

**RETRAINING PROGRAMS FOR COAL WORKERS IN TRANSITION:
LESSONS FROM APPALACHIA**

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EXECUTIVE SUMMARY

The use of coal for energy in the United States is being pushed to historic lows for a number of reasons, including the ascent of natural gas as the fuel of choice, technological advancements, environmental regulations, mechanization of extraction and the rise of renewable sources of energy. Meanwhile, coal communities around the nation are left to grapple with the consequences of coal mine and power station closures, and consequent job losses. In response, the government, and some civil society organizations, have made available several retraining programs for unemployed coal workers. However, these initiatives have largely failed to attract and retain displaced workers in the coal mining regions. Helping coal country move forward has proved more difficult than anticipated, and this paper delves into the technical and practical aspects of some of the existing programs and organizations.

The paper explored three case studies of retraining initiatives in the Appalachian region, which were created specifically to help former coal workers transition to a new sector. The research explores the effectiveness of Appalachian-born responses to the mining job crisis by comparing a selection of three case studies, and an analysis of the most successful elements is discussed.

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1. INTRODUCTION

As global efforts to curb the effects of climate change steam ahead, technological advances are helping the world transition to cleaner, alternative sources of energy, while at the same time use of natural gas is also increasing. Although, the United States withdrew from the Paris climate agreement in 2017, coal use has been experiencing a steep decline in several years, with no sign of that trend reversing. There are three major coal mining areas in the United States, the Western, the Interior and the Appalachian region. While all coal workers in those regions have been affected by the decline in coal consumption, the Appalachian ones have been some of the hardest hit. Part of the reason is Appalachia's historical dependence on coal and the lack of other sectors for employment. Although coal mining accounts for less than 52,000 jobs in the United States¹, mining significantly contributes to local economies in Appalachia, especially West Virginia².

Federal and state efforts to retrain displaced miners abound, with billions of dollars being spent in training programs. In spite of that, participation and success rates are low, and effective solutions are seemingly yet to be found. Typically, efforts undertaken to reach out to coal communities have been described as “out of touch”³ by Appalachians, where coal mining, a “mono-economy” in the region, is embedded in their

¹ "Bureau of Labor Statistics Data," Databases, Tables & Calculators by Subject, <https://data.bls.gov/timeseries/CES1021210001>.

² Dan Black, Terra McKinnish, and Seth Sanders, "The Economic Impact Of The Coal Boom And Bust*," *The Economic Journal* 115, no. 503 (2005): xx, doi:10.1111/j.1468-0297.2005.00996.x.

³ Nick Mullins, 2015, "The Problem with Environmental Activism in Appalachia", *The Thoughtful Coal Miner*, December 30. <https://thethoughtfulcoalminer.com/2015/12/30/the-problem-for-environmentalism-in-appalachia/>

culture and identity. The paper identifies important characteristics of three effective retraining programs for coal miners in Appalachia.

1.1 RESEARCH OBJECTIVES

The objective of this study is to gain a better understanding of existing efforts to assist coal workers in Appalachia, specifically what it has been done and what should be done differently to effectively reach out to those coal communities. The research was designed to provide additional tools and solutions to organizations that work toward the development and education of the workforce. One such organization is the National Association of Workforce Boards, whose mission reads:

NAWB's mission is to support its members through a comprehensive program of advocacy, training and technical assistance, communication, and the promotion of strategic partnerships for the advancement of our nation's workforce.⁴

Additionally, the organization Workforce West Virginia has been given a federal grant of \$7.4 million to "to provide retraining and reemployment services to dislocated coal miners and displaced homemakers impacted by mass layoffs and coal mine closures". The findings in this report can provide them, and other entities with similar goals, the most effective solutions to encourage high participation and reemployment rates to former coal miners.

⁴ "National Association of Workforce Boards (NAWB) - Representing Workforce Development Boards (WDBs)," NAWB, http://nawb.org/about_us.asp.

2. LITERATURE REVIEW

This research project draws on three areas of scholarship: climate change, coal communities, and training programs.

2.1 THE ROLE OF COAL IN CLIMATE CHANGE

Beginning with the Industrial Revolution of the mid-1700s, fossil fuels, and coal in particular, have played a crucial role in catapulting some countries, including the United States, into industrialization. Technology improved in unprecedented ways and production processes sped up thanks to machines, leading to mass production of most products⁵. Many industrializing nations quickly became dependent on fossil fuels for heating, electricity, transportation and continued expansion, but this modernization didn't come without a cost.

Booming economic and population growth brought about an increase in atmospheric concentrations of carbon dioxide, methane and nitrous oxide. Notably, the combustion of coal adds more carbon dioxide to the atmosphere per unit of heat energy, than of other fossil fuels⁶. Coal is also the nation's major contributor to global warming, "producing three-fourths of our carbon emissions from electricity, even though it generates just over one third of our electricity".⁷

⁵ T. Mitchell, "Carbon democracy," *Economy and Society* 38, no. 3 (2009)

⁶ B.D. Hong and E. R. Slatick. EIA Quarterly Coal Report, January-April 1994, DOE/EIA-0121(94/Q1) (Washington, DC, August 1994), pp.1-8

⁷ Michael, Grunwald (2014), "New Carbon Rules the Next Step in Obama's War on Coal." *Time*, June 01. <http://time.com/2806697/obama-epa-coal-carbon/>

World leaders have begun mobilizing to act on the anthropogenic causes of climate change and came together by adopting the Paris climate accord through the United Nations Framework Convention on Climate Change (UNFCCC) in December 2015. 195 countries signed the agreement, with the United States being a glaring exception. The deal aims to keep a rise in global temperature this century well below two degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius.⁸ Mitigating climate change remains a great challenge, and transitioning from coal-based economic activity to alternatives is part of that challenge.

