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CLEARING THE FOG: A HISTORICAL ANALYSIS OF ENVIRONMENTAL AND ENERGY LAW IN COLORADO

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I. INTRODUCTION

The intersection of energy extraction and environmental issues shapes Colorado's economy, its people, politics, and virtually every aspect of life within the state.¹ Colorado boasts a diverse bounty of energy resource wealth.² These reserves, along with other natural resources, are deeply entrenched in the state's history.³ Ever since settlers rushed into the Rocky Mountains in search of gold in the late nineteenth century, the state's cultural and economic identity has been "linked [closely to] the extraction of natural resources."⁴ Early pioneers and boosters quickly discovered that hydrocarbons, "the buried life force of the distant past," were capable of invigorating the state's economy.⁵ That trend of developing fossil fuel

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1. See *Colorado Climate Plan: State Level Policies and Strategies to Mitigate and Adapt*, CDOT 1, 25 (2015), <https://www.codot.gov/programs/environmental/Sustainability/colorado-climate-plan-2015> (explaining Colorado's demographics and financials).

2. See *Colorado State Energy Profile*, U.S. ENERGY INFO. ADMIN., <http://www.eia.gov/state/?sid=CO> (last updated Dec. 15, 2016) (discussing Colorado's diverse range of both conventional fossil fuel and renewable energy resources).

3. See *Colorado Climate Plan*, *supra* note 1, at 31 (explaining natural resource effect on state history).

4. See Katherine Toan, *Not Under My Backyard: The Battle Between Colorado And Local Governments Over Hydraulic Fracturing*, 26 COLO. NAT. RESOURCES, ENERGY & ENVTL. L. REV. 1, 3 (2015) (discussing development of Colorado natural resource wealth).

5. See THOMAS G. ANDREWS, *KILLING FOR COAL: AMERICA'S DEADLIEST LABOR WAR* 129 (2008) (discussing history of energy practices).

(1)

resources continues today, as the energy sector remains an important economic force in Colorado.⁶

At the same time, newcomers moving out West in search of a better quality of life have always factored the state's natural beauty into their decisions to move.⁷ Despite their obvious benefits,⁸ energy-related activities affect air, water, wildlife, and the quality of life in communities that live alongside such development.⁹ The energy sector is also "fundamentally linked to a changing climate" through its significant contribution to global greenhouse gas emissions.¹⁰

Energy history is dynamic.¹¹ It serves as a constant reminder that fundamental shifts in energy regimes are nothing new, but rather, are driven by new resource discoveries, advances in technology, economics, social pressures, and increasingly, environmental concerns.¹² The United States is entering a new era, in which it must address these concerns in an effort to find the appropriate balance between the costs and benefits of traditional fuel extraction, including measures to mitigate climate change.¹³ Because the state is blessed with both traditional and renewable energy resource wealth, in addition to boasting a strong environmental ethic, the story of Colorado seems a fitting case study to explore the intersection of environmental and energy law.¹⁴

6. See *Colorado Climate Plan*, *supra* note 1, at 25 (explaining in 2012, Colorado's energy sector employed over 122,000 people and generated "more than forty-one billion dollars in revenue and twenty-four billion dollars in exports").

7. See CARL ABBOTT, Stephen J. Leonard, and Thomas J. Noel, *COLORADO: A HISTORY OF THE CENTENNIAL STATE* 396 (2013) (illustrating Coloradan's appreciation for natural beauty).

8. See Monika Ehrman, *The Next Great Compromise: A Comprehensive Response To Opposition Against Shale Gas Development Using Hydraulic Fracturing In The United States*, 46 *TEX. TECH L. REV.* 423, 459 (2014) (explaining how development of oil and natural gas provides essential commodity, boost to national and local economies, and more secure domestic energy supply).

9. See *Colorado Climate Plan*, *supra* note 1, at 29 (describing effects of energy industrial sector).

10. *Id.* at 25, 31 (asserting state officials estimate coal mining and abandoned mines in 2010 accounted for nearly one-third of Colorado's methane emissions, while natural gas and oil systems contributed additional thirty-nine percent).

11. See generally DANIEL YERGIN, *THE QUEST: ENERGY, SECURITY, AND THE REMAKING OF THE MODERN WORLD* (2012) (discussing changes in energy regimes throughout modern history).

12. *Id.* at 720–21 (explaining various factors that influence energy markets and policy decisions).

