

BEYOND MOUNTAINTOP REMOVAL: PATHWAYS FOR CHANGE IN THE APPALACHIAN COALFIELDS

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I. INTRODUCTION

In spite of mounting opposition, from court cases to protests, the environmentally destructive practice of mountaintop removal (MTR) mining continues in the Central Appalachian coalfields. By numerous indicators, MTR is not sustainable: its environmental impacts include water pollution, stream ecosystem degradation, deforestation, and the leveling of mountaintops; coal mining pollution has been linked to birth defects and increased rates of mortality and chronic disease; the wealth derived from coal extraction has historically been taken out of the region rather than reinvested to promote local prosperity; and mining substantially depletes coal reserves, causing projections to indicate that only a short lifespan remains for the industry (and the jobs it provides) in the region. Despite these indicators that the current trajectory is unsustainable, there are currently few economic alternatives to coal mining for these rural areas. Given this situation, what is the equitable and effective policy response? Further, and in line with the topic for this journal's issue, how could growth of the "green economy" in the region address these problems?

The campaign against MTR is multi-pronged and diverse. In fact, calling it a single campaign is misleading, because participants seek varying degrees of change. Some opponents critique MTR narrowly but still support other forms of coal mining, while others more broadly question whether any coal extraction is beneficial to the region.¹

Amidst the more traditional calls for the end of MTR, or even for the complete end to coal mining, has arisen another approach whose theory of change relies not on regulatory or legislative amendments to prohibit the mining technique but rather a strategy that attempts to diversify the economy beyond coal and thus *indirectly* end MTR. This approach circumvents the "jobs versus environment" dichotomy commonly raised in environmental politics by creating new "green collar" jobs. It relies on an assumed causal mechanism whereby economic dependence has led to political dependence, and this political dependence inhibits policy change to restrict MTR, despite the practice's

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1. This variation has existed throughout the opposition to surface mining in Appalachia. For instance, Friends of the Little Kanawha, a citizens group in West Virginia, while active in opposing mining projects in the early 1980s, stated that it was "not opposed to strip mining in general, but to it when a community's water, transportation, recreation, peace and quiet, and health is threatened." DAVID P. ELKINTON, FIGHTING TO PROTECT THE HIGHLANDS: THE FIRST FORTY YEARS OF THE WEST VIRGINIA HIGHLANDS CONSERVANCY 268 (2007).

damaging consequences.² Under this causal model, diversifying the economy beyond coal would trigger a decrease in political support for the coal sector and thus lead to policy change.

Still, there are different strategies for promoting green energy opportunities within a coal-dominated environment. One possibility is to campaign for abolition of surface mining in the region, in conjunction with advocating for and nurturing sustainable economic alternatives. A second option is to accept the economic and political position of coal and collaborate with the coal sector to make it more responsible, and from that platform create value-added industries that introduce diversified options. This article describes two case studies that typify each approach: the Kentuckians for the Commonwealth's (KFTC) Renew East Kentucky campaign follows the first approach, and West Virginia's JOBS Project and its pyrolysis proposal follows the second.³ The analysis of these cases indicates the barriers and opportunities encountered by each, though it stops short of determining the more effective route.

This article begins with a historical overview of coal, in particular the rise of MTR mining in Central Appalachia and the development of a public policy framework to govern its operations. Next, this paper describes its position that the coal sector is not sustainable for the Central Appalachian region and justifies this position using economic, environmental, and other trends. The contrasting cases of KFTC's Renew East Kentucky campaign and the JOBS Project's pyrolysis proposal are then reviewed against this background. The article concludes by considering the underlying theories of change on which these two cases are based.

II. HISTORICAL BACKGROUND

Appalachia's history is intrinsically intertwined with coal extraction.⁴ Though originally mined only underground, the use of surface ("strip") mining techniques took hold and greatly expanded during World War II's coal boom.⁵ This form of strip mining was the predecessor to MTR, in that it usually involved excavation along the contours of a mountain rather than at the peak. Although this method ameliorated the health impacts of underground mining (particularly black lung disease and mining accidents), early strip mining brought new dangers to the communities below and around the mine sites such as landslides,

2. For instance, following environmentalists' victory in district court in the case, *Bragg v. Robertson*, 54 F. Supp. 2d 635 (S.D. W. Va. 1999), which could have significantly halted MTR, all five of West Virginia's Congressional delegation members issued a joint press release stating that the ruling did not represent congressional intent. ELKINTON, *supra* note 1, at 337.

3. The JOBS Project takes no position on the coal industry in West Virginia. Its biochar proposal is not designed to counter coal mining or MTR. See *Smart-Technology*, THE JOBS PROJECT, INC., <http://jobs-project.org/our-focus/smart-jobs/smart-technology/> (last visited Apr. 3, 2012) (stating the proposal as focused on "post-mining land reclamation"). This article, however, employs the Project as a heuristic device to consider the different routes for achieving a sustainable economy including transitioning away from MTR.

4. See generally, JOHN A. WILLIAMS, APPALACHIA: A HISTORY (2002).

5. See generally, CHAD MONTRIE, TO SAVE THE LAND AND PEOPLE: A HISTORY OF OPPOSITION TO SURFACE COAL MINING IN APPALACHIA (2003) [hereinafter LAND AND PEOPLE].

flyrock, and flooding.⁶ Mine sites were commonly abandoned without being reclaimed due to the existence of only basic, ineffectively enforced reclamation laws.⁷ Further, the decentralized approach of state level regulations created a “race to the bottom” incentive within each state to attract and maintain mining operations by keeping regulations minimal and enforcement lax.⁸

Residents mobilized at the grassroots level against strip mining in the 1960s and early 1970s. They introduced bills in state legislatures to ban the practice,⁹ but none passed. Reformers then moved their focus to the federal level.¹⁰ In response to the grassroots movement in Appalachia, West Virginia Representative Ken Hechler proposed a bill to abolish all surface mining that received nearly one hundred co-sponsors.¹¹ However, instead of banning the practice, Congress shifted the issue away from a ban and toward regulation and balancing the adverse consequences of surface mining coal against the benefits of coal production.¹²

Congress wrangled over the passage of the Surface Mining Control and Reclamation Act (SMCRA) for six years, with President Ford vetoing the bill twice due to political concerns over the energy crisis, inflation, and unemployment.¹³ Amidst this conflict, members of the Appalachian mining industry introduced a newly developed mining technique called “mountaintop removal,” which was not a common practice during the time of the SMCRA debate. However, those mining companies that employed the technique, as well as Appalachian governors and congressmen, strongly supported it as a highly beneficial technique that Congress should approve.¹⁴ SMCRA finally passed,

6. See generally, WENDELL D. BERRY, *The Landscaping of Hell: Strip Mine Morality in East Kentucky*, in *THE LONG-LEGGED HOUSE* 12 (1965).

7. A 1974 House committee report pointed to twenty-nine states with surface mining laws, and it described how and why they fell short of reaching the protections citizens had rallied for: “Citizens who organized and lobbied for the new State laws generally assumed that old abuses were ended. . . . Unfortunately, public confidence in State regulation of surface coal mining has frequently been misplaced. As environmental problems multiply rather than recede, popular discontent has reasserted itself.” Insufficient staffing in state agencies and political influence of the coal industry are identified as reasons for inadequate enforcement. H.R. Rep. No. 93-1072, at 61 (1974).

8. See Molly E. Schechter, *Statutory Comment, The Surface Mining Control and Reclamation Act of 1977: Its Background and Its Effects*, 25 N.Y.L. SCH. L. REV. 953, 960–61 (1980) (explaining state regulation inequities).

9. For instance, in 1960 Harry Caudill introduced a bill to the Kentucky assembly to abolish surface coal mining, achieving little support from fellow legislators. Chad Montrie, *To Have, Hold, Develop, and Defend: Natural Rights and Movement to Abolish Strip Mining in Eastern Kentucky*, 11 J. APPALACHIAN STUD. 64, 67; see generally LAND AND PEOPLE, *supra* note 5 (detailing efforts by citizens of several Appalachian states to end strip mining in their states).

10. RONALD D. ELLER, *UNEVEN GROUND: APPALACHIA SINCE 1945* 145–63 (2008).

11. Schechter, *supra* note 8, at 962.

12. See generally, *id.* at 962–74 (detailing a series of regulatory bills considered by Congress for defining the federal government’s role in regulating MTR).

13. *Surface Mining Veto Justification Briefing: Hearing on the President’s Veto of H.R. 25 before the Subcomm. on Energy and the Environment & the Subcomm. on Mines and Mining of the H. Comm. on Interior and Insular Affairs*, 94th Cong. 2 (1975) (statement of Rep. Morris K. Udall); Uday Desai, *The Politics of Federal–State Relations: The Case of Surface Mining Regulations*, 31 NAT. RESOURCES J. 785, 789 (1991).

14. Governors Jay Rockefeller and Julian Carroll, of West Virginia and Kentucky respectively, testified in favor of including MTR as an approved mining method. Gov. Rockefeller advocated for

with President Carter's signature, in 1977. SMCRA's stated purpose is to construct "a nationwide program to protect society and the environment from the adverse effects of surface coal mining operations" through appropriate mining and reclamation procedures, and it gave particular attention to "assur[ing] that surface mining operations are not conducted where reclamation is not feasible."¹⁵

Congress created The Office of Surface Mining (OSM) under the Department of the Interior to implement the Act, but transferred much of the power to the individual states under a strongly state-oriented "cooperative federalism" arrangement.¹⁶ Issues concerning funding and communication between the state and federal level were problematic from the start.¹⁷ A key influence on the implementation of the Act has been changes made during the Reagan Administration under Secretary of the Interior, James Watt.¹⁸ Responding to industry and state complaints that OSM regulations promulgated under the Carter Administration went beyond congressional intent by giving too much responsibility to the federal level, Watt reasserted the role of the states emphasizing state discretion and flexibility.¹⁹

A. The Expansion of Mountaintop Removal

Before summarizing the expansion of MTR, an explanation of terms is necessary. While public salience on the opposition to destructive surface mining in Appalachia centers on the problem of "mountaintop removal," this title is partly inaccurate. MTR mining is a specific technique that coal operators can employ to mine an entire mountaintop and leave a flat plateau after the mining is complete.²⁰ Importantly, this requires an exemption from the federal reclamation

Senate Bill No. 7, to better accommodate the mining practice: "The proposed legislation does not, in my judgment, adequately allow for the mountaintop removal method, proven through practice in West Virginia, to be environmentally equivalent to the contour method of surface mining." *Surface Mining Control and Reclamation Act of 1977: Hearings on S. 7 before the Subcomm. on Public Lands and Resources of the S. Comm. on Energy and Natural Resources, 95th Cong.* 520 (1977) (statement of Gov. John D. Rockefeller). Industry advocates lobbied strongly in favor of MTR, emphasizing among other points that it better reflected state preferences under SMCRA's cooperative federalist approach. *See id.* at 296-97 (statement of Governor James W. McGlothlin, a representative of United Coal Company in Virginia: "The goal of the Federal Government to return that to the original contour, for instance, is quite different from the goal of most citizens and the State legislature of Virginia, simply because we were making tremendous use of that land now, where we have created a flat bench, where we have taken the top of the mountain off . . . many citizens, many States, don't want a return to the original contour.").