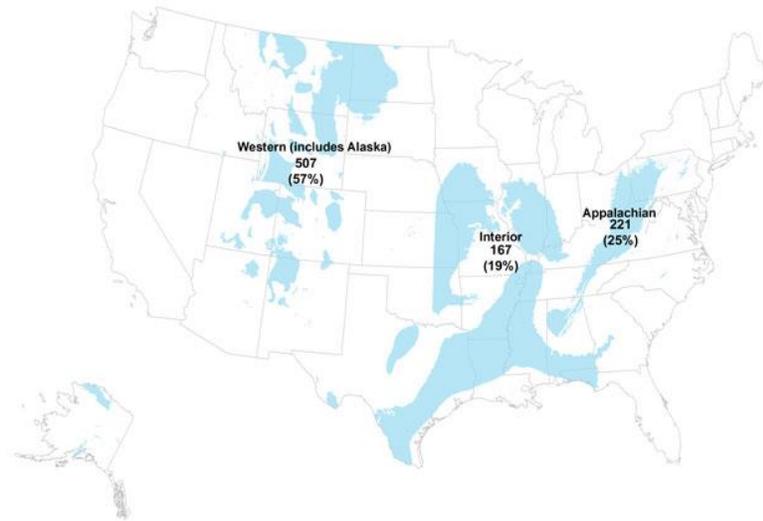
2.2 COAL MINING IN APPALACHIA

The Appalachian coal region includes parts of Alabama, Eastern Kentucky, Maryland, Ohio, Pennsylvania, Tennessee, Virginia, and West Virginia. As seen in Figure 1, 25% of the coal produced in the United States comes from the Appalachian coal region, with West Virginia as the largest coal-producing state in the region and the second-largest coal-producing state in the United States⁹.

⁸ “Paris Agreement”, (2015), United Nations Framework Convention on Climate Change (UNFCCC)

⁹ “Where Our Coal Comes From,” Where Our Coal Comes From - Energy Explained, Your Guide To Understanding Energy - Energy Information Administration, , https://www.eia.gov/energyexplained/index.cfm?page=coal_where.

Coal production by region in million short tons and regional share of total production, 2015



Note: Excludes refuse recovery coal. Sum of shares may not equal 100% because of independent rounding.

Source: U.S. Energy Information Administration, *Annual Coal Report*, November 2016



Figure 1: Coal mining regions in the United States

In recent years, the United States has seen a rapid shift in the way energy is produced and several factors are at play. Most importantly, advancements in shale extraction in the late nineties, which was previously too costly and hard to access, made the extraction of shale gas economic¹⁰. After decades of marginal extraction, new reserves were being discovered, and shale gas production began expanding rapidly in the mid-2000s, “growing at more than 45% per year between 2005 and 2010”¹¹. Prior to the year 2000, coal production seemed to fare well, rising almost every year in a four-decade period¹². But by 2010, after the shale revolution, natural gas production surpassed that of coal, which has since been on a steady decline, plummeting 18% in 2015 and reaching its the lowest level of production since 1978.¹³

¹⁰ "International Energy Agency (IEA). 2012 "World Energy Outlook Special Report on Unconventional Gas: Golden Rules for a Golden Age of Gas?"

¹¹ Id.

¹² S.F. Tierney, *The U.S. Coal Industry: Challenging Transitions in the 21st Century*, (2016), ES-1.

¹³ 2017. "U.S. coal production and coal-fired electricity generation expected to rise in near term." U.S. Energy Information Administration. February 08. <https://www.eia.gov/todayinenergy/detail.php?id=29872>.

Furthermore, in Appalachia, the best seams have already been mined out, shifting demand to cheaper western coal, and increasing energy efficiency has kept energy demand flat. In fact, according to the 2017 Sustainable Energy in America factbook by Bloomberg New Energy Finance, while GDP increased by 12 percent from 2007 to 2016, energy use decreased by 3.6 percent¹⁴. Other important factors that led to a rapid decline in coal production are the dramatic drop in the cost of renewable energy, along with increasing wind and solar generating capacity¹⁵, as well as the loss of price advantage due to increasing difficulty to retrieve coal inexpensively¹⁶. Additionally, in the past few years, the coal industry and some Republican allies have been lamenting an ongoing “war on coal”, waged by the Obama administration, aimed at setting more stringent regulations on coal-fired power plants, therefore crippling the industry.¹⁷ Environmental regulation has undeniably played a role in the decline in coal production in Appalachia. Title IV of the Clean Air Act Amendments of 1990 for instance, required a reduction of sulfur dioxide emissions, and promoted the use of technologies such as scrubbers to clean high-sulfur coal.¹⁸ To comply, many utilities began shifting from the high-sulfur coal of areas of the Illinois Basin and Northern and Central Appalachia mines to the Powder River Basin in Wyoming, the major source of low-sulfur coal in the United States.¹⁹

Additionally, after the implementation of the Mercury and Air Toxics Standards (MATS) Rule in 2015, some older, high-emission plants became unprofitable to operate. In fact,

¹⁴ Bloomberg New Energy Finance (BNEF) and the Business Council for Sustainable Energy (BCSE), 2017, *Sustainable Energy in America Factbook*

¹⁵ Tierney, “U.S. Coal”.

¹⁶ Id.

¹⁷ Grunwald, “New Carbon

¹⁸ Clean Air Act Amendments of 1990, P.L. 101-549, 104 Stat. 2399, 1990-11-15.

¹⁹ Emil D. Attanasi and David H. Root, “Coal-Fired Power Generation, New Air Quality Regulations, and Future U.S. Coal Production,” *Environmental Geosciences* 6, no. 3 (1999): xx, doi:10.1046/j.1526-0984.1999.08044.x.

the majority of the 28 GW of coal retirements between 2013 and 2015 came in 2015 when the MATS rules required compliance²⁰. In spite of those occurrences, a recent study estimated that recent environmental regulations only accounted for about 3.5% of the total 33% decline in U.S coal production²¹. Even during high production rates, thousands of coal miners were losing their jobs, as the mechanization of extraction and a shift to surface mining, resulted in fewer workers needed to mine greater amounts of coal. Between 1975 and 2000, total employment in the U.S. coal industry dropped by more than a half (from nearly 225,000 to under 110,000). In the last 15 years of the 20th Century, coal-mining jobs dropped by 53 percent²². By 2010, after the shale revolution, natural gas production surpassed that of coal (Figure 2), which has since been on a steady decline, plummeting 18% in 2015 and reaching its the lowest level of production since 1978. Coal production in Appalachia fell nearly 45 percent between 2005 and 2015, more than double the average 21 percent rate of the national decline during the same period.²³

²⁰ Eric Bowen, Ph.D et al., *An Overview of the Coal Economy in Appalachia*, report, West Virginia University, January 2018, , https://www.arc.gov/assets/research_reports/CIE1-OverviewofCoalEconomyinAppalachia.pdf.