13. See *Colorado State Energy Profile*, *supra* note 2 (discussing energy production and consumption patterns). The transition to a low-carbon energy sector is a daunting challenge, but Colorado is in a good position to provide leadership due to its abundance in natural gas and renewable energy. *Id.*

14. *Colorado Climate Plan*, *supra* note 1, at 25 (discussing ways Colorado aims to promote energy policies benefitting economic and environment health).

When resource development and environmental interests conflict, Coloradans have “engaged and sometimes enraged” one another.¹⁵ Over time, such disputes have increasingly focused on the energy sector.¹⁶ Today, that debate is centered on the development of unconventional oil and natural gas resources using hydraulic fracturing, often referred to as “fracking.”¹⁷

History provides a guidepost, a framework from which society can evaluate successes and failures from previous resource exploitation.¹⁸ The law clarifies the contours of the environment’s relevance to and influence on how the nation develops its energy resources.¹⁹ Thus, looking at the fracking issue through the lens of legal history can aid the industry, state and local officials, and ordinary citizens in their efforts to find the right balance between energy development and protecting the environment.²⁰ Not surprisingly, many of the same broad themes continually surface throughout Colorado’s history.²¹

Those capitalizing on the fracking boom are susceptible to being characterized by opponents “as the latest villain” in Colorado’s “long history of companies racing to capture resources, make money, and depart without cleaning up.”²² Whether they like it or not, fracking proponents are intimately tied to this environmental legacy of conquest that persists in the West, and, thus, would be wise to approach shale extraction with precaution and attention that goes beyond what the law requires.²³ At the same time, anti-fracking forces should look at what earlier generations did to suc-

15. Abbott et al., *supra* note 7, at 396 (discussing influence on Coloradans).

16. Yergin, *supra* note 11, at 720–21 (discussing how environmental issues will continue to affect energy markets).

17. RUSSELL GOLD, *THE BOOM: HOW FRACKING IGNITED THE AMERICAN ENERGY REVOLUTION AND CHANGED THE WORLD* 29 (2014) (distinguishing fracking process from technical perspective). Hydraulic fracturing, or “fracking,” is the process of injecting a cocktail of mostly water, sand, and chemicals at high pressure into deep geologic strata to fracture hydrocarbon-bearing source rocks in order to provide permeable pathways to extract the oil and gas. *Id.*

18. See GEORGE M. MCCARTHY, *HOOR OF TRIAL: THE CONSERVATION CONFLICT IN COLORADO AND THE WEST, 1891-1907* 9 (1977) (encouraging future generations to solve environmental by looking to history).

19. Uma Outka, *Environmental Law And Fossil Fuels: Barriers To Renewable Energy*, 65 *VAND. L. REV.* 1679, 1683 (2012) (displaying effect of legal decisions).

20. For a further discussion on how to view the fracking issue, see *infra* notes 380–391 and accompanying text.

21. For a further discussion of these broad themes, see *infra* notes 285–326 and accompanying text.

22. Patricia Limerick, *The fractured terrain of oil and gas opposition*, *HIGH COUNTRY NEWS* (Feb. 22, 2016), <http://www.hcn.org/issues/48.3/the-fractured-terrain-of-oil-and-gas-opposition> (describing opposition to oil and gas).

23. See *id.* (detailing dangers of fracking).

cessfully protect their environment in the face of unchecked resource exploitation.²⁴ The nation's past reveals that neither side is going to positively contribute to a successful energy future without confronting one another in an open-minded and cooperative fashion.²⁵ The legal profession has an important role to play in this process.²⁶ After all, a lawyer's primary goal is "to engage [] other[s] firmly and fairly."²⁷ By compromising on energy development issues at the local level, capping waste and pollution from extractive processes, and taking a proactive stance on environmental regulation, Colorado can position itself to become a leader in responsible energy development, consequently providing a model for the nation to follow.²⁸

This article surveys energy extraction and the environmental movement throughout Colorado's history.²⁹ It reflects a growing trend toward merging the disciplines of environmental and energy law.³⁰ This article serves as a guidance tool for those wishing to effectuate greater consensus in energy decisions.³¹ Part II teases out the historic disconnect between energy and environmental law.³² Part III briefly summarizes energy's emerging role as an economic driving force in American society in the nineteenth century.³³ Part III then discusses resource extraction in Colorado, leading up to the conservation movement of the 1890s.³⁴ Part IV covers energy development and early efforts to conserve the environment from 1890 up until the early 1960s.³⁵ Part V examines the environmental movement that began in the late 1960s with a focus on how the events of the movement shaped energy development in

24. See *infra* notes 390–394 and accompanying text.

25. See *infra* notes 390–394 and accompanying text.

26. See JUSTICE GREGG HOBBS, IN PRAISE OF FAIR COLORADO: THE PRACTICE OF POETRY, HISTORY, AND JUDGING 135 (2004) (discussing advocacy tactics honed by skilled lawyers).