15. Surface Mining Control and Reclamation Act, 30 U.S.C. § 1202 (2006).

16. Donald C. Menzel, *Redirecting the Implementation of a Law: The Reagan Administration and Coal Surface Mining Regulation*, 43 PUB. ADMIN. REV. 411, 412 (1983).

17. *See id.*

18. In 1981 the agency proposed that eighty-nine rule sections be deleted, 329 sections be revised, 112 sections be combined with other sections, and twelve new sections be added. *Id.* at 414.

19. *See generally* Desai, *supra* note 13, at 795-99 (detailing the regulatory changes made during Reagan's Presidency).

20. MTR is defined as "surface coal mining and reclamation operations that remove entire coal seams running through the upper fraction of a mountain, ridge, or hill by removing all of the overburden and creating a level plateau or gently rolling contour with no highwalls remaining." 30 C.F.R. § 716.3(a) (2002).

requirement that mine sites be returned to their “approximate original contour” (AOC).²¹ In order to receive this AOC variance, the coal operators must meet certain requirements in their mining permit applications. These requirements center on the proposed post-mining land use for that newly created leveled land, which must be deemed an “equal or better economic or public use” of the land compared to its pre-mined use.²² Currently, however, much of the mining that takes place in Central Appalachia, which is the target of opposition by environmental and citizens groups, is not MTR in this legal sense. Rather, it is large-scale surface mining that primarily employs techniques of area mining, contour mining, or both. These mine sites must be returned to their AOC but are not held to the strict post-mining land use requirements. Nevertheless, the environmental and social consequences of these surface mines are very similar to those of MTR. Mining usually results in valley fills in both cases,²³ and since AOC is not defined to require a restoration of elevation,²⁴ even AOC mine sites generally result in significant topographical changes. Therefore, recounting the rise of MTR mining should include both the mines defined as MTR as well as the broader category of large-scale surface mines, especially those which create valley fills.

Instead of being used as an exception to the rule, the specific method of MTR became increasingly utilized over the 1980s and 1990s. By 1997 it accounted for two-thirds of the surface mine acreage permitted in West Virginia according

21. AOC “require[s] the operator to backfill, compact . . . and grade in order to restore the approximate original contour of the land with all highwalls, spoil piles and depressions eliminated.” *Bragg v. Robertson*, 54 F. Supp. 2d 635, 646 (S.D. W. Va. 1999) (quotations and emphasis omitted); *see also* 30 U.S.C. § 1265(b)(3) (2006). “The regulatory authority [(RA)] may issue a permit for mountaintop removal mining, without regard to the requirements . . . to restore the lands disturbed by such mining to their approximate original contour” if certain requirements are met. 30 C.F.R. § 785.14(c).

22. “The proposed postmining land use of the lands to be affected [has to] be an industrial, commercial, agricultural, residential, or public facility (including recreational facilities) use.” 30 C.F.R. § 785.14(c)(1). It also has to be “deemed by the RA to constitute an equal or better economic or public use.” *Id.* § 785.14(c)(1)(i).

23. In joint coal industry comments to the U.S. EPA responding to the agency’s Mountaintop Mining/Valley Fill Draft Environmental Impact Statement, the coal associations explain, “[u]sing valley and head of hollow fills in this region is absolutely necessary, because when mining is conducted in steep slope areas such as Appalachia, the volume of the spoil material is significantly greater than the volume of the overburden excavated from its original geological location. This is true whether the mining methods are mountaintop mining, contour mining, or even, in many instances, when creating the necessary surface area to begin and support an underground mine. Consequently, the excess spoil must be placed in valley and head of hollow fills.” Letter from Joint Coal Indus. to John Forren, Assoc. Div. Dir., Evtl. Prot. Agency (Jan. 6, 2004), www.nma.org/pdf/legal/final_eis.pdf.

24. The OSM conducted oversight reviews on the application of AOC within the Appalachian states, and part of this review was to investigate congressional intent on whether AOC included both configuration and elevation. OFFICE OF SURFACE MINING, AN EVALUATION OF APPROXIMATE ORIGINAL CONTOUR AND POSTMINING LAND USE IN WEST VIRGINIA—DRAFT A-1 (1998) (“An important AOC issue, however, is to what extent a post-mining change in land elevation, slope, relief, or configuration constitutes a departure from AOC. Our research to date into SMCRAs’ legislative history has indicated that the primary element of AOC is configuration or shape. The House Committee Report mentioned both configuration and elevation, but gave primary emphasis to configuration.”).

to early investigative reporting by The Charleston Gazette.²⁵

Many factors appear to have played key roles in causing the turn to MTR, both internal and external to the policy system. For example, competition in the national coal market made MTR increasingly attractive to Appalachian coal operators. Since the 1970s, western coal had been encroaching on traditional Eastern and Midwestern markets of Appalachian mines.²⁶ With thick coal seams and flat land, the productivity of coal extraction in the west was far greater than in Appalachia.²⁷ Further, western coal generally had a lower sulfur content than Illinois Basin or Northern Appalachian coal.²⁸ Acid rain provisions in the Clean Air Act shifted market demand in favor of this “compliance coal.”²⁹ The mountains of Central Appalachia, however, contained thin seams of low-sulfur, high-quality coal.³⁰ Thus, coal companies viewed these as key strategic reserves. In 1985, *Coal Week* highlighted Peabody Coal and Arch Mineral’s acquisitions of large tracts of low-sulfur reserves in West Virginia and Kentucky, explaining:

Both firms are there for the same reasons—high-heat, low-sulfur coal reserves close to major eastern markets. Arch, for instance, made a deliberate corporate decision to go after what it was lacking—lots of quality eastern coal whose price doesn’t flip-flop in uncertain economic times and that can be a hedge against potential acid rain rules requiring the use of low-sulfur coal.³¹

These low-sulfur reserves, however, were generally characterized by high ratios of overburden (rock and soil above the coal seam) to coal.³² Moving overburden is a very costly component of a surface mining operation, and so another important development was in the realm of technological innovations to surface mining machinery, which helped to reduce some of these variable costs.³³

25. Ken Ward, 'As High as God Did': Law to Rebuild Mountains Falls by Wayside, CHARLESTON GAZETTE, May 3, 1998, <http://www.wvgazette.com/static/series/mining/MINE0503.html>.

26. Denise Scheberle, *High Stakes, Small Wins, and Big Coal in the Surface Mining Program*, in FEDERALISM AND ENVIRONMENTAL POLICY: TRUST AND THE POLITICS OF IMPLEMENTATION 158–59 (Gerard W. Boychuk et al. eds., 2004).

27. *Id.* at 159–60.

28. See ENERGY INFO. ADMIN., U.S. DEP’T OF ENERGY, ENERGY POLICY ACT TRANSPORTATION RATE STUDY: FINAL REPORT ON COAL TRANSPORTATION x (2000).

29. See *id.* at ix.

30. See *id.* at 20.

31. Peter Galuszka, *Quietly Building a Coal Empire, Arch Mineral Seeks Eastern Market*, 11 COAL WEEK 3, 3 (Feb. 25, 1985).

32. The cost of coal extraction is strongly related to the “mining ratio,” or the ratio of cubic yards of earth (or overburden) per ton of marketable coal; as a coal seam gets thinner, further underground, or both, the costs of surface mining increase proportionately. Gene Kitts, Int’l Coal Group, *Special Guest Blog Exclusive: Why Surface Mine?*, THE COAL TATTOO, CHARLESTON GAZETTE, July 23, 2009, <http://blogs.wvgazette.com/coaltattoo/2009/07/23/special-guest-blog-exclusive-why-surface-mine/>. Powder River Basin mines in Wyoming generally are characterized by very thick seams of coal near the surface: eighty percent of Wyoming’s extracted coal in 1992 came from the Wyodak coalbed, the thickest U.S. coalbed, averaging about seventy feet in thickness and exceeding 100 feet in places. ENERGY INFO. ADMIN., U.S. DEP’T OF ENERGY, STATE COAL PROFILES 107 (1994). Low-sulfur regions in southern Appalachia instead are characterized by thin seams further underground, yet not meeting the necessary conditions for underground mining. Southern West Virginian fields have variable seam thickness, ranging from about three to seven feet. *Id.* at 103.

33. Discussing the “[f]alling prices [that] have triggered serious cost-cutting in the industry,” Jerry Eyester of Fieldston Company, a coal market analysis firm, stated: “That the Appalachian

B. The Need for an “Appalachian Transition”

This section outlines demographic, economic, environmental, and other trends pointing toward the need to change the status quo in favor of economic diversification. This “Appalachian transition” is an important step in achieving a just and sustainable future for the region.

Although Central Appalachia’s economy has long relied on coal mining, the contribution of coal has decreased over time. The region now produces less coal than western states: by the late 1990s, coal production west of the Mississippi surpassed its eastern competitors for the first time, and the gap has continued to widen.³⁴ The decline in Central Appalachian coal can be explained by the various factors that affect the cost of producing coal, including: labor costs, shifts to more marginal reserves as the productive areas are mined out, environmental regulations, technological advancements, transportation costs, the demand for coal, and competition across regions and with other fuel sources.³⁵ The average price of Appalachian coal increased from \$1.27 per million BTU in 2000 to \$2.56 per million BTU in 2009.³⁶ With the average cost of U.S. coal in 2009 resting at \$1.67 per million BTU,³⁷ the decline in the region’s competitiveness is clear.

Data analyses across a range of sources, including government and industry consultants, show that coal in Central Appalachia is running out.³⁸ More specifically, the remaining reserves are those that are more costly to mine, due to higher stripping ratios (the ratio of coal to overburden) caused by thin seams buried beneath hundreds of feet of mountain.³⁹ For instance, a consensus report by researchers at West Virginia University summarized that “[t]he depletion of low-cost reserves in the southern part of the state leads to increased mining costs that can make the [sic] southern West Virginia too expensive for the market.”⁴⁰ Similarly, the U.S. Energy Information Administration, projecting coal production until 2035, reports substantial expected declines from current levels, “as coal produced from the extensively mined, higher cost reserves of Central Appalachia is supplanted by lower cost coal from other supply regions.”⁴¹ While these reports have centered recent public attention on the decline of the region’s coal reserves, it is noteworthy that these warnings have been made since at least the early 1980s.⁴² For instance, a 1988 *Coal Week* article begins,

industry has been able to survive and grow is due to larger-scale equipment and high-extraction mining techniques.” Martha Bryson Hodel, *Record-High Production Slashes Coal Prices Cheaper Western Coal Supplanting Appalachian*, CHARLESTON GAZETTE, Nov. 27, 1998, at P2C.