²¹ Carley, S., Evans, T. and Konisky, D. (2017), *Adaptation, culture, and the energy transition in American coal country*. *Energy Research & Social Science*, 37, pp.133-139.

²² Tierney, "U.S. Coal".

²³ Bowen, "An Overview".

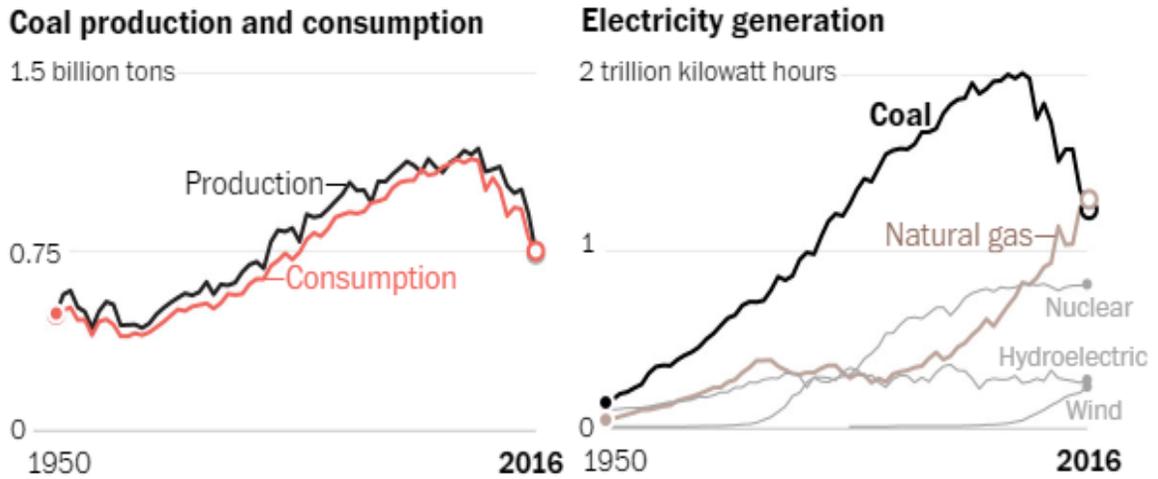


Figure 2: Coal trends.

In the United States, coal accounts for about fifteen percent of primary energy use, and was the source of about thirty percent of the electricity generated in 2016²⁴, therefore still representing an important component of the U.S. energy mix.

²⁴ "Use of Coal", (2017), U.S. Energy Information Administration. Office of Energy Statistics. Department of Energy. https://www.eia.gov/energyexplained/index.cfm?page=coal_use

2.3 COAL JOBS DECLINE

The dramatic decline of coal use and the need for mining resulted in a rapid loss of related jobs in the Appalachian coal region. According to data from the U.S. Bureau of Labor Statistics, as of January 2018, there were 51,900 coal mining jobs in the nation, compared with 77,400 only 10 years ago²⁵. In Appalachia alone, the total number of employees in 2016 decreased by 27.4 percent since the previous year, going from about 37,000 miners in 2015 to about 27,000 in 2016.²⁶

Coal mining has increasingly become a mono-economy in the region, due to a lack of job alternatives with a comparable salary, and “families with generational ties to the land, or those who are financially incapable of moving away, must do what they can to survive”²⁷. The situation became more difficult also due to the promises made by Donald Trump to bring back coal jobs, made during and after his presidential campaign, a promise that he might not be able to keep as the nation transitions to different sources of energy.

²⁵ "Bureau of Labor Statistics Data," Databases, Tables & Calculators by Subject, <https://data.bls.gov/timeseries/CES1021210001>.

²⁶ U.S. Energy Information Administration, Annual Coal Report, (15 November 2017), retrieved from <https://www.eia.gov/coal/annual/>

²⁷ Nick Mullins, "The Mono-Economy Of Coal." The Huffington Post. December 12, 2017, https://www.huffingtonpost.com/entry/the-mono-economy-of-coal-or-how-to-maintain-a-captive_us_599c53a1e4b09dbe86ea374b.

2.4 TRAINING PROGRAMS FOR EMPLOYMENT

The U.S. government has a long history of attempted job training reform. Following high rates of unemployment in the late 1950s to early 1960s, Congress passed the Area Redevelopment Act (ARA) of 1961, followed by the Manpower Development and Training Act (MDTA) of 1962 which were designed to improve the skills of the unemployed and promote employment where skills were needed²⁸. In more recent times, Congress enacted two major employment and training programs: the Adult and Dislocated Worker programs authorized under the Workforce Investment Act of 1998 (WIA), which cost roughly \$8 billion in 2013, and served about 8 million job seekers²⁹. In 2014, the Workforce Innovation and Opportunity Act (WIOA) reauthorized these programs, while offering services like those under WIA³⁰.

The U.S. Department of Labor, Employment and Training Administration only began evaluating those training programs in 2008, after initiating the WIA Adult and Dislocated Worker Programs Gold Standard Evaluation³¹. The Gold Standard Evaluation addresses the following questions:

- Did access to intensive services and training through the WIA Adult and Dislocated Worker programs lead to better employment-related outcomes?
- How were the WIA Adult and Dislocated programs implemented?
- Were the services cost-effective?³²

The 2015 report assessing the 15-month impact of the program found that, although after intensive training job seekers were more likely to find a job, that

²⁸ Floyd A. Patrick, "An Analysis of Federal Retraining Programs.," *Labor Law Journal* 20, no. 1 (January 1969).

²⁹ "Workforce Investment Act Adult and Dislocated Worker Programs Gold Standard Evaluation.," 2017, *Mathematica Policy Research*, Accessed December 8. <https://www.mathematica-mpr.com/our-publications-and-findings/projects/wia-gold-standard-evaluation>.