27. *Id.* (explaining how Thomas Jefferson welcomed disputation "by appealing to [] shared experience or aspiration, to summon up something forgotten, to realize [] new synthesis" but in [] professional manner "without resort to bullying tactics").

28. For a further discussion of various ways Coloradans compromise on energy decisions that affect the environment, see *infra* notes 319–325 and accompanying text.

29. See *infra* notes 83–284 and accompanying text.

30. See *infra* notes 47–51 and accompanying text.

31. See *infra* notes 360–394 and accompanying text.

32. See *infra* notes 40–51 and accompanying text.

33. See *infra* notes 52–82 and accompanying text.

34. See *infra* notes 83–114 and accompanying text.

35. See *infra* notes 115–136 and accompanying text.

Colorado up until the present.³⁶ Part VI summarizes historical trends in the space where energy and environmental values converge in Colorado, and Part VII analyzes these themes in the context of the contentious fracking debate.³⁷ Part VIII concludes that both greater collaboration and consensus need to take place between those on each side of the fracking issue and also suggests several ways to accomplish this goal.³⁸

II. HISTORIC DISCONNECTION BETWEEN ENERGY AND ENVIRONMENTAL LAW

The dissociation between environmental protection and “energy development is complex and often contradictory.”³⁹ The law can serve to merge the two interests, drive them apart, or promote one over the other.⁴⁰ This persistent disconnection is due, in large part, to divergent historical roots in how each body of law developed.⁴¹

Energy law evolved primarily from utilities regulation and anti-trust law, areas that “emphasize economic analysis, monopolistic presumptions, and market preferences.”⁴² Environmental law, by contrast, derived from a hybrid of risk assessment and policy, a solution to overexploitation of natural resources; it also stems from common law principals intended to reduce industrial activity that harms public health and the environment.⁴³ Historically, the two disciplines spoke different languages.⁴⁴ Energy advocates expressed their ideas in terms of production, growth, and market efficiency, while environmentalists preached “a language of conservation and protection.”⁴⁵

36. See *infra* notes 137–284 and accompanying text.

37. See *infra* notes 285–358 and accompanying text.

38. For suggestions on ways to compromise on fracking issues, see *infra* notes 359–406 and accompanying text.

39. See Outka, *supra* note 19, at 1681 (describing law’s relationship to renewable energy development).

40. See *id.* (explaining how law can serve as catalyst or barrier to promoting renewables).

41. *Id.* at 1682 (displaying divergent legal paths).

42. Lincoln L. Davies, *Alternative Energy And The Energy-Environment Disconnect*, 46 IDAHO L. REV. 473, 475–76 (2010) (illustrating difficulties in energy law).

43. *Id.* (discussing historical development of environmental law); see also Outka, *supra* note 20, at 1682 (discussing origins of environmental law).

44. JOSEPH P. TOMAIN, *ENDING DIRTY ENERGY POLICE: PRELUDE TO CLIMATE CHANGE* 237 (1st ed. 2011) (explaining disconnect between environmental and energy law).

45. See *id.* (discussing different perspectives of energy and environmental advocates).

Merging the two disciplines began during the environmental movement of the 1970s; since the development of sustainability principles and the nation's understanding of climate change, however, this blending accelerated.⁴⁶ Environmental law plays a significant role in "regulating and mitigating certain harms of energy production," while also providing structural support for less polluting fuel sources and methods of production.⁴⁷ It is also increasingly apparent that approaching the two areas through "separate spheres of regulation" fails to effectively control or consider the effects of one or the other.⁴⁸ Perhaps more than anything else, this disconnection "has contributed to the failure to control for energy's role in climate change."⁴⁹ Sifting through Colorado's legal history "requires us to face up to the cultural and psychological disconnection" that exists between energy production and policy decisions that affect the environment.⁵⁰

III. ENERGY DEVELOPMENT AND ENVIRONMENTAL LEGACIES IN THE NINETEENTH CENTURY FRONTIER ERA

A. Industrial Revolution and Native American Removal

At its most basic level, "[e]nergy is the capacity to do work," and since the founding of this country, Americans have gone through several energy transitions.⁵¹ When American settlers began making inroads into Colorado during the mid-nineteenth century, the country was experiencing a sweeping transformation in industrialization and modernization.⁵² Railroads, powered by both the steam engine and federal grants and subsidies, accelerated this shift and brought industrialism to the West.⁵³ The Industrial Revolution also greatly increased mankind's ability to affect the nat-

46. See Joseph P. Tomain, *The Past And Future of Electricity Regulation*, 32 ENVTL. L. 435, 466 (2002) (explaining how environmentalists "drew significant attention to [] negative externalities of [] dominant energy policy").