34. U.S. ENERGY INFO. ADMIN., ANNUAL ENERGY REVIEW 2009 xxix (2009); see also Scheberle, *supra* note 26, at 158–59.

35. See RORY MCILMOIL & EVAN HANSEN, THE DECLINE OF CENTRAL APPALACHIAN COAL AND THE NEED FOR ECONOMIC DIVERSIFICATION 10 (2010).

36. U.S. ENERGY INFO. ADMIN., ANNUAL ENERGY OUTLOOK 2011 WITH PROJECTIONS TO 2035 86 (2011) [hereinafter U.S. ENERGY INFO. ADMIN. 2011].

37. *Id.*

38. *Id.* at 85.

39. See MCILMOIL & HANSEN, *supra* note 35, at 20.

40. RANDALL A. CHILDS & GEORGE W. HAMMOND, CONSENSUS COAL PRODUCTION FORECAST FOR WEST VIRGINIA 2009–2030 10 (2009).

41. U.S. ENERGY INFO. ADMIN. 2011, *supra* note 36, at 85.

42. See generally, MARTIN B. ZIMMERMAN, THE US COAL INDUSTRY: THE ECONOMICS OF POLICY CHOICE (1981).

[d]espite current bargain prices and an apparent abundance of compliance and low-sulfur coals from Pike County KY and Mingo County WV, an Annapolis MD-based consulting firm has warned that low-cost Kentucky reserves are wearing thin and even the new Mingo County properties have only about 30 years of economic life.⁴³

The viability of mines in this region has been extended beyond the article's grim outlook especially due to technological advancements that reduce the costs of mining, such as the draglines discussed above, as well as changes to the regulations and policies governing the mines, which also improve profit margins.⁴⁴ Both Kentucky and West Virginia, for example, have tax incentives for mining thin-seam coal.⁴⁵

In addition to the mining trends suggesting the need to move beyond surface coal mining, mining's negative impacts on the environment and human health suggest legal and ethical reasons to constrain it. A range of scientific researchers, government agencies, and environmental groups have documented and asserted the significant environmental and human-health challenges associated with MTR. The EPA estimated that between 1985 and 2001, MTR buried 724 miles of streams and adversely affected an additional 1,200 miles of them,⁴⁶ and it resulted in "fundamental changes to the region's landscape and

43. *Eastern Low-sulfur Reserves Restricted; Pike-Mingo Price War Hastens Depletion*, COAL WEEK, Oct. 17, 1998, at 1.

44. As just one example, the federal regulations were changed to allow for an additional engineering construction of excess spoil fills, in addition to "valley fills" and "head-of-hollow fills." Excess Spoil, Coal Mine Waste, and Buffers for Perennial and Intermittent Streams, 73 Fed. Reg. 75,814-01 (Dec. 12, 2008) (to be codified at 30 C.F.R. pts. 780, 784, 816, 817). This third technique, "durable-rock fills," allows the overburden to be dumped from above rather than trucked down to the base of the valley. It requires that at least eighty percent of the overburden be "durable rock," which would allow the fill to remain stable after construction. 30 C.F.R. § 816.73 (2009); 30 C.F.R. § 817.73. This is the more cost effective technique because it requires less haulage of the overburden. Rather than an exception given specific geologic conditions, however, it became the most common fill construction technique in the steep slope areas of Appalachia. Surface Coal Mining and Reclamation Operations; Excess Spoil; Stream Buffer Zones; Diversions; Proposed Rule, 69 Fed. Reg. 4 (proposed Jan. 7, 2004) (to be codified at 30 C.F.R. pts. 780, 816, 817). Regulators have found it difficult to enforce the eighty percent durable rock requirement. An early news article on MTR recounts: "Federal experts suspect that some fills are being improperly constructed by simply dumping spoil over the sides of the mountain and bulldozing it into shape. 'In-dumping' is far less expensive than trucking waste down the mountain and building a fill from the bottom up, but it is potentially less stable. The practice is supposed to be permitted only when the fill material is at least 80 percent solid rock. 'More often than not the fills aren't being built of durable rock at all, but of shale,' one official said. 'When shale becomes saturated with water, it turns to clay, and it slides. I'm afraid we're just seeing the beginning of it,' he said. 'You can engineer these fills to last forever, but it's not happening in Kentucky.'" Cass Peterson, *Bulldozers Driving Through Holes in 1977 Strip Mining Law*, WASH. POST, May 30, 1987, at A13.

45. For tax years beginning 1997, a change to the W. Va. tax structure reduced the severance tax rate for thin-seam coal produced from new mines. For qualified mines with a seam thickness of less than thirty-seven inches, the State tax equals one percent of gross receipts, and for mines with seam thickness between thirty-seven and forty-five inches, the State tax equals the greater of two percent of gross receipts. W. VA. STATE TAX DEP'T, REDUCED SEVERANCE TAX RATE FOR THIN SEAM COAL PRODUCED FROM NEW MINES (2003). Kentucky also offers a thin-seam coal tax credit, available on new production permitted after July 2000, ranging from 2.25 to 3.75 percent. KY. REV. STAT. ANN. § 143.021 (West 2000).

46. U.S. ENVTL. PROT. AGENCY, DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT ON

terrestrial wildlife habitats.”⁴⁷ Since Appalachia is one of the most biodiverse regions in North America and home to several endangered species, these findings give scientific justification to the argument in favor of protecting these forests from mining impacts.

A defining characteristic of MTR and large-scale surface mining in the region is that they create a large amount of overburden that is then deposited in adjacent valleys atop streams creating valley fills. Burial of headwater streams causes permanent loss of ecosystems, whose key biological function is to decompose organic matter into fine particulate and dissolved organic matter, whose nutrients are utilized further downstream.⁴⁸ Valley fills thus impair the quality of the entire run of the river. Scientists have found an inverse relationship between concentration of metals and stream biological health.⁴⁹ Other studies have measured higher pH levels, electrical conductivity, and total dissolved solids in the water below the valley fills.⁵⁰

The human health effects in the communities surrounding mining sites are also notable and gaining increased public attention. Chemicals and toxins are found in the drinking water in areas near the mining sites as well as in hazardous airborne dust.⁵¹ Rates of mortality, lung cancer, and chronic heart, lung, and kidney disease are all elevated as a function of county-level coal production.⁵² Another study has found that birth defects are significantly higher in mountaintop mining counties compared to other counties in the region,⁵³ though this study conflates mountaintop mining with other underground and surface mining that occurs in many of the counties. This pattern remains even after controlling for risks associated with socioeconomic disadvantage, such as a mother’s health and education, prenatal care, and race.⁵⁴ Moreover, immediate dangers from the mine site also remain and impact the local community. The removal of vegetation, compaction of soil, and other impacts at the mined sites cause greater storm runoff and increased frequency and magnitude of downstream flooding.⁵⁵

Additionally, while recognizing that some data point in positive directions, the overall economic status of Central Appalachian residents reinforces the

MOUNTAINTOP MINING/VALLEY FILLS IN APPALACHIA III.D-1-D-2 (2003), available at <http://www.epa.gov/region03/mtntop/eis2003.htm> [hereinafter U.S. EPA].

47. *Id.* at III.F-12.

48. M. A. Palmer et al., *Mountaintop Mining Consequences*, 327 *SCIENCE* 148, 148 (2010).

49. *Id.* at 148–49.

50. Kyle J. Hartman et al., *How Much Do Valley Fills Influence Headwater Streams?*, 532 *HYDROBIOLOGIA* 91, 94–97 (2005); Natasha Gilbert, *Mountain Mining Damages Streams: Study Shows That Stripping Mountains for Coal Has a Much Greater Impact Than Urban Growth*, 466 *NATURE* 806 (2010), available at <http://www.nature.com/news/2010/100809/full/466806a.html>.

51. Palmer et al, *supra* note 48, at 148. See Michael Hendryx & Melissa M. Ahern, *Mortality in Appalachian Coal Mining Regions: The Value of Statistical Life Lost*, 124 *PUB. HEALTH REP.* 541, 547 (2009) (“There is evidence that the coal mining industry is a significant source of both air and water pollution.”).

52. *Id.*

53. Melissa M. Ahern et al., *The Association Between Mountaintop Mining and Birth Defects Among Live Births in Central Appalachia, 1996–2003*, *ENVTL. RES.*, May 2011, at 6.

54. See generally *id.*

55. Palmer et al., *supra* note 48, at 148–49.

argument that coal production has not created prosperity for the region. In a study of county-level economic conditions in Central Appalachia from 1960 to 2000, researchers concluded that economic distress is a product of the region's continued dependence on extractive industries, particularly coal, as well as of geographical conditions such as its isolation from major urban areas and its rugged terrain.⁵⁶ Notably, they find that economic dependence on coal has limited the options for a diversified economy in the region.⁵⁷

The study also points to the negative impacts of the "boom and bust" cycle of economic prosperity that is typical of extractive industries, particularly in rural areas. For instance, while a number of counties emerged from distress following the spike in coal production and prices during the oil crises by 1980, the counties fell back to distressed status by 1990 when coal prices subsequently dropped.⁵⁸ Many other coal counties fared even worse: seventy-five percent of mining-dependent counties were persistently distressed.⁵⁹ The poor incentives coal provides for investing in the region, even at the individual level, may be one possible causal mechanism linking historical dependence on coal with poverty and economic distress. One study suggests that negative socioeconomic conditions such as unemployment, high school drop-out rates, and unequal income distribution discourage residents from making human capital investments that could potentially improve their futures.⁶⁰ This reasoning, however, places responsibility and even blame on the individual rather than on the initial determinants of those structural conditions. Alternatively, these same research conclusions can be viewed as evidence that wise public policy changes are required to realign the incentives for human capital investments and reverse negative socioeconomic trends.