³⁰ *Id.*

³¹ *Id.*

³² *Id.*

did not equal to an increase in earnings³³. The findings also showed that those who received the most extensive services were less likely to obtain health insurance and pension or retirement benefits³⁴. The American Recovery and Reinvestment Act (ARRA) of 2009 was a \$800 billion stimulus package created to revive the economy after the recession that began in 2007. The stimulus funded job training programs to propel employment of US workers, which included training for jobs in the renewable energy sector. Additionally, in 2014 President Obama, announced \$600 million in investments in job training programs, and more specifically \$500 million worth of grants to community colleges to make students more employable, and \$100 million towards the expansion of apprenticeship programs³⁵.

The Job Training and Career Counseling industry helps the unemployed develop their skills through job training and counseling provided mostly by nonprofit or government entities³⁶. Nationally, this industry reports a revenue of \$14.6bn³⁷, while total spending on programs in the U.S. “from federal and state jobs initiatives to on-the-job training, certifications, community college, and employer training” for those not going to four-year colleges, is at least \$300 billion a year. Those numbers paint a picture of a government that is heavily invested in educating and employing its workforce, at least financially, yet many programs have no positive effect at all.

³³ Sheena McConnell et al., *Providing Public Workforce Services to Job Seekers: 15-Month Impact Findings on the WIA Adult and Dislocated Worker Programs*, report (Washington, DC: Mathematica Policy Research, 2016).

³⁴ Id., p. xxiii

³⁵ Maya Rhodan, "Job Training Initiative Announced by Barack Obama," Time, April 16, 2014, <http://time.com/65635/obama-job-training-initiative/>.

³⁶ Dylan Miller, *Career change: As unemployment decreases, demand for job services will suffer*, report, Job Training & Career Counseling in the US (IbisWorld, 2017)

³⁷ Id.

2.5 FEDERAL RETRAINING INITIATIVES IN COAL COUNTRY

The coal industry has long been the principal source of economic affluence and good-paying jobs in mining communities. Therefore, the steady decline in coal demand has deeply shaken entire coal mining communities, and Appalachia has taken the hardest hit. As a response, in 2016 the Obama administration announced the availability of \$65.8 million through the Partnerships for Opportunity and Workforce and Economic Revitalization (POWER+ Plan) Initiative to help diversify the economy of historically coal dependent communities, and develop new strategies for economic growth and worker advancement³⁸. The POWER National Dislocated Worker Grant (POWER DWG) addresses needs in Ohio and Kentucky, while a National Emergency Grant (NEG) addresses needs in West Virginia³⁹.

In spite of numerous resources, Trump's promise to revive coal production and bring back coal mining jobs is creating false hopes in the coal communities, which are now turning down retraining in other fields in hope of repeals of environmental regulations and restrictions⁴⁰. "Although there have been small gains in coal output and hiring this year, driven by foreign demand, production levels remain near lows hit in 1978"⁴¹ There are thousands of retraining programs nationally, a few of which target coal miners nationally, and in Appalachia. Following is a description of the methods used to identify and assess the selected case studies

³⁸ W. Wassermann, "Obama Administration Announces \$65.8 Million Available for Economic and Workforce Development in Coal-Impacted Communities" Newsroom, March 17, 2016, <https://www.eda.gov/archives/2016/news/press-releases/2016/03/17/power.htm>.

³⁹ "Division of Coal Mine Workers' Compensation (DCMWC)," U.S. Department of Labor - Office of Workers' Compensation Programs (OWCP) - Division of Federal Employees' Compensation (DFEC) -, , <https://www.dol.gov/owcp/dcmwc/powergrants.htm>.

⁴⁰ Id.

⁴¹ Id.

3. METHODOLOGY

Many existing federal retraining programs across the US and over several decades have not yielded positive results, as well as the numerous failed attempts by outside entities to “fix” the employment crisis in coal country. Therefore, I was interested in finding and understanding programs that appear to be effective in retraining displaced coal workers. The initiatives explored in this paper were chosen because of their Appalachian origins: conceived in Appalachia, for Appalachian coal communities and by Appalachians.

The foundation of this study was built on case-study methodology, and data was collected through digital representations and semi-structured interviews (See Appendix A for interview questions). I began with a desktop study to gather the background information for my research. After identifying the case studies, I utilized the Kirkpatrick’s Four Levels Model (discussed below) to inform my question design as part of recorded semi-structured interviews with key informants for each organization. The informants are: Marilyn Wrenn, Coalfield Development’s Chief Operating Officer; Dan Conant, founder of Solar Holler; and Payton May, Director of Operations and Design at Bit Source.

I initially emailed the informants to request more information about the respective organizations, and an interview. All three interviews took place over the phone and lasted about thirty minutes, participants gave consent, and were provided with a draft of the report for verification and accuracy. The type of case study based on selection is collective, meaning multiple case studies are selected based on their “ability to contribute

to a general understanding of a phenomenon⁴² which in this instance is retraining of Appalachian workers in coal communities. Based on Yin's (2014) framework, the type of cases based on study purpose are exploratory in nature, a form of pilot study to inform subsequent research.⁴³

For the purpose of this study, I looked for the most well-established frameworks to evaluate training programs, and I opted for the Kirkpatrick Four Levels Model as reference while assessing each case study and preparing the interview questions. The four levels are: Reaction, Learning, Behavior, Results. *Reaction* measures how the trainees reacted to the training, and whether it was well-received. *Learning* defines what the trainees have learned as a result of the training, while *Behavior* assesses how trainees apply the information, and the change in behavior due to the training. *Results* is simply about the observed results from the training.⁴⁴ In addition to the Kirkpatrick's Four Level book, my research was supported by papers on research methodology to learn about assessment approaches for training programs⁴⁵.

4. CASE STUDIES

There have been numerous efforts undertaken to help displaced workers in coal communities transition to other jobs, but few left a durable impact. The following case studies were chosen primarily because they are organizations based in Appalachia and

⁴² Marion L. Pearson, Simon P. Albon, and Harry Hubball, "Case Study Methodology: Flexibility, Rigour, and Ethical Considerations for the Scholarship of Teaching and Learning," *Canadian Journal for the Scholarship of Teaching and Learning*, 2015, xx, doi:10.5206/cjsotl-rcacea.2015.3.12.

⁴³ Id.