47. See Outka, *supra* note 19, at 1683 (describing effect of environmental law on energy policy).

48. *Id.* (discussing disconnect between energy law and environmental law).

49. *Id.* at 1682-83 (detailing rise of climate change).

50. See Limerick, *supra* note 22, at 18 (illuminating physiological dimensions of energy policy).

51. Aaron Sachs, *Energy in American History*, OXFORD RESEARCH ENCYCLOPEDIAS 4 (July 2015), <http://americanhistory.oxfordre.com/view/10.1093/acrefore/9780199329175.001.0001/acrefore-9780199329175-e-54> (discussing energy transitions).

52. *Id.* (discussing impact of Industrial Revolution on American society).

53. See *id.* (proving to some extent, "steam power helped to democratize American culture" by facilitating "flow of people, goods, and ideas" out West and into urban areas).

ural environment.⁵⁴ Additionally, because this revolution “rests on a hydrocarbon foundation,” “[t]here may nothing so fundamental to U.S. environmental history as energy.”⁵⁵

Before the prospect of gold brought swarms of fortune seekers to Colorado in 1858, the region was home to sparsely populated bands of various Native American tribes, fur traders, and settlements of Hispanos in the San Luis Valley of Colorado.⁵⁶ This early cultural convergence would bring to the native peoples their own dramatic transition in terms of energy use.⁵⁷ The introduction of the horse had significant cultural implications on the Native American way of life in much the same way the Industrial Revolution did for the Europeans.⁵⁸ Old traditions often disappeared, and for some tribes, the horse became the center of their economy.⁵⁹

Unfortunately, most of the tribes would themselves disappear from Colorado.⁶⁰ Over the next quarter century, genocide and forced removal permanently evicted all of the indigenous groups from their homeland, except the Utes, who had once called Colorado their home.⁶¹ Early Coloradans, like others throughout the country, “saw Indians as nuisances to be eliminated.”⁶² Prospectors who wanted to safely extract natural resources in the mountains were some of the biggest proponents of Indian removal.⁶³ After the discoveries of gold, silver, and coal in the late-eighteenth century, the region’s natural environment “underwent more radical and rapid alteration than in a millennium of Native American inhabitation.”⁶⁴ These mineral rushes were the catalyst of mass migration

54. *See id.* (discussing impact of industrialization on environment).

55. Yergin, *supra* note 11, at 426 (explaining fundamental association between fossil fuels and heavy industrialization); Sachs, *supra* note 42, at 1 (discussing energy history).

56. KATHLEEN A. BROSNAN, *UNITING MOUNTAIN AND PLAIN: CITIES, LAW, AND ENVIRONMENTAL CHANGE ALONG THE FRONT RANGE* 2-3 (2002) (discussing pre-industrial population).

57. *See* Abbott et al., *supra* note 7, at 22 (discussing Native American interaction with European settlers).

58. *Id.* (detailing effect of horse on Native American life).

59. *Id.* (discussing transformation of Native American culture).

60. *Id.* at 93 (explaining removal of tribes in Colorado).

61. *Id.* (explaining how Utes retained some land in southwest portion of state). Today, the fossil fuel resources on those lands provide the tribe with some financial security. *Id.*

62. Abbott et al., *supra* note 7, at 94 (discussing nineteenth-century attitude toward Native Americans).

63. *See id.* at 19 (pointing to European American engagement with Native Americans).

64. *See* Brosnan, *supra* note 56, at 3 (describing how “mountains became [] source of precious metals, industrial ores and reservoir water”). *See also* Abbott et al., *supra* note 7, at 41 (discussing extent of ecological transformation).

into a region that many had previously considered to be unsuitable for human settlement.⁶⁵

B. Outside Influence and Conquest of Western Mineral Economies

Mining for hard-rock minerals and solid fuel was by far the most dominant industry in nineteenth-century Colorado.⁶⁶ The history of Colorado mining is a particularly enlightening illustration of “the boom psychology.”⁶⁷ The mineral rushes of their era brought in large sums of outside private capital to Colorado, stimulating the economy of a region where intrastate capital was virtually non-existent.⁶⁸ Besides using its military might to remove Native Americans, the federal government spurred mineral development by subsidizing the industry and selling rich mineral lands to prospectors at low prices.⁶⁹ Laws, such as the Homestead Act of 1862 and General Mining Law of 1872, reflected a federal policy that encouraged rapid western expansion and growth, especially in terms of natural resource exploitation.⁷⁰ In many ways, the influx of eastern capital, coupled with the manifest destiny narrative that the United States government promoted, resembled an attitude of colonial conquest not so different from that exhibited by European enterprises throughout the world.⁷¹