Nevertheless the coal industry contributes significantly to the regional economies. In West Virginia, for instance, the state collected \$417.2 million in severance taxes in 2010.⁶¹ Severance taxes are disbursed to the coal-producing counties according to the various tax arrangements of each state. In West Virginia, for instance, most is deposited in the State General Revenue Fund (slightly more than eighty-six percent in fiscal year 2011), with approximately five percent going to the State Infrastructure Fund and nine percent to local governments.⁶² However, the overall impact of the sector's economic contribution is uncertain. Various reports argue that coal mining results in an overall cost—rather than profit—to the states' budgets. A research and economic development non-profit, Mountain Association for Community Economic

56. LAWRENCE E. WOOD & GREGORY A. BISCHAK, APPALACHIAN REG'L COMM'N, PROGRESS AND CHALLENGES IN REDUCING ECONOMIC DISTRESS IN APPALACHIA: AN ANALYSIS OF NATIONAL AND REGIONAL TRENDS SINCE 1960 18-19 (2000).

57. *Id.* at 19.

58. *Id.*

59. *Id.* at 25.

60. See generally Thomas Johnson et al., *Improvements in Well-Being in Virginia Coalfields Hampered by Low and Unstable Income*, 6 RURAL DEV. PERSPS. 37 (1989).

61. MELISSA BRAYBROOKS ET AL., U.S. CENSUS BUREAU, STATE GOVERNMENT TAX COLLECTIONS SUMMARY REPORT: 2010 7 (2011). Severance taxes are assessed on natural resources once extracted. *Id.* at 2.

62. STATE OF W. VA., EXECUTIVE BUDGET, FISCAL YEAR 2013, VOLUME 1: BUDGET REPORT 89 (2012).

Development (MACED), concluded that for the 2006 fiscal year Kentucky *subsidized* the coal industry with nearly \$115 million, due particularly to state spending on its coal haul road system and the state's expenditures to support people directly and indirectly employed by the coal industry.⁶³ Similar reports produced for West Virginia and Tennessee also indicate that state expenditures exceeded state revenues,⁶⁴ although some state politicians and other researchers have responded critically to these reports.⁶⁵ Regardless of their acceptance, these reports serve the important function of prompting public discussion that critically assesses whether and how the coal industry contributes to the states.

III. TRADITIONAL MEANS OF OPPOSITION TO MOUNTAINTOP REMOVAL

Many advocates in Appalachia focus on stopping the current destructive practices of MTR and surface mining as the first step in the transition to a sustainable, equitable economy. A primary strategy to do so has been to use the courts. Considered the first major case on the issue, *Bragg v. Robertson* set the course for much of the later litigation.⁶⁶ In 1998 the West Virginia Highlands Conservancy and several citizens filed a lawsuit against the Director of the West Virginia Department of Environmental Protection (WVDEP) under SMCRA's citizen suit provision, making a series of allegations under both SMCRA and the Clean Water Act (CWA).⁶⁷ With respect to SMCRA, the citizens alleged that WVDEP failed to fulfill its non-discretionary duties, including its failure to enforce a 100-foot buffer between mining operations and streams, its failure to make measurable demonstrations that AOC were attained, and its violation of post-mining land use requirements for approved permits with AOC variances.⁶⁸ With respect to the CWA, the issue centered on the mining practice of forming valley fills that cover the upper reaches of streams with overburden.⁶⁹ The district court ruled in favor of the plaintiffs, leading to a restriction on permitting for MTR.⁷⁰ The Fourth Circuit reversed, applying the doctrine of sovereign immunity to conclude that the state DEP Director could not be sued in federal

63. MOUNTAIN ASS'N FOR CMTY. ECON. DEV., *THE IMPACT OF COAL ON THE KENTUCKY STATE BUDGET 1-2* (2009).

64. RORY MCILMOIL ET AL., *COAL AND RENEWABLES IN CENTRAL APPALACHIA, THE IMPACT OF COAL ON THE TENNESSEE STATE BUDGET ix* (2010); RORY MCILMOIL ET AL., *COAL AND RENEWABLES IN CENTRAL APPALACHIA, THE IMPACT OF COAL ON THE WEST VIRGINIA STATE BUDGET x* (2010).

65. See, e.g., Mannix Porterfield, *West Virginia Coal Study Ignites War of Words*, BLUEFIELD DAILY TELEGRAPH, June 25, 2010, <http://bdtonline.com/local/x1617562707/West-Virginia-coal-study-ignites-war-of-words>.

66. See, e.g., PENNY LOEB, *MOVING MOUNTAINS: HOW ONE WOMAN AND HER COMMUNITY WON JUSTICE FROM BIG COAL* (2007).

67. *Bragg v. Robertson*, 54 F. Supp. 2d 635, 638 (S.D. W. Va. 1999) (order granting preliminary injunction).

68. *Id.* at 639-40.

69. *Bragg v. Robertson*, 72 F. Supp. 2d 642, 648 (S.D. W. Va. 1999) (discussing defendants' response to plaintiffs' CWA arguments). The plaintiffs argued that the overburden should be classified as waste, and thus prohibited by the CWA to be deposited into streams. Clean Water Act, § 402, 33 U.S.C. § 1251 et seq. (2006). Defendants countered that the overburden was properly classified as fill, allowed by the CWA. *Id.* § 404.

70. *Id.* at 663.

court.⁷¹ This case established a precedent that essentially forecloses SMCRA as a route for MTR opponents seeking to ban or limit the practice through litigation. Although the Fourth Circuit's decision did not preclude SMCRA suits in state court, advocates rarely choose this option since elected state judges are often expected to make pro-coal judgments.

Advocates have also attempted to change the federal and state laws governing Appalachian surface mining. When the efforts have been successful, they have predominantly brought about only minor adjustments to mining practices in order to better protect the surrounding communities. For instance, in 2010 the West Virginia legislature passed legislation enacting limited improvements to cemetery protection laws, such as requiring immediate cessation of land alteration if a cemetery or remains are found.⁷² Bills that would more significantly restrain surface mining have been far less successful. In Kentucky, KFTC has lobbied yearly since 2007 in favor of its "Stream Saver Bill."⁷³ The bill includes two key provisions that would substantially limit MTR and large-scale surface mining in Kentucky. First, it would prohibit the disposal of overburden "in an intermittent, perennial, or ephemeral stream or other water of the Commonwealth," essentially barring valley fills.⁷⁴ Second, it would require restoration of AOC to include both original *configuration* as well as original *elevation* of the mine site.⁷⁵ The bill has yet to pass from committee to the floor in either the state House or Senate.⁷⁶ At the federal level, advocates focus much of their efforts on legislation that would reclassify the mining overburden as "waste" rather than "fill," so that the CWA would bar the creation of valley fills;⁷⁷ however, this legislation has yet to successfully pass in the House of Representatives.⁷⁸

Frustrated with setbacks in the more traditional venues of courts and legislatures, some advocates have expanded their protests to include direct action. For example, West Virginia-based-organizations, including the Radical Action for Mountain People's Survival (RAMPS) and Climate Ground Zero, employ techniques such as tree-sits, banner drops, and other forms of nonviolent protest to focus national attention on MTR.⁷⁹ Another strategy, utilized by groups such as Rainforest Action Network, is to launch campaigns against the

71. *Bragg v. W. Va. Coal Ass'n*, 248 F.3d 275, 285–86 (4th Cir. 2001), *cert. denied*, 534 U.S. 1113 (2002); see also Michael G. Crotty, *Bragg v. West Virginia Mining Association: The Eleventh Amendment Challenge to Mountaintop Coal Mining*, 13 VILL. ENVTL. L.J. 287, 291 (2002).

72. W. Va. Code §§ 29-1-8a, 37-13A-1, 37-13A-2, 37-13A-5, 37-13A-7 (2011).

73. *The Stream Saver Bill – HB 231*, KENTUCKIANS FOR THE COMMONWEALTH, <http://www.kftc.org/our-work/general-assembly/stream-saver-bill> (last visited Apr. 20, 2012).

74. H.B. 231, 12th Reg. Sess. § 1(2)(a) (KY 2012).

75. *Id.* § 3(4).

76. See *HB231, An act relating to surface mining*, KY. LEG., <http://www.lrc.ky.gov/record/12RS/hb231.htm> (last visited Apr. 20, 2012) (indicating that the bill was introduced to the House Natural Resources and Environment Committee).

77. See discussion of "waste" versus "fill" under the CWA, *supra* note 69. This change would be made through bills like the Clean Water Protection Act and the Appalachian Restoration Act.

78. See *The Clean Water Protection Act*, ILOVEMOUNTAINS.ORG, <http://ilovemountains.org/clean-water-protection-act/> (last visited May 16, 2012).

79. RAMPS, <http://rampcampaign.org/> (last visited Apr. 20, 2012); *About Us*, CLIMATE GROUND ZERO, <http://climategroundzero.net/about-us/> (last visited Apr. 20, 2012).

banks that finance MTR, organizing protests at shareholder meetings and monitoring banks' compliance with voluntary policies they set with respect to limiting or ending their financing of MTR projects.⁸⁰

IV. ALTERNATIVE ROUTES TO CHANGE

The efforts reviewed above have resulted in only tempered success. Many anti-MTR advocates attribute this lack of success to the political power of the coal sector, whose influence, they argue, reaches across all levels and branches of government.⁸¹ Changing the economic conditions in which this legal and regulatory debate takes place, therefore, could lessen the sector's power on the outcome. Within this alternative approach, however, tactics still vary. Ultimately these differences may shape the indirect effect of the efforts to limit surface mining and MTR in the region. The following section reviews two examples of this variation.

Differing theories of change underlie the efforts described in the case studies.⁸² Each reflects a different assumption in terms of both what causes and what will ameliorate the problem. KFTC's Renew East Kentucky work is based on a platform that calls for *concurrent* actions to both ameliorate the impacts of surface coal mining and to take steps to diversify beyond a coal-based economy. This suggests the organization sees regional well-being as incompatible with surface mining, but also that its theory of change assumes the mutual dependence of the two concurrent actions in order to achieve their goal. In contrast, the West Virginia JOBS Project's pyrolysis proposal makes clear that it works not in opposition to the coal industry, but in collaboration with it. It is premised on a theory of change that win/win solutions are possible to diversify the economy and to chip away at the problems plaguing the region. By layering bioenergy production on top of surface mining—literally replanting on post-mining land—it suggests new ways to create value-added industries in a region centered on the coal sector.

80. RAINFOREST ACTION NETWORK, POLICY & PRACTICE: 2011 REPORTCARD ON BANKS AND MOUNTAINTOP REMOVAL 2-8 (2011).

81. For instance, testifying at a Congressional hearing regarding the "Stream Buffer Zone rule," Coal River Mountain Watch member Bo Webb stated: "To date there are 19 peer-reviewed science papers addressing human health in mountaintop removal communities. Not a single one of them have [sic] been scientifically refuted. And yet, the chair of this committee has refused to acknowledge this growing health crisis. Instead, he has chosen to serve the for-profit interests of an industry that is harming us. This committee hearing is an affront to people living—and dying—in mountaintop removal communities." John McFerrin, *Congress Comes to Charleston, Pretends to Consider Buffer Zone Rule*, W. VA. HIGHLANDS VOICE, Oct. 12, 2011, at 3.