⁴⁴ D.L. Kirkpatrick, and J.D. Kirkpatrick, *Evaluating Training Programs: The Four Levels*, San Francisco: BK, Berrett-Koehler, 2012.

⁴⁵ J. Kluge, S. Puerto, et. 2016; JOBS Skills Assessment, 1992

founded by Appalachian to help their struggling coal communities. They are also particularly interesting due to their innovative practices, and effective training methods.

4.1 CASE STUDY #1: COALFIELD DEVELOPMENT

Coalfield Development Corp. was launched by Brandon Dennison, a West Virginia native, to bring work and training opportunities to a region dominated by coal mining and facing a steep decline of jobs available.⁴⁶ The initial goal was to hire unemployed people to build energy-efficient and affordable housing in the area⁴⁷. With time, the organization expanded into a group of five social enterprises, and the mission morphed as follows:

To support a family of social enterprises that inspire the courage to grow, the creativity to transform perceived liabilities into assets, and the community needed to cultivate real opportunity in Appalachia through mentorship, education, and employment⁴⁸.

Through Coalfield Development, laid-off coal miners have a real opportunity at employment as they receive priority to participate in their programs. The organization follows a 33-6-3 model, meaning that trainees commit to completing 33 hours of paid work, six hours of community-college classes and three hours of life-skills mentorship classes every week. After two years trainees earn an associate degree and professional certification in fields such as solar installation and asbestos removal⁴⁹.

⁴⁶ Bloch, Hannah. 2017. "Job Renewal in Appalachia; Coalfield Development Corp. is Training Unemployed People in West Virginia to Work in Industries Like Agriculture and Solar Power." *Wall Street Journal (Online)*, Jul 07.

⁴⁷ Id.

⁴⁸ "Social Enterprises," Coalfield Development, accessed May 1, 2018, <http://coalfield-development.org/realized-potential-social-enterprises/>.

⁴⁹ Id.

4.1.1 SOCIAL ENTERPRISES

Coalfield Development’s five social enterprises are: Reclaim Appalachia, Rediscover Appalachia, Refresh Appalachia, Revitalize Appalachia and Rewire Appalachia. Coalfield’s CEO, Marilyn Wrenn explained “all of our social enterprises are structured more like for-profit businesses, although they are actually under our nonprofit umbrella, but they are market shapers and are true market drivers”. Through those five social enterprises, Coalfield Development Corp. “have created more than 40 on-the-job training positions, more than 200 professional certification opportunities, [and] redeveloped more than 150,000 square feet of dilapidated property”⁵⁰.

4.1.2 FUNDING

The most recent gross income reported was \$2,361,866 from fiscal year 2015⁵¹, and 42 percent of the revenue is earned by selling materials salvaged from construction sites. The organization receives financial support from private and public programs like the Appalachian Regional Commission (ARC) and the U.S. Department of Health and Human Service’s Community and Economic Development program. ARC is a federal-state partnership that was established by an act of Congress in 1965, and its mission is to “mission is to innovate, partner, and invest to build community capacity and strengthen

⁵⁰ Coalfield Development. <http://coalfield-development.org/about-us/>.

⁵¹ Guidestar, "Coalfield Development Corporation", Guidestar.org, <https://www.guidestar.org/profile/26-3836207>.

economic growth in 420 counties across the 13 Appalachian states.”⁵² ARC was also responsible for awarding a \$1,870,000 grant to Coalfield Development Corp through the Obama administration’s Partnerships for Opportunity and Workforce and Economic Revitalization (POWER) Initiative⁵³. Grants total almost \$700,000 from ArtPlace America, the Mary Reynolds Babcock Foundation, and other nonprofit organizations⁵⁴.

Coalfield is committed to making an impact through partnerships with others. Nevertheless, Brandon Dennison, founder of Coalfield Development, has identified at least three ways in which the federal government can be more effective in its engagement with Appalachia. Firstly, by offering increased support for the Appalachian Regional Commission, whose investments in economic development are crucial for the region; increase funding to the Community and Economic Development program at DHHS; pass the RECLAIM Act (H.R. 1731), which would make \$1 billion available for mine-land reclamation projects that are linked to economic development end uses⁵⁵.

4.1.3 TRAINING

The highlight of Coalfield's operation is its comprehensive training, also called Quality Jobs Initiative (QJI). The program follows the 33-6-3 model as previously noted, with an objective to lay the foundation for a quality life. Young locals are recruited, ranging from

⁵² https://www.arc.gov/images/appregion/fact_sheets/ARCFactSheet2-17.pdf

⁵³ https://www.arc.gov/images/grantsandfunding/POWER2016/POWER2016_Awards_WHFactSheet_8-24-2016.pdf

⁵⁴ Daniels, Alex. 2016. "Hope on the Homefront." *Chronicle Of Philanthropy* 28, no. 3: 14. *MasterFILE Premier*, EBSCOhost.

⁵⁵ Dennison, Brandon. "We Urgently Need to Find a Replacement for King Coal's Disappearing Jobs." *Newsweek*. January 21, 2018. <http://www.newsweek.com/we-urgently-need-find-replacement-king-coals-disappearing-jobs-786286>.

recent high school graduates to those in their twenties, to eventually take on the organization's construction, deconstruction, and rehabilitation projects⁵⁶. In fact, in addition to learning contracting and construction concepts including plumbing and electrical wiring, crew members dismantle old structures and either recycle, resell, or repurpose the material. The practice is so effective that “Dennison claims around 80% of deconstructed material is reused, with only 20% going to landfills. In a recent project, Coalfield gutted a 10,000 square foot building utilizing only a single construction dumpster” for waste⁵⁷.

4.2 CASE STUDY #2: SOLAR HOLLER

Dan Conant, a native of Jefferson County, West Virginia, studied international politics and environmental science, and helped advance a variety of solar energy programs in several states including the largest solar installer in Vermont. Meanwhile in his state, the coal crisis was ongoing, while many, including his family and friends, were losing their jobs. Conant decided it was time to do something to help people in his home state, so he moved back and in 2014 he founded Solar Holler whose mission is “Repowering West Virginian homes, businesses, and non-profits with renewable energy”⁵⁸

⁵⁶ Jones, Dylan. n.d. "BLOG – Quality Jobs." Coalfield Development. <http://coalfield-development.org/quality-jobs/>

⁵⁷ Id.