Legal institutions and government policy during the late nineteenth century “reflected an instrumental approach that facilitated market exploitation.”⁷² These governmental policies allowed cer-

65. See PATRICIA N. LIMERICK & JASON L. HANSON, A DITCH IN TIME: THE CITY, THE WEST AND WATER 22 (2012) (discussing influence of mining booms on westward expansion).

66. See *The Mining Industry in Colorado*, HISTORY COLORADO, <http://www.historycolorado.org/oahp/mining-industry-colorado> (last visited Nov. 6, 2016) (summarizing history of mining industry in Colorado). “The Pike’s Peak Gold Rush brought unprecedented numbers of people into the region and that in turn led to power social, economic, and political changes that brought about the creation of Colorado Territory in 1861. . . .” *Id.*

67. JOSEPH E. KING, A MINE TO MAKE A MINE: FINANCING THE COLORADO MINING INDUSTRY, 1859-1902 189 (1977) (explaining psychological condition of only considering boom, not bust, phase of mining).

68. *Id.* (explaining influx of outside capital to western mineral industry).

69. Abbott et al., *supra* note 7, at 129 (discussing federal policies that encouraged mineral development).

70. Carrie C. Doyle, *The Modern Oil Shale Boom: An Opportunity for Thoughtful Mineral Development*, 20 COLO. J. INT’L ENVTL. L. & POL’Y 253, 256 (2009) (explaining laws that influenced western expansion).

71. Abbott et al., *supra* note 7, at 41 (comparing western expansion to European colonial conquests).

72. Brosnan, *supra* note 56, at 6 (illustrating legal frameworks and economic policy during nineteenth-century).

tain wealthy entrepreneurs to accumulate vast amounts of capital.⁷³ Boosters, like William Gilpin, regarded Colorado's mountainous hinterlands "as natural vaults of precious metals" and used wealth gained from mining ventures "to oil their political ambitions."⁷⁴ Boosters used wealth gained from mining ventures "to oil their political ambitions."⁷⁵ Indeed, it was this vault of resource wealth that put Denver on the map as the epicenter of regional mining activity.⁷⁶ Denver, along with other Front Range cities, like Colorado Springs and Pueblo, developed into "cities of nature," dependent upon "the extraction, processing, and marketing of the region's natural capital."⁷⁷

The Gilded Age was notable for its mass concentration of wealth and power in individuals and large corporations that pulled the strings of centralized political authorities; this era, however, also fostered a flourishing of local governance in the West.⁷⁸ Self-governing communities and roughly organized trade groups joined forces to protect themselves against outsiders whose interests were not geared towards the same ends as the locals.⁷⁹ The explosion in civic participation at the local level is perhaps evidence that American democracy "gained new strength every time it touched a new frontier."⁸⁰ Although Denver boosters, outside investors, and local communities did much to encourage Colorado's early economic and social prosperity, they did little to protect their environment.⁸¹

73. *Id.* (explaining how "capital bought for regional smelters [] new technology that gave once difficult-to-reduce ores value as commodities").

74. Abbott et al., *supra* note 7, at 69 (describing boosters' attitudes toward Colorado's natural resources); *Id.* at 126-27 (discussing connection between natural resource exploitation and political influence).

75. *Id.* at 126-27 (explaining boosters' motivation for mining).

76. *Id.* at 69 (displaying reason for Denver's growth).

77. Brosnan, *supra* note 56, at 1 (showing why certain cities in Colorado flourished).

78. *Id.* at 6 (finding basis for political shift in West).

79. *Id.* at 5-6 (explaining adoption of "[t]enets of localism and systems of self-imposed regulation. . . ."); *see also* Abbott et al., *supra* note 7, at 53-54 (discussing how diverse groups came together to form local governments).