82. Carol Weiss popularized the concept of a "theory of change," so as to "describe the set of assumptions that explain both the ministepts that lead to the long-term goal of interest and the connections between program activities and outcomes that occur at each step of the way." ANDREA A. ANDERSON, THEORY OF CHANGE AS A TOOL FOR STRATEGIC PLANNING: A REPORT ON EARLY EXPERIENCES 2 (2004). The concept became formalized through ActKnowledge's and others' training tools, which assist organizations in identifying their associated theories of change in order to improve evaluation of their programs by their funders. *Id.* at 4. The phrase can also link more broadly to research in the social sciences in which the purpose is to identify causal mechanisms underlying processes of social, political, or economic change. See, e.g., P. PIERSON, POLITICS IN TIME: HISTORY, INSTITUTIONS, AND SOCIAL ANALYSIS (2004).

A. KFTC's Renew East Kentucky Campaign

KFTC is a citizen organization that addresses issues of equity and environmental destruction in Kentucky. This overview of its history traces how KFTC came to emphasize economic diversification and green collar jobs as an indirect route to supporting its opposition to surface coal mining in Kentucky.

KFTC has shifted its focus over time, according to its members' understanding of the drivers of social and environmental injustice in the state.⁸³ The organization began in 1981 as "Kentucky Fair Tax Coalition," a small group calling for unmined minerals (predominantly coal reserves) to be taxed at the same rate as other real property, which would substantively contribute to the state economy.⁸⁴ The organization ultimately won that legislative battle and directed its attention to other coal campaigns in Kentucky.⁸⁵ Through much of the 1990s, KFTC opposed coal mines individually in response to community member requests for help addressing concerns like blasting or dust from living close to the mine sites.⁸⁶ As a result of this bottom-up issue selection, KFTC's position on coal was one of regulation rather than abolition. It limited its campaigns to calling for mining companies to obey laws, rather than questioning whether coal benefitted Kentuckians in the first place.⁸⁷ By 2002, the organization's leadership realized that while they had made significant strides, their approach meant they were still "losing the war." Consequently, following support from its membership, the organization shifted its critique from destructive mining practice to coal in general.⁸⁸ The Canary Project, adopted by

83. A KFTC thirty-year retrospective publication catalogs these shifts over time, and particularly on the topic of coal explains, "[d]ealing with an abusive coal industry has been a dominant part of KFTC's work for 30 years. Today, our work around coal and energy addresses the entire cycle of coal—extraction, transportation, burning and waste disposal. And in recent years we've taken our desire to move from fighting the bad to being a catalyst for positive change by formalizing efforts to bring about a more just and sustainable economy built on a diverse mix of healthy local industries." KENTUCKIANS FOR THE COMMONWEALTH, 2011 ACTION FOR JUSTICE: 30 YEARS OF HISTORY! 31 (2011), available at <http://issuu.com/kftc/docs/history-booklet/32>.

84. *Id.* at 8–9.

85. Indeed, early on the organization looked to branch out from its specific focus on tax and land ownership. Melanie Zuercher comments that KFTC "recognized early the need to be multi-issue. KFTC members would gain experience and understanding as they worked on problems not necessarily their own." *Id.* at 15.

86. The organization's newsletter gives accounts of these efforts over time, often written by the members themselves. See *KFTC Publications*, KENTUCKIANS FOR THE COMMONWEALTH, <http://www.kftc.org/our-work/publications> (last visited June 7, 2012) (providing recent issues of KFTC newsletter, titled *Balancing the Scales*).

87. Interview with a KFTC staff person, in Berea, Ky. (May 25, 2011) [hereinafter May 2011 Interview] (on file with author) (conducted on condition of anonymity); see, e.g., *KFTC Platform for 1995–96*, KENTUCKIANS FOR THE COMMONWEALTH (As adopted by the KFTC membership, Nov. 11, 1995; archived at the University of Kentucky) ("We demand full enforcement of coal mining regulations to protect water resources, prevent blasting damage and require reclamation of land.").

88. In KFTC's 2002 platform on mining issues, for which the Canary Project was created, the frustration is explained as follows: "Over the past 20 years, KFTC has worked on many issues related to abusive coal mining practices. . . . Despite these victories, the rate and scale of destruction caused by mining is on the rise. The time has come to demand fundamental changes in the way that mining is done." *A KFTC Platform on Mining Issues*, KENTUCKIANS FOR THE COMMONWEALTH, <http://www.kftc.org/our-work/canary-project/about-canary/platform> (last visited Jan. 16, 2012). KFTC's position on coal, adopted in 2007, takes the stance further, stating pointedly: "Kentucky is at [sic]

the membership in 2003, gave structure to this broader focus. The Project's goals are: (1) Enforcement of existing laws for coal mines; (2) Adoption of new laws where existing laws are inadequate to protect homes and communities; (3) Creation of a sustainable economy with good jobs in the coalfields; and (4) Promotion of survivable energy sources.⁸⁹

With these goals, KFTC found itself on new ground. The first two goals aligned with its history of advocating for responsible mining (and *against* irresponsible mining), although it took the organization a step further to oppose all surface mining for coal. The latter two goals brought a new angle of advocating *for* something, and thus proposing an alternative economic future to the coal-centered current economy that they opposed. These goals also, therefore, directed the organization's focus away from mining laws and into economic development and renewable energy policy.

In 2006, the Eastern Kentucky Power Cooperative's (EKPC) plans to build a new coal-fired power plant in Clark County helped trigger KFTC to address economic development and sustainable energy in the state. The organization campaigned to stop the proposed Smith Plant, thus forming an alliance with the Kentucky Environmental Foundation and the Sierra Club.⁹⁰ They pointed to the excessive cost of the proposed plant, the weak financial position of the EKPC, and the environmental and human health consequences of coal extraction and combustion.⁹¹ The campaign succeeded in 2010 after a settlement in which EKPC agreed to abandon its plans for the Smith Plant in exchange for KFTC and the other groups agreeing to drop their pending lawsuits and other legal proceedings.⁹² In addition, the settlement created a collaborative working group to study and recommend demand-side management and renewable energy programs to be considered by the EKPC board for adoption.⁹³ The three plaintiff

historic turning point. Global climate change, severe depletion of Kentucky's economically recoverable coal, carbon taxes, Kentucky's dependence on coal for electricity are all coming together, right now, to create a time of great changes where there will be great challenges and opportunities. We believe Kentucky can and must stop the destruction, mine coal safely and responsibly, and phase out our dependence on coal while we phase in a new sustainable economy with safe, sustainable, living wage jobs, and new, renewable sources of energy." *KFTC's Position on Coal*, KENTUCKIANS FOR THE COMMONWEALTH, <http://www.kftc.org/our-work/canary-project/about-canary/position-on-coal> (last visited Jan. 16, 2012).

89. *A KFTC Platform on Mining Issues*, *supra* note 88.

90. *Campaign Overview*, KENTUCKIANS FOR THE COMMONWEALTH, <http://www.kftc.org/our-work/stop-smith/campaign-overview> (last visited Jan. 16, 2012).

91. The campaign member organizations commissioned a study to investigate the financial and credit position of EKPC and the financial impact of the proposed Smith Plant on EKPC and its ratepayers. The report's key findings included that "[t]he Cooperative's priority to build new coal-fired power plants is misaligned with the direction of capital markets and national energy policy," and that "EKPC's current financial position is weak, and its decision to build Smith #1 is one of the main impediments to improving its credit status." The report recommended that EKPC abandon its plans for the Smith Plant and instead move forward with "less risky and less capital intensive investments" including energy efficiency, renewable energy, and natural gas. KENTUCKIANS FOR THE COMMONWEALTH, *THE RIGHT DECISION FOR CHANGING TIMES* 1, 3 (2009), <http://www.kftc.org/our-work/stop-smith/RightDecisionReport.pdf>.

92. Press Release, East Kentucky Power Cooperative, EKPC to Cancel Coal-Fueled Power Plant (Nov. 18, 2010), http://www.ekpc.coop/pressreleases/2010%20press%20releases/2010-11-18__Sm1_cancelled.pdf.

93. In its 2010 annual report, EKPC reviews the cancellation of the Smith Plant, the settlement,

organizations hold seats in the working group, as do representatives of each of the sixteen member cooperatives within EKPC and a representative of EKPC.⁹⁴ The structure of the working group may help it achieve adoption of its recommendations: it aims to make decisions through consensus, which requires balancing the interests of the environmental groups and EKPC. Meanwhile, the joint chairmanship by a utility representative and a KFTC member helps assure that each has an equal say in the agenda-setting and other procedural opportunities to exert influence.

The working group provides the launching point for a new KFTC campaign, Renew East Kentucky, which seeks to address sustainable economic development, job creation, and the transition away from coal.⁹⁵ In its five-year plan, Renew East Kentucky sets out a strategy to create new jobs, reduce home energy costs, and diversify energy production in the region.⁹⁶ A KFTC strategy document summarizes the plan's benefits as the following:

Such a plan not only has tangible energy, economic, and job creation benefits, but can also begin to shift public perception toward transition, offers a proactive plan that all but the most fearful or coal-captive politicians can promote, and launches a new, growing sector of the national economy right here in eastern Kentucky. It is an immediate solution to the host of complex problems facing the region and could be modeled in rural areas across the United States.⁹⁷

KFTC looks to the rural cooperative structure as a means to carry out their proposed plan.⁹⁸ EKPC is a utility that generates and transmits electricity to its sixteen local cooperatives, each of which then distributes the power to their members. The local cooperatives already have some of the infrastructure to carry out energy efficiency and renewable energy programs.⁹⁹ KFTC also emphasizes the local ownership and democratic organizational structure of the cooperatives.¹⁰⁰ Members of the cooperatives have an official mechanism through which they can influence the business decisions of their cooperatives, and they also stand to benefit twice from wise choices—from both reduced energy costs and from profits earned. Another campaign by KFTC aims to bolster this approach by calling for reforms to the cooperatives to restore transparency and

and the formation of the collaborative working group. EAST KENTUCKY POWER COOPERATIVE, A BRAND NEW DAY: EKPC 2010 ANNUAL REPORT 11 (2010), http://www.ekpc.coop/pdfs/EKPC_Annual_Report.pdf.

94. *Id.*

95. The project is explained as a proposal in the special issue of the Solutions Journal dedicated to the future of Appalachia. Sara Pennington & Randy Wilson, *A Cooperative Approach to Renewing East Kentucky*, 1 SOLUTIONS 62 (2010), available at <http://www.thesolutionsjournal.com/node/683>.