⁵⁸ <http://www.solarholler.com/project/shepherdstown-presbyterian-church/>

4.2.1 FUNDING

In my interview with Conant, he explained that Solar Holler originally started as a financing company for non-profits looking to get solar in Western Virginia. That was done by designing groundbreaking, crowdfunding programs which made solar affordable within the state. To finance its first solar project with Shepherdstown Presbyterian, Conant attempted to do a power purchase agreement with the church, as it is done in 25 states, but its efforts were blocked by the WV government⁵⁹. As a result, Solar Holler developed an innovative system through a crowd funding program which earned them the Interfaith Power & Light's National Renewable Role Model award.

Solar Holler partnered with Maryland-based Mosaic Power, and found 100 local supporters and businesses to install Mosaic remote controllers on their electric water tanks. These remotes, installed, operated and paid for by Mosaic Power, turn the water heaters on and off in accordance with grid demand, while paying participants \$100 per tank per year. Rather than taking the payments themselves, solar project supporters allow these payments to go toward paying for the solar panels for the organization. After installing enough Mosaic remote controls to pay for a solar system, a local solar company is hired for the installation, and Solar Holler donates the system to the organization. Solar Holler was repaid by the income from the Mosaic controllers, and through solar renewable electricity certificates, credits that are sold to utilities. Conant explained that the first five projects benefiting nonprofits were funded through this system, while for-

⁵⁹ Eillie, Anzilotti. "How The Next Generation Of West Virginians Are Building A Way Out Of The State's Coal Economy", Fast Company, June 29, 2017, <https://www.fastcompany.com/40434038/how-the-next-generation-of-west-virginians-are-building-a-way-out-of-the-states-coal-economy>.

profit companies simply pay for the installation themselves. Today, the organization provides installation of solar powered energy to homeowners, businesses and community organizations. It has shifted away from the crowdfunding sourcing for nonprofits, and instead, depending on the project, it relies on investors, government funding, and out-of-pocket resources to pay for equipment and installation.

In 2016 an important partnership was formed partly thanks to a donation of \$150,000 by U.S. Mayors Conference and Wells Fargo, to help Solar Holler partner with Coalfield Development⁶⁰. Solar Holler would find projects and take care of logistics through crowdfunding, and Coalfield would retrain miners and provide the installation crews. The new program was renamed ReWire Appalachia and it became one of the social enterprises under Coalfield Development Corp, going from having four workers to a dozen⁶¹.

4.2.2 TRAINING

Solar jobs are in high demand, even in West Virginia to the extent where Solar Holler was recently backed up on sixteen projects⁶². Therefore, as Conant also recognized, the training for the workers is crucial to achieve the organization's mission to expand solar energy across the state. In fact, before the trainees start working for Solar Holler, an electrical apprenticeship is required. The partnership with Coalfield

⁶⁰ Clark Davis, "Coalfield Development Corporation to Team With Solar Holler," West Virginia Public Broadcasting, last modified September 28, 2016, <http://wvpublic.org/post/coalfield-development-corporation-team-solar-holler#stream/0>.

⁶¹ Madrid, Manuel. "Going Solar in West Virginia." The American Prospect. Last modified April 14, 2017. <http://prospect.org/article/going-solar-west-virginia>.

⁶² Jason Margolis, "After Generations Working in Coal, Young West Virginians Are Finding Jobs in Solar," Public Radio International, last modified September 12, 2017, <https://www.pri.org/stories/2017-09-12/after-generations-working-coal-young-west-virginians-are-finding-jobs-solar>.

Development is very cost effective for Solar Holler, as they do not bear the cost of recruiting and training employees, which Coalfield does by providing a paid 2.5 years apprenticeship program. In order to begin the apprenticeship, trainees take a state exam. Next, trainees need to attend a two-week Associate certification class, in which they are taught every aspect of the solar installation system, and all that goes into it including savings. Then they take their exam for their Associate certification and eventually will continue on learning on the job, rather than keep them in a classroom.

Typically, Solar Holler targets trainees that previously never had a job, and those from coal communities, which, Conant points out, is very different from the coal industry. Occasionally, workers from other industries are hired, including a handful of former miners, although that is not the objective. The reason for hiring workers starting their first job is the need for the ability of people to stay in their home state in West Virginia rather than moving away for jobs and for opportunities. A young adult leaving high school might be faced with the decision of whether they are going to be able to have a chance to stay at home or be forced to move out of the region for opportunities. That's when Solar Holler steps in with an opportunity to allow them to stay and do something positive in their state.

To give the trainees as much hands-on training as possible, Solar Holler is helping Coalfield Development set up a 96,000-square-foot facility center in an old, abandoned factory in Huntington, West Virginia. There, trainees can practice installing panels on a

shed behind the main building to help them become comfortable working on a roof, and are taught how the arrays create electricity and connect to the power grid.⁶³

4.2.3 FUTURE OUTLOOK

The long-term vision of Solar Holler is to dramatically shift the economics of solar in West Virginia, by changing the way West Virginia generates energy in the state. The organization continues to expand, as the number of installations and of people working on the various projects are showing. There have been about 50 installations to date, but Solar Holler is ramping up, currently performing between 8 to 10 installations a month on average.

The partnership with Coalfield Development is a major part of their continued success, where Coalfield is responsible for the recruitment and initial training of workers, as well as their continued personal development, which enables Solar Holler to focus its time and resources on all the remaining phases of the solar installation. They continue to recruit, not from the coal industries themselves, but from the communities that were left behind by the mine closures. Conant indicated during our interview that communities have been very supportive of the organization's effort, says Conant. He is also confident of the way his organization is structured, and its ability to turn the tide and result in a positive outcome for West Virginia, without any further assistance from the state, as long as the government will not become an obstacle to Solar Holler work.

⁶³ Margolis, "After generations"

4.3 CASE STUDY #3: BIT SOURCE

The concept of a coal miner brings to mind a person covered in dust, working underground with only a few tools at hand. But today's coal miners possess a much broader set of skills than in the past, as coal mines are now equipped with a series of technologies and machinery. Rusty Justice, entrepreneur and former coal miner, and his business partner M. Lynn Parrish decided to take advantage of the untapped potential miners represented, and seek new ventures to diversify their portfolio away from their engineering and excavation business⁶⁴.