80. Brosnan, *supra* note 56, at 7 (discussing simultaneous expansion of civic participation and western migration); *see also* Abbott et al., *supra* note 7, at 56 (explaining "miners . . . imitated federal land policies by setting aside one claim in each lode for [] school fund"). Additionally, "[p]rospectors usually turned out by the hundreds to vote for officials." *Id.*

81. Brosnan, *supra* note 56, at 7 (describing ignorance to environmental degradation).

C. Nineteenth Century Pre-Conservation Movement's
Environmental Legacy

Early Coloradans looking to strike it rich during boom periods failed to recognize the scale of environmental degradation they were causing.⁸² Cities and large mining operations “befouled the air with smoke from coke ovens, smelters, and coal stoves.”⁸³ Waterways became polluted with sewage and industrial waste.⁸⁴ Early Coloradans cleared vast swaths of forests, hunted animals, like bison, to the brink of annihilation, introduced non-native species, and applied eastern farming techniques that were unsuitable for the parched lands of the arid West.⁸⁵ One of the most notorious environmental legacies of this era is the pollution left behind from hard rock mineral mining, which included “abandoned mines leaking acid drainage” and other contaminants into lakes and streams.⁸⁶ Mining and milling processes were only concerned with efficiency and expediency, fueled by a desire to beat the bust.⁸⁷

Early advocates wishing to mitigate these impacts were rarely successful in their efforts.⁸⁸ The attitude toward the environment of most Coloradans “was unsophisticated and simplistic: the land existed to be exploited.”⁸⁹ Natural resource developers simply could not fathom the idea of creating an environmental impact statement or any sort of mitigation mechanism.⁹⁰ Legal philosophies on environmental protection did not exist in any sort of robust statutory or regulatory form.⁹¹ The only legal recourse for

82. *Id.* (describing destruction caused by early settlers).

83. Abbott et al., *supra* note 7, at 371 (showing pollution caused by settlers).

84. *Id.* (providing further examples of destruction).

85. *Id.* (displaying negligent treatment of native species).

86. Limerick, *supra* note 22, at 18 (explaining legacy left to Coloradans).

87. See Eryn Gable, *Of Mines and Minerals*, HEADWATERS 16 (2008), <https://www.yourwatercolorado.org/cfwe-education/water-is/water-law/81-headwaters-magazine/headwaters-summer-2008-public-land-issue/148-of-mines-and-minerals> (discussing environmental problems related to abandoned mines in Colorado).

88. Abbott et al., *supra* note 7, at 371 (describing early attempts by conservationists to protect forests).

89. McCarthy, *supra* note 18, at 3-4 (explaining Americans' unsophisticated attitude toward environment); see also Brosnan, *supra* note 56, at 7 (showing attitude for early use of Colorado land).

90. See Limerick & Hanson, *supra* note 65, at 202 (showing lack of foresight by early developers).

91. H. LAWRENCE HOYT, *Colorado's History of Environmental and Land Use Laws, and their Impact on Colorado's Water*, CITIZEN'S GUIDE TO COLORADO'S ENVIRONMENTAL ERA 24 (2005) (explaining non-existence of environmental law).

concerned citizens was common law complaints, such as nuisance and trespass.⁹²

Despite the environmental degradation that occurred during this period, there was one bright spot in the evolution of Colorado's environmental ethic.⁹³ The state's natural beauty has always played a significant role in influencing how Coloradans treat their environment.⁹⁴ Early Coloradans valued the state's scenic attractions as a source of tranquility and as a commercial resource much in the same way individuals, today, recognize the state as a "recreational mecca."⁹⁵ Boosters capitalized on the "intentional mythologizing of the West as a place of romantic escape and adventure."⁹⁶ They accomplished this by investing in what would develop as a robust outdoor tourism economy.⁹⁷

D. Nineteenth-Century Energy Resource Development

Colorado, also known as the Centennial State, "has a long history of energy production," beginning with coal mining near Boulder in 1859 and oil operations near Florence several years later.⁹⁸ By the late nineteenth century, coal had largely replaced wood as the dominant form of energy used to power the American economy.⁹⁹ This was especially true for Coloradans, who exploited their state's significant coal supplies to heat buildings and power steam

92. See *id.* (explaining common law). Common law "worked for decades when most of the population was rural and the distances between landowners were great," but "as the population grew more urbanized and became more socially and economically complex, such recourse was only available to those who could afford to pay lawyers and await court action and appeals." *Id.*

93. Abbott et al., *supra* note 7, at 396 (discussing importance of Colorado geography to conservation efforts).

94. *Id.* (describing Coloradan terrain).

95. *Id.* at 223–28 (explaining early recognition of Colorado's scenic attractions); Hobbs, *supra* note 26, at 78 (showing current view of Coloradan recreational resources).

96. PATRICIA N. LIMERICK, *SOMETHING IN THE SOIL: LEGACIES AND RECKONING IN THE NEW WEST* 25 (2001) (emphasizing romantic appeal of exploring western landscapes).