96. Kentuckians For The Commonwealth, *Renew East Kentucky Campaign & Strategies* (2011-2012) (unpublished manuscript, on file with author).

97. *Id.* at 4.

98. Pennington & Wilson, *supra* note 95.

99. Interview with a KFTC staff person, in Berea, Ky. (Aug. 23, 2011) [hereinafter Aug. 2011 Interview] (on file with author) (conducted on condition of anonymity).

100. Pennington & Wilson, *supra* note 95 ("Why co-ops? Rural electric co-ops have an (often neglected) history of education, concern for community, democratic structure, and local, cooperative ownership. The solution and its benefits will be owned by the local co-op members, not distant outside interests.").

membership participation to their decision-making process.¹⁰¹

A component of Renew East Kentucky's plan is driven by increased electricity costs and energy inefficient, substandard housing in the state. Kentucky residents use twenty-four percent more electricity at home than the national average, and the state's poorest families spend fifty-five percent of their monthly household income on home energy bills.¹⁰² In an analysis of clean energy job potential in Kentucky, one study argues that this energy efficiency gap actually creates the opportunity for cost savings and job growth.¹⁰³ Closing the gap can be achieved from "low hanging fruit" like weatherization and home retrofits, which would reduce electricity bills as well as create jobs in labor-intensive construction and retrofit sectors.¹⁰⁴ An analysis by the Southeast Energy Efficiency Alliance (SEEA) concluded that while Kentucky had a "higher-than-average level of energy intensity," addressing this problem through an aggressive portfolio of energy efficiency policies could reduce energy consumed by the equivalent of avoiding the need for six 500-MW power plants in 2030.¹⁰⁵ Furthermore, these savings would be realized at the individual household level with an average reduced utility bill of \$240 annually.¹⁰⁶ According to SEEA, the construction and retrofit work required to achieve these efficiency gains translates into a net gain of 10,600 jobs in 2020 and 14,300 jobs in 2030.¹⁰⁷

One barrier to Renew East Kentucky's goal of energy efficiency is financial: many of the residents who would most benefit from weatherization and home retrofits are also those who can least afford to make an up-front investment in the upgrades,¹⁰⁸ even though the initial investment is more than covered by the energy savings over time. An innovative program called How\$martKY is piloting on-bill financing to address this challenge.¹⁰⁹ The program works as follows: After conducting an energy assessment of the house, How\$martKY assessors recommend efficiency improvements such as insulation, air and duct sealing, and heat pump upgrades.¹¹⁰ Residents pay back the costs of these upgrades in installments charged to their monthly utility bills.¹¹¹ Importantly,

101. *Kentuckians for the Commonwealth's Rural Electric Co-Op Reform Platform*, KENTUCKIANS FOR THE COMMONWEALTH, <http://www.kftc.org/our-work/co-ops/kftcs-co-op-reform-platform> (last visited Jan. 22, 2012).

102. *See Home Energy Affordability Gap*, <http://www.homeenergyaffordabilitygap.com> (last visited Jan. 22, 2012).

103. KRISTIN TRACZ & JASON BAILEY, MOUNTAIN ASS'N FOR CMTY. ECON. DEV., *BUILDING CLEAN ENERGY CAREERS IN KENTUCKY 1* (2010).

104. *Id.* at 5.

105. MARILYN A. BROWN ET AL., *STATE PROFILES OF ENERGY EFFICIENCY OPPORTUNITIES IN THE SOUTH: KENTUCKY 2* (2010).

106. *Id.* at 6.

107. *Id.* at 8.

108. The federal government also recognized this general issue and authorized a federal block grant program, the Weatherization Assistance Program, to increase the energy efficiency of homes occupied by low-income individuals. *Weatherization Assistance Program*, U.S. DEP'T OF ENERGY, <http://www1.eere.energy.gov/wip/wap.html> (last visited Apr. 23, 2012).

109. *How\$martKY Overview*, MOUNTAIN ASS'N FOR CMTY. ECON. DEV., <http://www.maced.org/howsmart-overview.htm> (last visited Jan 22, 2012).

110. *Id.*

111. *Id.*

this charge is calculated so that it does not exceed the projected electricity cost savings from the improvements, and thus the monthly bill is at most equal to the pre-upgrade bill.¹¹² Four rural electricity cooperatives partner with MACED to pilot this program.¹¹³

Renew East Kentucky faces numerous barriers ranging from a lack of a state-level green energy policy framework to incentivize investment to a political environment hostile to programs considered to be a threat to coal. Although Kentucky does have some state-level policies on renewable energy and energy efficiency (RE and EE), such as corporate and personal tax credits for installing RE/EE measures,¹¹⁴ these measures have been woefully insufficient to prompt investment.¹¹⁵ With more than ninety percent of electricity derived from coal, and electricity rates below the national average, Kentucky is a difficult market for renewable energy to enter.¹¹⁶ Supported by the Kentucky Sustainable Energy Alliance (KySEA), state representative Mary Lou Marzian introduced the Clean Energy Opportunity Act in February 2011.¹¹⁷ The key component of the bill is a renewable and efficiency portfolio standard, which requires utilities to meet specific goals. The efficiency goal will require that utilities achieve a savings of 10.25% of retail sales by 2021, and this savings must be in part derived from residential efficiency savings.¹¹⁸ To achieve improvements in the residential sector, the bill calls for programs to help low-income households.¹¹⁹ With respect to renewable energy, the bill requires 12.5% of retail sales to derive from renewable sources by 2021.¹²⁰ The bill also creates a feed-in tariff to add impetus

112. *Id.*

113. *Id.* The four cooperatives are Big Sandy RECC, Fleming-Mason RECC, Grayson RECC, and Jackson Energy.

114. H.B. 240, 2010 Gen. Assemb., Reg. Sess. (Ky. 2010), <http://www.lrc.ky.gov/statrev/acts2010rs/0005.pdf>.

115. For instance, H.B. 240, passed by the Kentucky state legislature in 2010, allows the Kentucky Public Service Commission to create requirements for demand-side management programs. *Id.* In Kentucky's first statewide energy plan released in 2008, Governor Beshear set the state's goal as achieving twenty-five percent of the projected energy demands in 2025 through energy efficiency and conservation, renewable energy, and biofuels. Of this, the plan sets a goal of eighteen percent derived from energy efficiency. STEPHEN BESHEAR, INTELLIGENT ENERGY CHOICES FOR KENTUCKY'S FUTURE: KENTUCKY'S 7-POINT STRATEGY FOR ENERGY INDEPENDENCE 9 (2008), <http://eec.ky.gov/Documents/Kentucky%20Energy%20Strategy.pdf>. Nevertheless, Kentucky is ranked thirty-seventh (out of fifty-one) in the 2011 State Energy Efficiency Scorecard published by the American Council for an Energy-Efficient Economy, demonstrating that the state lags in its policies and incentives to increase uptake of efficiency measures. MICHAEL SCIORTINO ET AL., THE 2011 STATE ENERGY EFFICIENCY SCORECARD vi (2010).

116. In 2009, 92.7% of the electric power generation in Kentucky derived from coal, increasing from 84.1% ten years prior. U.S. ENERGY INFO. ADMIN., STATE ELECTRICITY PROFILES: 2009 105 (2011). Kentucky's average residential electricity rate in 2010 was 6.75 cents per kWh, compared to the national average of 11.6 cents per kWh. *Electricity Explained: Factors Affecting Electricity Prices*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/energyexplained/index.cfm?page=electricity_factors_affecting_prices (last visited Jan. 22, 2012).

117. H.B. 239, 2011 Gen. Assemb., Reg. Sess. (Ky. 2011), available at <http://www.lrc.ky.gov/record/11rs/hb239.htm>.

118. *Id.*

119. *Id.*

120. *Id.*

for private investment in renewables in the state.¹²¹ Like the on-bill financing program, the feed-in tariff is meant to soften the financial risk that can inhibit both large- and small-scale renewable deployment, but it addresses return over time rather than the upfront costs.

Energy inefficient housing is a problem especially for the poor, which compounds the fact that a greater share of their household income goes to electricity costs. KySEA, a Kentucky coalition of fifty-two members spanning beyond those typically engaged in environmental legislation, targets this problem.¹²² Notably, the coalition includes affordable housing organizations such as Kentucky Habitat for Humanity and the Federation for Appalachian Housing Enterprises.¹²³ In spite of this diverse coalition, the Clean Energy Opportunity Act has seen little success in the legislature and has not passed out of the House Tourism Development and Energy committee.¹²⁴ Some members of the coalition suggest that the reticence of many legislators to even consider the bill ties to the political power wielded by coal.¹²⁵ Although neither the bill nor the KySEA coalition takes a position on coal, some insiders argue that the bill is viewed as a threat to coal's dominance in Kentucky.¹²⁶

Lastly, because there are few green collar jobs in the region, there is little impetus for workers to invest in training in this sector. On the other hand, without trained workers, companies are likely to be deterred from siting production in Kentucky, or may source their workers from outside the state. Energy efficiency and clean energy advocates are working with community colleges and other existing training institutions to address this gap.¹²⁷ However, as noted above, some research suggests that negative socioeconomic conditions can serve as a barrier to residents making human capital investments in themselves.¹²⁸

B. The JOBS Project and its Pyrolysis Proposal

Just over the border in southern West Virginia, a coalition of partners is pursuing economic development for their home, Mingo County. Programs here, like Sustainable Williamson and the JOBS Project, are “value added” with respect to the existing coal sector, rather than as a replacement for it. Mingo County is one of West Virginia's top three producers of surface-mined coal,¹²⁹ making the

121. *See id.*

122. The KySEA website maintains a running list of its members. *KySEA Membership List*, KY. SUSTAINABLE ENERGY ALLIANCE, <http://www.kysea.org/about-us/kysea-membership-list> (last visited Jan. 22, 2012).

123. *Id.*

124. Anne Marshall, *Renewed Energy: Activists Point to Higher Bills, Job Creation in Urging Legislators to Support Clean Energy*, THE LOUISVILLE ECCENTRIC OBSERVER, Sept. 28, 2011, available at <http://leoweekly.com/news/renewed-energy>.

