization of various renewable technologies, following the STS framework of the Social Construction of Technology.

We can see how the cultural landscape of Appalachia prevents effective renewable energy development when looking at the case of Freedom Works LLC’s attempted pumped

storage hydropower (PSH) project located in Grant County, West Virginia, in 2020. This project was slated to be the "worlds' largest pumped storage hydropower project," and would have constituted a 5 billion dollar development plan (Steelhammer, 2020). When considering this proposal from an outsider's perspective, one might be tempted to assume the community would rally in support of the economic boom it could provide in the form of new jobs and capital being infused into the region. However, the Grant County community had a very different idea about the plan, and shot it down at a public meeting that "drew overflow crowds" who "overwhelmingly opposed the development" (Steelhammer, 2020). This was Freedom Works' third failed project in West Virginia in as many years. But what rallied these West Virginia communities together to so strongly oppose these renewable energy projects? At the end of the day, it was landowners who really stymied the progress, citing the history associated with the properties (Steelhammer, 2020). The strong culture of the region, including not only economic history with coal and the ensuing distrust of environmental initiatives surrounding renewables, but the additional personal histories citizens have, many also tied in with mining, led to a grassroots movement to prevent the project from occurring. This project could have provided a stimulus to an otherwise faltering economy, yet despite this incentive, the people of the area banded together around their shared cultural history and values to stop it in its tracks. Through civic action, their society shaped, albeit negatively, the development of PSH technology, preventing the worlds' largest site to date from being completed, and in doing so blocking a monumental victory for the development of this new technology from occurring.

In reference to the period of political realignment in West Virginia from 1996 to 2020, Politico claimed that "few spots in America have shifted politically faster and more decisively than this state, swinging from nearly entirely blue to almost totally red over the last 20 years"

(Van Nostrand, 2022). This political realignment is tied to the distinct culture surrounding coal, and features strong anti-environmentalism and anti-renewable energy sentiments, following the rhetoric of Appalachian politicians on both sides of the aisle. During the Obama administration, Appalachian political leaders laid the blame for the steep decline of the coal industry at the feet of the "job killing EPA," which "conveniently relieved them of the responsibility of leading the state through an inevitable and necessary transition away from coal" (Van Nostrand, 2022). These same politicians left the Appalachian people with an expectation that emissions standards would be rolled back, leading to a resurgence of the coal industry accompanied by a positive turn for the economic prospects of the region. When this rollback in regulations, and the repeal of Obama's Clean Power Plan did occur during Donald Trump's presidency, there was only "minimal impact on coal production and employment in West Virginia" (Van Nostrand, 2022).

One would think that following the revelation that the promises made by politicians were merely empty words, Appalachians would see that the coal industry was doomed to continue its decline, and that it would be more productive and profitable to look to the future of energy production, rather than to continue looking for ways to return to coal production's former glory. While this realization is beginning to become more accepted within the region, there is still a reluctance to accept subsidies and funding for renewable energy development within Appalachia, simply because they are seen as "Biden-Democrat plans" (Levitt et al., 2024). The intense regional political polarization following the conservative realignment poses a difficult barrier for renewable acceptance when most of the politicians pushing for renewable energy are Democrats. But as one West Virginian resident puts it, "I guess the best way I can put it is [that] my feelings don't matter that much. What matters is price. If you can give people power that's cheaper and cleaner, why would they pay more money for coal" (Levitt et al., 2024). So, while the political

culture of the region is opposed to renewable development, at the end of the day, economics may yet win out. In an area with a floundering economy, perhaps the boost offered by the renewable energy industry will be enough to get things moving in the right direction, and to influence the Appalachian people to overcome their feelings towards renewable energy. As this same resident puts it, "We're kind of past the point of feelings. It comes down to money, which, as you know, kind of runs the world" (Levitt et al., 2024).

Conclusion

Appalachia has a complex cultural and political history, much of which is tied to the coal industry which has been the backbone of the economy ever since the mid 19th century. Currently, the cultural identity of the region is still strongly tied to coal, despite the declining demand for it, and the dwindling economic prospects that it offers. Appalachian politics have become distinctly conservative over the past 3 decades, and much of this has been attributed to the economic decline of the coal industry being placed at the feet of pro-environmentalism and pro-renewable energy policies. So, it follows that the region does not favor renewable energy development, and as such negatively influences the progress made on these new technologies, as explained by the Social Construction of Technology framework. However, in recent years, there does seem to be some progress made in the acceptance of renewable energy initiatives in the region, albeit begrudgingly. With such dire economic prospects, which have been trending down, as well as an exodus of the working aged population from the region, something needs to be done to reverse these trends. There is hope, as some Appalachian states have shown. In reference to West Virginia's recent reluctance to accept renewable initiatives, Van Nostrand claims that "Nearly all the surrounding states adopted policies promoting the development of renewable energy resources, and were able to capture jobs and associated economic activity." While

renewable energy cannot provide jobs for the entire Appalachian population that have been laid off as the coal industry has been declining, it can provide an influx of economic activity to the region that could spark further growth. Coal is dying, and it will not return. By accepting the future of renewable energy, Appalachians stand to at least claim some economic gain, and position themselves for a potential future of dominance in this energy sector, as they once dominated coal production. Additionally, they will benefit both their own region, and the greater world, through promoting environmental health, and helping in the goal of achieving NZE by 2050. While the political and cultural identities of the region serve as distinct hurdles in the pursuit of renewable energy development, they are by no means deal-breakers, and in the coming years, they can be overcome at scale. The region must invest in education and training for its population to prepare them for the new types of jobs they will find themselves in as renewable energy development begins to take a hold.

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