97. See Abbott et al., *supra* note 7, at 223 (explaining how boosters considered "[] climate, mineral waters and scenic attractions of Colorado . . . as resources in themselves").

98. See Colorado Climate Plan, *supra* note 1, at 31 (showing Colorado's coal mining past). Oil was discovered near Florence in 1860, but successful drilling attempts did not occur until 1881. *Id.* As of this writing, the Florence Field remains "the oldest continuously operating oil field in the United States." *Id.*

99. See LEE SCAMEHORN, *HIGH ALTITUDE ENERGY: A HISTORY OF FOSSIL FUELS IN COLORADO (MINING THE AMERICAN WEST)* 1 (2002) (displaying change of dominant energy source in Colorado). In the 1890s, coal accounted for over ninety percent of energy consumed in the United States. *Id.*

engines that drove manufacturing and other industrial enterprises.¹⁰⁰

Coal mining became an important driver of the Colorado economy, and production increased dramatically from the 1870s through the 1880s.¹⁰¹ Besides its use as a fuel source for heating homes and businesses, metallurgical coal contained the raw material for making coke, a form of carbon that was used extensively in steelmaking and smelter operations.¹⁰² The dominant, and perhaps most important local market for coal, however, was the railroad industry.¹⁰³ Besides consuming nearly half of the coal produced in the United States in the mid-1880s, “railroads were vital links between mines and the state’s growing urban industrial centers.”¹⁰⁴ The railroads built the transportation network that allowed prospectors to exploit mines in previously isolated mountain areas at a more extensive pace.¹⁰⁵ Colorado became the leader in coal production among the states and territories in the Rocky Mountain West.¹⁰⁶

By the end of the nineteenth century, however, a new form of fossil fuel began changing energy markets.¹⁰⁷ Coloradans discovered petroleum near Canon City in 1860, but attempts to economically extract the oil were not successful until 1881, with the development of the Florence Field.¹⁰⁸ Natural gas, although commonly produced in association with oil exploration, was not developed on a significant commercial scale until the 1920s, which was

100. *See id.* (explaining use of resources). Through distilling processes, coal could also be converted to manufactured gas for lighting and heating purposes. *Id.*

101. Abbott et al., *supra* note 7, at 139 (displaying coal mining’s importance).

102. *Id.* (explaining connection between coal mining and coke manufacturing); *see also* Scamehorn, *supra* note 99, at 23 (finding further uses for coal); *see also generally* JAMES E. FELL, JR., ORES TO METALS: THE ROCKY MOUNTAIN SMELTING INDUSTRY (2009) (detailing history of smelting industry in West).

103. Scamehorn, *supra* note 99, at 7 (explaining railroad industry’s importance).

104. *Id.* at 6 (showing further importance of railroads).

105. Abbott et al., *supra* note 7, at 79-80 (describing Coloradan development).

106. Scamehorn, *supra* note 99, at 7 (displaying reason for shift to coal).

107. *See A Short History of Energy*, UNION OF CONCERNED SCIENTISTS, http://www.ucsusa.org/clean_energy/our-energy-choices/a-short-history-of-energy.html#.VzEX42MEXVo (last visited Dec. 10, 2016) (explaining arrival of petroleum). For years, oil was considered “a nuisance, contaminating wells for drinking water[,]” but it became a valuable alternative for lighting after the whaling industry declined. *Id.*

108. Scamehorn, *supra* note 99, at 43 (finding early oil extraction).

primarily due to a lack of pipeline infrastructure to transport the gas to urban markets.¹⁰⁹

Traditional Western historians inaccurately describe 1890 as the year the frontier closed.¹¹⁰ This misnomer is especially misleading in terms of energy resource extraction.¹¹¹ Oil, natural gas, coal, and uranium all “went through their principal booms and busts after 1890.”¹¹² The 1890s also ushered in a new frontier and fundamental shift in the way Coloradans would think about conserving their natural resources and the environment.¹¹³

IV. CONSERVATION EFFORTS AND ENERGY DEVELOPMENT (1890 TO 1960)

A. Conservation Movement in the Progressive Era

The Western conservation movement that took place at the turn of the nineteenth century reflected a major “change in Americans’ attitudes toward nature” and provided the foundation for later movements to protect the environment.¹¹⁴ Progressive thinkers, like Theodore Roosevelt, Gifford Pinchot, John Muir, and Colorado’s Enos Mills, encouraged citizens to value nature for its beauty, “not just as a resource to be exploited.”¹¹⁵ A “new wilderness cult,” wishing to halt the unsustainable natural resource exploitation, “triggered a full-scale rebellion against American tradition.”¹¹⁶

This new way of thinking about resource extraction pitted Coloradans sharply against one another and against the federal government, perhaps more than any other state.¹¹⁷ The eventual framework that emerged was a policy in which federal government agencies retained managerial control over public land, developed long-term resource planning and stressed the “economic necessity of conservation.”¹¹⁸ The conservation movement also led to the creation of the National Parks System and planted the seeds for the

109. *Id.* at 71-87 (explaining natural gas development).