125. May 2011 Interview, *supra* note 87.

126. *Id.*

127. Aug. 2011 Interview, *supra* note 99.

128. Johnson et al., *supra* note 60, at 37–41.

129. The West Virginia Coal Association, citing WV Office of Miners' Health, Safety and Training, lists Mingo County as third in surface tonnage, sixth in total tonnage (underground and surface), and fifth in direct employment for the year 2009. W. VA. COAL ASSOC., WEST VIRGINIA COAL FACTS 2010 9

growth of a program in its county seat, entitled “Sustainable Williamson,” all the more notable.¹³⁰ In describing the importance of sustainable coal practices to Mingo County, Williamson Mayor Darrin McCormick explained that

for the town of Williamson, renewable energy and sustainable development is not about taking coal jobs. . . . It is about maintaining West Virginia’s legacy as an energy producer by providing a viable mechanism for sustainable economic diversification in the fastest growing sector in energy today, the renewable energy sector.¹³¹

Much of Sustainable Williamson’s origins can be linked to a local organization, the JOBS Project. The JOBS Project, based in the county’s seat, focuses on the creation of renewable energy jobs for the region. Its mission is to be “a catalyst for sustainable economic diversification in Central Appalachia, creating replicable, locally-owned institutions that capitalize on renewable energy resources.”¹³² Its projects range from encouraging wind development by supporting landowners who are investigating siting a wind project on their land, to spearheading the formation of a farmers market in Williamson, to collaborating with a local company to train local electricians and ex-coal miners on solar panel installation.¹³³

The JOBS Project’s effort to create a pyrolysis/biochar program on reclaimed surface mine sites exemplifies the value-added, collaborative approach with the coal sector. Pyrolysis incinerates organic, plant material in the absence of oxygen, creating gas, bio-oil, biochar (charcoal), or a combination thereof. The gas and bio-oil can be combusted as a non-fossil-fuel source of energy.¹³⁴ The biochar can either be buried, which sequesters its carbon content and acts as a sink for greenhouse gas emissions, or it can be combusted.¹³⁵ The JOBS Project and its partners propose to use surface mine sites as a land base to grow the feedstock, in this case a mixed-species native hardwood and grass complex.¹³⁶ Thus, their proposal would create a productive new post-mining land use reclamation strategy. Both the growth and harvest of the feedstock and the incineration of the material into biochar present the possibility for long-term job

(2010), available at <http://www.wvcoal.com/201012182463/2010-coal-facts.html>.

130. The initiative’s website explains, “Sustainable Williamson is a non-profit organization on a mission to create a replicable sustainable community model for low-wealth communities throughout Central Appalachia.” It lists its new projects: Local Energy Action Plan; Sustainable Tourism; Farmers’ Market; Health & Wellness Center; Walkable Communities; Community Solar; Restoration; and Historical Preservation. *Welcome, SUSTAINABLE WILLIAMSON*, <http://sustainablewilliamson.org/> (last visited Jan. 22, 2012).

131. Nino Marchetti, *Sustainable Development in Coal Country*, EARTH TECHLING (Feb. 8, 2011), <http://www.earthtechling.com/2011/02/sustainable-development-in-coal-country>.

132. *About the JOBS Project*, JOBS PROJECT INC., <http://jobs-project.org/about> (last visited Jan. 22, 2012).

133. *Energy in the U.S.*, JOBS PROJECT INC., <http://jobs-project.org/energy-in-the-us> (last visited Jan. 22, 2012).

134. THE JOBS PROJECT ET AL., APPALACHIAN SURFACE MINE BROWNFIELD REHABILITATION FOR LOCAL GREEN JOBS & ENERGY 2 (2011) (draft).

135. See, e.g., Johannes Lehmann, *Commentary: A Handful of Carbon*, 447 NATURE 143, 143 (2007) (noting that “[b]y withdrawing organic carbon from the cycle of photosynthesis and decomposition, biochar sequestration directly removes carbon dioxide from the atmosphere.”).

136. THE JOBS PROJECT ET AL., *supra* note 134, at 6–10.

prospects, after the mines have closed. A draft white paper on the project concludes that, “[b]ased on the present need for economic diversification within the coalfield region of West Virginia, the JOBS Project proposes an innovative energy-based reclamation process to stimulate the production of biomass feedstocks, locally derived electrical energy and job growth within these impoverished areas.”¹³⁷

The pyrolysis proposal responds to a number of problems present in coalfield regions like Mingo County. One issue is the abundance of old mine sites that are not converted into a productive use after the cessation of mining. The Natural Resources Defense Council estimates that between 1.05 and 1.28 million acres were extensively surface mined in the Appalachian region,¹³⁸ but that the vast majority of this area has no post-mining land use other than for pasture or forestry.¹³⁹ Recognizing that surface mining was only a temporary use of the land, the writers of SMCRA had aimed to create conditions for productive post-mining land use.¹⁴⁰ Although there are a few exceptions, critics of mining argue that this intention has been substantially unfulfilled.¹⁴¹ The pyrolysis proposal would provide a productive, ongoing economic use for the reclaimed land, and it would also provide a positive program to which a coal company could point in order to alleviate heightened criticism of their environmental practices.¹⁴² In fact, former surface-mined land is increasingly identified as a potential source of renewable energy and employment. West Virginia University (WVU) recently

137. *Id.* at 2.

138. See ROSS GEREDIEN, *ASSESSING THE EXTENT OF MOUNTAINTOP REMOVAL IN APPALACHIA* app. A (2009), available at http://www.ilovemountains.org/reclamation-fail/mining-extent-2009/Assessing_the_Extent_of_Mountaintop_Removal_in_Appalachia.pdf.

139. ROSS GEREDIEN, *POST-MOUNTAINTOP REMOVAL RECLAMATION OF MOUNTAIN SUMMITS FOR ECONOMIC DEVELOPMENT IN APPALACHIA* 3 (2009), http://www.ilovemountains.org/reclamation-fail/mining-reclamation-2010/MTR_Economic_Reclamation_Report_for_NRDC_V7.pdf. Other sources highlight the variety of post-mining land-use sites in the region, ranging from public school campuses to golf courses to a fish hatchery. See, e.g., Charlotte Sanders, *Post Mine Land Offers Valuable Property*, WILLIAMSON DAILY NEWS, Nov. 7, 2010, http://www.williamsondailynews.com/view/full_story/10191947/article-Post-mine-land-offers-valuable-property?instance=secondary_news_left_column.

140. See Harold P. Quinn, Jr., *Coal Resource Development and Land Use Planning: The Demands of SMCRA*, 3 NAT. RES. & ENV'T 24, 24 (1988-89) (noting that “[t]he underlying premise of SMCRA is that coal mining serves as only a temporary land use. Coal producers must return the land to the same or a higher capability than before mining.”). For MTR mines with an AOC variance, the post-mining land-use requirements are stricter than for AOC mine sites. In all cases, however, the land is meant to be returned to a productive use: “All disturbed areas shall be restored in a timely manner to conditions that are capable of supporting— (1) The uses they were capable of supporting before any mining; or (2) Higher or better uses.” 30 C.F.R. § 816.133(a) (2011).

141. See Sanders, *supra* note 139 (listing several uses for development sites).

142. See, e.g., *Mountaintop Removal: Reclamation Fail*, ILOVEMOUNTAINS.ORG, <http://www.ilovemountains.org/reclamation-fail/> (last visited Apr. 23, 2012) (explaining that “[m]any wonder how coal companies justify blowing up the oldest mountains on the continent. Is it because it’s more profitable for them? Because it employs fewer miners? Nope, according to the coal companies, they are blowing up mountains because the Appalachians need more land for economic development. We put that theory to the test and found that the promise of ‘reclaimed’ flat land for economic development is a big, flat lie. Two new studies by NRDC and Appalachian Voices reveal that 1.2 million acres, including 500 mountains, have been demolished by coal companies in Kentucky, West Virginia, Virginia and Tennessee. Over 89% of sites are not currently being used for economic development.”).

received a grant from the U.S. EPA to develop the concept of “Sustainable Energy Parks” (SEPs), which proposes to site biofuel farms, wind turbines, and solar panels on these former mine sites.¹⁴³ A WVU research center website explains:

This project provides a catalyst to foster a companion “green” energy industry to coal in Appalachia. The result will be an environmentally and economically sustainable reuse of brownfields. SEP’s [sic] have the potential to generate local economic growth, decrease or offset greenhouse gases through carbon sequestration, promote renewable energy technologies, and create a replicable model for communities nationwide to apply to former surface mined land.¹⁴⁴

Second, this proposal would stimulate investment in, and attention to, biomass, a renewable energy sector that the Appalachian Regional Commission has pointed to as “possibly having the greatest regionwide [sic] potential of all renewable energy sources.”¹⁴⁵ Additionally, those in the coal sector may view biomass as less offensive to their position in the energy market because it can be burned in conjunction with coal in power plants, similar to the way that ethanol has been mixed with traditional gasoline.¹⁴⁶

Despite its successes, the pyrolysis project faces hurdles at each step of the production process. First, the feedstock—in this case, trees—must be grown on the reclaimed mine sites. Reforestation of mine sites has not been common practice since the passage of SMCRA, and its uptake faces a number of barriers.¹⁴⁷ To tackle these problems and develop procedures for successful reforestation of surface-mining sites, a group of government and university scientists and technicians created the Appalachian Regional Reforestation Initiative (ARRI).¹⁴⁸ ARRI scientists are also partners of the pyrolysis project.¹⁴⁹ ARRI notes three main barriers to using forestry in the reclamation of coal mine lands.¹⁵⁰ The “cultural” barrier they cite is that many coal operators view reforestation as a more expensive and risky reclamation plan than conventional

143. See N. W. VA. BROWNFIELDS ASSISTANCE CTR., SUSTAINABLE ENERGY PARKS ON FORMER SURFACE MINED LAND IN APPALACHIA 2009, <http://wvri.nrcc.wvu.edu/docs/bf09-fact-sheet.pdf>.

144. *Id.*

145. APPALACHIAN REG’L COMM’N, ENERGIZING APPALACHIA: A REGIONAL BLUEPRINT FOR ECONOMIC AND ENERGY DEVELOPMENT 16 (2006).

146. See NAT’L RENEWABLE ENERGY LAB., FEDERAL ENERGY MANAGEMENT PROGRAM: BIOMASS COFIRING IN COAL-FIRED BOILERS 1 (U.S. Dep’t of Energy ed., 2006) (confirming that “[o]ne of the most attractive and easily implemented biomass energy technologies is cofiring with coal in existing coal-fired boilers.”).

147. See Patrick Angel et al., *The Appalachian Regional Reforestation Initiative*, 1 FOREST RECLAMATION ADVISORY 1, 1 (2005) (“SMCRA improved the surface-mine landforms by increasing stability, improving water quality, and enhancing human safety in the Appalachian region, compared to the results of pre-SMCRA mining. However, SMCRA’s implementation has not been accompanied by widespread replacement of forests disturbed by mining. Many mined lands were restored as grasslands but are not currently used for hay or pasture by their owners. Native forests will eventually be restored on such areas by natural succession, but this process is slow and centuries may be required.”).