They knew that one of the main deterrents to former coal workers to transition to a new field, is the lack of high-paying options, as a coal miner salary ranges between \$60,000-\$70,000. After learning that junior developers in Kentucky earn a similar amount, Justice decided to form a coding business called Bit Source (named after bituminous coal), which hired laid-off coal miners. In 2015, after setting up the company's headquarters in a former Coca-Cola bottling plant, Justice advertised 10 positions which attracted over 900 applicants⁶⁵. Payton May, Director of Operations and Design at Bit Source, explained that Bit Source was started as an effort to train out-of-work coal miners or people who were part of the industry, to be software developers. At first, federal funds covered expenses to pay the apprentices \$15 per hour, while May was

⁶⁴ Peterson, Erica. "From Coal To Code: A New Path For Laid-Off Miners In Kentucky." NPR. May 06, 2016. <https://www.npr.org/sections/alltechconsidered/2016/05/06/477033781/from-coal-to-code-a-new-path-for-laid-off-miners-in-kentucky>.

⁶⁵ Prachi Patel, "The Kentucky Startup That Is Teaching Coal Miners to Code," IEEE Spectrum: Technology, Engineering, and Science News, last modified February 15, 2017, <https://spectrum.ieee.org/energywise/energy/fossil-fuels/the-kentucky-startup-that-is-teaching-coal-miners-to-code>.

hired as the Creative Director, and later shifted into an Operations role, responsible for managing projects, clients, teams, and working with the Accounting Department. Current Bit Source President Justin Hall, also joined the team and has led the effort on the software and business development side, putting together the curriculum for the training involving HTML, CSS, and JavaScript, as well as coaching the trainees.

When the ten positions were advertised, the objective was to get a representative sample of the coal sector, and select those who possessed the aptitude to become software developers. The final selection included three former underground miners, three former surface miners, three who were in support roles for the coal sector such as maintenance, planning, engineering, and one candidate from outside the industry. The ten people selected completed a 22-week training program, which eventually led them to a full time job within the company. Today, the team is comprised of 13 people, with the majority being former coal miners. There are nine developers, Hall as the lead architect, May as the Director of Operations and Design, a part-time designer and a business development employee.

May describes a very open organizational culture, where lines of communication are readily accessible through chat channels for every project. Also, all the data for projects is available to the team, aside from financial details. May elaborates this further: “[Such open organizational culture] encourages people to take ownership and responsibility in projects and further their own learning. We are trying to nurture an environment of continual learning, to continue to be innovative while we solve local problems and develop connections to the outside market to sustain ourselves.”. The learning is not limited within the organization, in fact through another training grant

developers can achieve additional certifications such as mobile app and game development. Each developer chooses a separate track, and when they are not actively working on a project, they are pursuing one or more certifications.

This approach has proven effective: to date, only one employee left the company due to personal matters, rather than dissatisfaction in the workplace.

The difficulty Bit Source has to currently face, is how to scale up the business, as the local market quickly saturated.

5. DISCUSSION: LESSONS FOR EFFECTIVE MENTORING INITIATIVES

The initiatives explored are innovative, and at a crossroad between a nonprofit and business model. Although somewhat different, several components are common across the case studies, and they are described as follows.

5.1 COMMUNITY MATTERS IN COAL COUNTRY

A great part of the reason why the initiatives explored have found a level of success, is certainly their deep ties to the local communities. All three organizations were founded by Appalachians who had a strong desire of helping their community and bring innovation and development to the region, because they understand, at times first-hand, the hardship coal communities are facing. Rusty from Bit Source was motivated by its belief that coal workers defy the belittling stereotypes, and there was potential to be harnessed. Dan Conant from Solar Holler wants to make solar power affordable and available throughout its state, and planned to involve the communities left behind by the

mining industry to do so. Also, he began working with local nonprofits to install solar panels, involving members of the community to fund the solar projects. Even now that its focus is more business-oriented, they have not stopped making an impact in the community. Founder Dan Conant does not view Solar Holler simply as a solar installer, but as a tool to cut the energy bills of families and help organizations, for example by using an allocated fund to install energy efficiency retrofits. Such projects have benefited The Boys and Girls Club in Huntington, the Coalition for the Homeless, and a 53-unit downtown apartment complex for the homeless, in which they installed LED for the whole building⁶⁶. When trainees know that their work is helping their struggling community, it will add to the value of their work, and encourage them to continue. Since the launch of the Rewire Appalachia program in partnership with Coalfield Development in 2015, they now employ more than twenty people, a number that will continue to grow as the program trains up to ten people each year. Coalfield Development is reinventing retraining initiatives, blending its drive to develop the potential of Appalachian places and people with social enterprises, to cultivate opportunities in the communities.

5.2 DIVERSIFICATION IS BENEFICIAL

The second finding shows the importance of diversification, which we can especially see from Coalfield's family of enterprises. Formed in 2013, Reclaim Appalachia hires the unemployed to converted areas impacted by mining, into

⁶⁶ Lavender, Dave. "WV Group Training Workers to Install Solar Panels." Williamson Daily News. April 11, 2018. http://www.williamsondailynews.com/news/wv-group-training-workers-to-install-solar-panels/article_7848e756-b62e-5fb1-873e-7e28a3569898.html.

“sustainable economic development sites”⁶⁷. Rediscover Appalachia develops local small businesses in the hopes of attracting visitors to the region and increase the appeal of its people and places. Revitalize Appalachia, on the other hand, makes use of on-the-job training to develop its work-crews in the green construction business, by redeveloping mainly abandoned buildings into energy-efficient and environmentally friendly properties. Finally, the goal of Rewire Appalachia is to triple the amount of solar power generated in West Virginia, and Refresh Appalachia trains the unemployed to become farmers and to make healthy food more accessible to low- and middle-income communities.

Bit Source is unique as it retrains displaced miners in a completely different field from that with which they are familiar: coding. The job was surprisingly popular when first advertised: as noted above, for 10 positions available, there were over 900 applicants. It should be noted that a major deterrent for coal miners to transition to a different field is the difficulty in finding a job that would pay as well as mining which varies around \$60,000-\$70,000. Junior developers earn a similar amount which is also what pushed Bit Source founder to pursue that particular field, and could be one of the factors that attracted so many applicants.