148. *Id.*

149. THE JOBS PROJECT ET AL., *supra* note 134, at 2.

150. APPALACHIAN REG’L REFORESTATION INITIATIVE, <http://arri.osmre.gov/About/AboutARRI.shtm> (last visited Apr. 23, 2012) [hereinafter ARRI].

plans like pastureland.¹⁵¹ Since operators must pay a reclamation bond up front, which is then returned only upon demonstration of successful reclamation,¹⁵² this cultural barrier links to a risk-averse financial position by the companies. The “technical” barrier ARRI seeks to change is that the current practice in reclamation is to compact the soil and plant ground cover (fast growing grasses), making conditions ill-suited for tree growth.¹⁵³ On the third, “regulatory” barrier, however, the ARRI advocates argue that the barrier is an inaccurate perception, and that reforestation can be achieved under existing regulations by using the methodology they developed, namely the Forestry Reclamation Approach.¹⁵⁴ The hurdles ARRI and the scientists face may mirror those the pyrolysis project will also confront.

In addition to these challenges to creating the biomass, the pyrolysis project also must succeed in energy generation and distribution. Using pyrolysis technology to generate fuel is still in its early stages, and a variety of approaches are under development.¹⁵⁵ This pyrolysis proposal partners with a West Virginia-based research and development corporation, Mid-Atlantic Technology Research and Innovation Center, which has been investigating pyrolysis technology and its deployment in the state since at least 2007.¹⁵⁶

V. THEORIES OF CHANGE IN THE COALFIELDS

By promoting alternative energy systems, the projects in both case studies seek to reduce the amount of electricity ultimately derived from coal. They can therefore both be viewed as contributing to a decline in surface mining and MTR. Can they do so equally effectively? Concluding one way or the other is not the purpose of this article. However, it is possible to compare the implicit “theories of change” underlying each of the two projects against the conditions under which each would contribute more effectively toward this end.

Comparing the approaches of both case studies highlights the initial questions of whether and when the status quo serves to promote or inhibit change. Under some circumstances, it may serve as a springboard to greater economic diversification by creating new industries based on the raw materials, trained workforce, or other inputs already existing in the traditional sector. The pyrolysis project is premised on the status quo functioning in this manner, with the existing surface-coal mining sector providing the support and resources on which to develop the alternative energy project. Alternatively, existing

151. *Id.*; see also Patrick N. Angel, Forest Establishment and Water Quality Characteristics as Influenced by Spoil Type on a Loose-Graded Surface Mine in Eastern Kentucky, at 17 (Sept. 2008) (unpublished Ph.D. dissertation, University of Kentucky), available at <http://gradworks.umi.com/33/15/3315003.html> [hereinafter Angel Dissertation] (“Another erroneous perception serving as a serious cultural barrier is that tree planting is more expensive and risky than reclamation to pasture land.”).

152. See, e.g., Surface Coal Mining and Reclamation Act, W. Va. Code § 22-3-23(c)(2)(C) (2011).

153. ARRI, *supra* note 150; see also Angel Dissertation, *supra* note 151, at 14.

154. ARRI, *supra* note 150.

155. THE JOBS PROJECT ET AL., *supra* note 134, at 23; see also Johannes Lehmann, *Bio-energy in the Black*, 5 FRONTIERS IN ECOLOGY AND THE ENV'T 381, 386 (2007) (describing some types of biochar under development).

156. THE JOBS PROJECT ET AL., *supra* note 134, at 23.

conditions may inhibit efforts for diversification, either by shaping incentives so as to bias decision-makers in favor of the status quo,¹⁵⁷ or by entrenching power in a way that suppresses alternative viewpoints and proposals from reaching the political agenda.¹⁵⁸ KFTC's approach assumes the latter role of the coal-dominated status quo, as it views supplanting the coal sector with more attractive economic options as a necessary prerequisite to lessening the political power of coal.

What does this suggest for the viability of each of the projects? Working alongside the existing conditions may assist the JOBS Project in its goal to promote alternative energy programs. Yet the initial success may not expand beyond incremental change, as that expansion may be constrained by the very factors that allowed for its initial success. That is, the strategy of working in collaboration with the coal sector is only viable as long as it aligns with the interest of that sector.

On the other hand, efforts like KFTC's approach face a conundrum in which they cannot work in collaboration with the coal sector, and yet by not working with it, the new projects gain little traction. This is exactly the situation that the indirect pathway attempts to upend, wherein coal interests dominate the political and economic spheres and inhibit change. One possible way out of this infinite regress problem could be to focus efforts on pockets of energy policy and infrastructure where the coal sector lacks influence or substantial interest. This is indeed what appears to be taking place with Renew East Kentucky and similar efforts, where they find the greatest success in developing energy efficiency programs. From here, scaling up and expanding beyond efficiency may be possible, especially if they gain new supporters (for example, those employed by new jobs created through efficiency programs).

For either of these pathways to lead to policy change on MTR, it is critical to scale up from niche projects to substantially alter the current economic conditions. Drawing on institutional theory suggests that to do so, the pathways must counteract the "mechanism of reproduction" that underlies the status quo conditions. One scholar explains how wider conditions serve to both stabilize and change institutions: "Institutions rest on a set of ideational and material foundations that, if shaken, open possibilities for change. But different

157. Rational choice scholarship matches these circumstances well, for instance in its primary assumptions that collective outcomes are the consequences of individual actors who behave instrumentally and act strategically in response to how institutions structure incentives. See Peter A. Hall & Rosemary C. R. Taylor, *Political Science and the Three New Institutionalisms*, 44 POL. STUD. 936, 944-45 (1996).

158. See, e.g., Peter Bachrach & Morton S. Baratz, *Two Faces of Power*, 56 AM. POL. SCI. REV. 947, 948 (1962) (noting that a "second face of power" operates by limiting issues on a political agenda to those innocuous to those with power, for instance, "when A devotes his energies to creating or reinforcing social and political values and institutional practices that limit the scope of the political process to public consideration of only those issues which are comparatively innocuous to A"); see also STEVEN LUKES, *POWER: A RADICAL VIEW* 28 (2d ed. 2005) (proposing a "third face" of *latent* power that operates especially through institutional and social arrangements to limit people's recognition of their own preferences to those that benefit the powerful: "Is it not the supreme and most insidious exercise of power to prevent people, to whatever degree, from having grievances by shaping their perceptions, cognitions and preferences in such a way that they accept their role in the existing order of things, either because they can see or imagine no alternative to it, or because they see it as natural and unchangeable, or because they value it as divinely ordained and beneficial?").

institutions rest on different foundations, and so the processes that are likely to disrupt them will also be different, though predictable.”¹⁵⁹ Similarly, she and other institutionalists point to “mechanisms of reproduction” that maintain an institutional framework and patterns of development, perpetuating the status quo.¹⁶⁰ After identifying a mechanism that upholds the system, scholar Jacob Hacker argues that it is possible to then “specify the potential means by which institutions or policies might escape the developmental pathways of the past.”¹⁶¹ When applied to the case of MTR, this literature points toward identifying not only how the coal industry inhibits change, but also what maintains the coal sector’s political position.¹⁶²

Consider two possible mechanisms underlying the existing conditions. On the one hand, an interest-based mechanism may be operating so support for the coal sector is simply due to the economic role it plays (or is perceived to play) in the regional economy. If this is the case, then any effort to diversify the economy would help to dislodge coal’s position. Thus, the JOBS Project’s approach of collaboration may be more politically feasible for achieving small steps of progress. Over time, this could build progressively toward an ultimately more effective strategy.

On the other hand, if an idea-based mechanism is operating, the implications differ. For instance, the public’s acceptance of the coal sector as legitimate may be what allows for its continued operation in spite of the vocal opposition.¹⁶³

Because surface-coal mining is also a historically entrenched and extractive industry, might a similar dynamic also be stabilizing coal’s position? If this is the

159. Kathleen Thelen, *Historical Institutionalism in Comparative Politics*, 2 ANN. REV. POL. SCI. 369, 397 (1999).

160. *Id.* at 397-98.

161. JACOB S. HACKER, THE DIVIDED WELFARE STATE: THE BATTLE OVER PUBLIC AND PRIVATE SOCIAL BENEFITS IN THE UNITED STATES 311 (2002).

162. For quite some time, lessening the factors that underpin the coal sector’s political position has been recognized as a necessary long-term solution. Reflecting on direct action strategies to oppose strip mining in the late 1960s, a woman from eastern Kentucky commented in 1990, “After this I felt more consciously that you can’t try to fight on an issue like this [strip mining] without having to fight the whole system—and you can’t successfully organize the community to fight such an issue without trying to change the whole system. The need to protect the environment is deeply intertwined with people’s need for good jobs and means of protecting themselves and their family economically. Save the Land cannot be separated from Save the People.” Mary Beth Bingman, *Stopping the Bulldozers: What Difference did it Make?*, in FIGHTING BACK IN APPALACHIA: TRADITIONS OF RESISTANCE AND CHANGE 17, 29 (Stephen L. Fisher ed., 1993).

163. A study of forest policy helps explain how this might operate in the MTR context. In addressing the conflict over forest conservation and use in British Columbia, one study argued that conservationists succeeded in reaching their policy goals, because they undermined the legitimacy of their development-oriented opponents. The authors claim that because the development interests were “clientelist,” the public needed to view these interests as legitimate in order to accept their continued dominant position within the policy arena. By questioning whether and how the optimal yield model of forest management would bring about sustainable use of the forest resources, the conservationists successfully challenged the status quo’s technical premise, and, thus, its legitimacy. Because legitimacy had served as a stabilizing factor, this challenge dislodged the development interests from their position. Ken Lertzman et al., *Learning and Change in the British Columbia Forest Policy Sector: A Consideration of Sabatier’s Advocacy Coalition Framework*, 29 CAN. J. POL. SCI. 111, 127 (1996).

case, then efforts like the pyrolysis proposal could further entrench coal by reinforcing its legitimacy rather than undermining it. The proposal calls for using reclaimed mine land to grow feedstock, therefore nullifying the critique that surface mines do not lead to productive post-mining land uses. On the other hand, KFTC's approach simultaneously continues to point out the illegitimacy of the coal industry while promoting an alternative.

It is underlying drivers like the accumulated position of fossil fuel sectors in economic, political, and cultural institutions that push against a "Just Transition to a Green Economy." The Appalachian case reviewed here suggests there are various routes to overcoming these barriers, including working in collaboration with the powerful coal sector or, at least implicitly, in opposition to it. The contrasting approaches of the Renew East Kentucky campaign and the pyrolysis proposal, however, point to different assumptions about how change takes place in this context. If a better understanding of what upholds the status quo leads to more effective strategies for achieving sustainability goals, this suggests an important role for social science analysis.