5.3 PARTNERSHIPS CAN BE COST EFFECTIVE

The organizations studied have shown that partnership can be particularly beneficial, such as the one between Coalfield and Solar Holler. Solar Holler finds

⁶⁷ Reclaim Appalachia. N.d. <http://reclaimappalachia.com/>.

projects and takes care of logistics, while Coalfield retrain miners and provide the installation crews. The partnership is very cost-effective for Solar Holler, as they do not bear the cost of recruiting and training employees, which Coalfield does by providing a paid 2.5 years apprenticeship program. Coalfield's founder Brandon Dennison also recognizes that to serve a greater number of people in Appalachia their work alone is not enough. Support from private and public entities like the Appalachian Regional Commission (ARC) "are essential to ensuring we can adequately support coal communities as we transition to a sustainable economic future"⁶⁸.

5.4 HOLISTIC TRAINING

A pillar of these initiatives is their training, which is holistic in a variety of ways. Coalfield Development offers a 33-6-3 Workforce Development Model: 33 hours of paid work, six hours of community-college classes and three hours of life-skills mentorship classes every week. The training is also paid, which is essential to attract workers that might not be able to afford unpaid training. While Bit Source provides a 22-weeks training, producing in a certification that can be helpful in the long term, and also providing mentorship whenever needed.

The educational element of each program is vital to the success of the organization, and the continued growth of the trainee. Coalfield Development partners with community colleges that offer trainees the chance attend six credit hours per week of

⁶⁸ Dennison, Brandon. "We Urgently Need to Find a Replacement for King Coal's Disappearing Jobs." Newsweek. January 21, 2018. <http://www.newsweek.com/we-urgently-need-find-replacement-king-coals-disappearing-jobs-786286>.

science, technology, engineering and mathematics (STEM) courses toward an applied science degree. The Associate Degree represents a first step to lifelong learning, and some trainees continue their education to pursue a four-year degree.

5.5 INVESTING TOWARD EMPLOYEES' GROWTH

A truly outstanding training is one that readily invests in its participants.

Coalfield's overall goal is to provide a quality life to the participants of its program, and the life skills (3) component of their 33-6-3 model wants to fill the gap between what is taught in schools and day-to-day life by teaching financial skills and instilling personal responsibility in its crew members. Classes are described as follows:

Concepts taught in life skills include time and money management, leadership, emotional and physical health, tolerance, and the setting and achievement of long-term goals. (...) In an area with high poverty, financial skills are that much more crucial to the success and longevity of community members⁶⁹.

5.6 ORGANIZATIONAL CULTURE

Low retention is one of the main hurdles to overcome in retraining programs.

Coal communities are generally very proud of their heritage, and when workers are forced to move on to a new sector, it can be a daunting experience. As we have seen, there are a number of things that may help attract displaced workers to join a specific retraining program, and it was also observed that there are certain factors which influence the rate of retention as well. Organizational culture appears to be one of them, and more specifically, an open, transparent environment with clear lines of communications among

⁶⁹ Jones, Dylan. n.d. "BLOG – Quality Jobs." Coalfield Development. <http://coalfield-development.org/quality-jobs/>

all workers and management, seem to be particularly effective. When employees are encouraged to share ideas and opinions with colleagues and management, it contributes to making them feel valued and it helps the organization thrive.

6. CONCLUSION

The paper serves to advance understanding of the current cultural and employment situation in Appalachian coal country. As jobs in Appalachian coal communities continue to disappear, local retraining programs focused on utilizing and maximizing the skills of displaced coal workers, can reshape the social and economic aspects of the region.

After taking an in-depth look at three Appalachian organizations designed to benefit coal communities, it was found that (1) community ties help ensure training attractiveness and success of the training; (2) retraining should be diversified to a variety of fields to benefit the regional economy, especially in coal country, where often coal mining becomes a “mono-culture”; (3) holistic training yielded positive results in case studies, (4) an open and encouraging organizational culture helps the workers feel more valued; (5) lower pay is not necessarily a deterrent when paired with growth opportunities, such as certifications or classes from community colleges. In spite of this, a comparable or higher pay than coal mining jobs is important to attract and retain workers from coal communities; (6) a positive, open organizational culture can contribute to a program’s success.

The identified limitation of this study is the small sample size, and for that reason each case has been approached in-depth. Furthermore, a longitudinal study was not possible due to the time constraints of the capstone program. Undertaking an extensive study of the topic over a longer timeframe is recommended to build on the findings, and to better respond to the needs of displaced coal workers. Further questions could be explored by building on or extending on this study, including how to apply the concepts developed by these organizations on a larger scale, and to other coal regions.

Policy will play a key role in ensuring that coal communities can diversify and expand their economy to continue to thrive. It is important that policymakers maintain and expand future support for the Appalachian Regional Commission, which makes critical investments in economic development.

This research also identified pointers for individuals engaged in training programs. To maximize efficiency, training programs should be tailored to the needs and capabilities of displaced coal workers, rather than utilizing a standardized method. Applying the findings in this paper widely could improve the likelihood of successful job transitions and increase retention of displaced coal miners, as well as support to their community.

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9. APPENDIX

A. Interview Questions

- Your role?
- Can you tell me about the organization in your own words?
- How many people did you train? How many are working there right now?
- How would you describe your organizational culture?
- Did the trainees feel that the training was worth their time?
- What were the biggest strengths of the training and the program, and the biggest weaknesses?
- Would the trainees consider the training challenging?
- How proficient are they at their tasks? And what did it take to reach this level? More training? Practice?
- What would they change about the program? How has your program evolved since it started?
- Are trainees able to teach their new knowledge, skills, or attitudes to other people?
- How has trainee attitude and behavior changed since they started?
- What is your biggest challenge?
- How do you measure success? What do you consider success?
- How many installations?
- Do you plan on expanding? What are the next steps?
- How can you reach out to more displaced miners?
- How did the coal community respond to your organization?
- Is there anything that would make it more likely for them to participate?

- Is there anything else that you would like to add?