110. Limerick, *supra* note 96, at 18–19 (showing inaccuracy of knowledge of frontier discovery).

111. *Id.* (displaying further lack of knowledge).

112. *Id.* (showing transition of resources).

113. *See infra* notes 115–120 and accompanying text.

114. Abbott et al., *supra* note 7, at 240 (finding change in attitude toward resources).

115. *Id.* at 235 (displaying focus on nature).

116. McCarthy, *supra* note 18, at 4 (showing further change in attitude).

117. *Id.* at 236 (explaining reasons for tension with federal government).

118. *Id.* at 8 (finding reasoning for new policies).

environmental and wilderness movements of the mid-to-late twentieth century.¹¹⁹

B. Energy and Economic Development in the First Half of the Twentieth Century

If mining for precious metals describes the origin of Colorado resource extraction, then the twentieth century summoned in the era of fossil fuels.¹²⁰ Coal was still significant, but oil and natural gas became increasingly important industries in the western United States.¹²¹ Colorado's fossil fuel sector followed the boom and bust trends of commodity markets, often beholden to events and circumstances playing out in distant places.¹²² The Great Depression decade of the 1930s was a hard time for the industry.¹²³ Subsequently, with the outbreak of World War II in 1942, Colorado fuel production experienced an extraordinary boost, as did the entire American industrial sector.¹²⁴ The post-war boom years that followed changed Colorado in profound ways.¹²⁵ Oil production flourished along with the rest of the state's economy.¹²⁶ Coal output, meanwhile, dipped gradually up until the mid-1950s, as it lost its traditional markets to oil and natural gas.¹²⁷

The federal government played a key role in Colorado's post-war growth.¹²⁸ Federal expenditures on infrastructure projects, such as the Interstate Highway System and the building of large dams, provided immense support for economic development across

119. Abbott et al., *supra* note 7, at 235-40 (discussing origins of wilderness preservation policy and national parks in Colorado).

120. *Id.* at 418 (showing shift to fossil fuels).

121. Andrews, *supra* note 5, at 288 (displaying waning importance of coal). In addition to continued production at the Florence field, discoveries of petroleum west of the Continental Divide and along the Front Range near Boulder and Fort Collins boosted the state's output. See Abbott et al., *supra* note 7, at 324.

122. See Scamehorn, *supra* note 99, at 127 (explaining that, between 1920 to 1973, "Colorado's natural gas industry experienced roller-coaster ride").

123. See *id.* (showing shift during Great Depression). For Colorado's struggling oil industry, there was "too much supply and not enough demand." *Id.* at 111. At one point, in 1931, oil sold for less than ten cents a barrel in some states. *Id.*

124. *Id.* at 114 (discussing economic boom for petroleum industries during World War II); see also Abbott et al., *supra* note 7, at 309 (discussing mining industry role during World War II).

125. See Abbott et al., *supra* note 7, at 315-28 (discussing economic upturn after World War II).

126. See *id.* at 318, 324 (pointing out economic success).

127. See *id.* at 318 (noting decline in coal production in mid-1950s).

128. See Limerick & Hanson, *supra* note 65, at 211 (discussing federal programs that provided jobs for Coloradans).

the state.¹²⁹ Bolstered by the nation's Cold War commitment to nuclear power, for both electricity and military strength, the Atomic Energy Commission (AEC) promoted uranium mining in the Four Corners region.¹³⁰ Production quickly outpaced demand, however, and the uranium boom sputtered out in less than a decade.¹³¹

The persona of Uncle Sam also contributed to suburban growth along the Front Range by building military bases, defense facilities, and offices for a number of federal agencies.¹³² Two military facilities built just north of Denver, in the Rocky Mountain Arsenal (RMA) and in the Rocky Flats, provided thousands of jobs and local citizens initially welcomed the projects with high praise.¹³³ RMA manufactured chemical weapons and rocket fuel, while the AEC's top-secret Rocky Flats plant processed plutonium and made nearly all of the detonators for the country's nuclear bomb stockpile.¹³⁴ These facilities would eventually leave an environmental mess, the costs of which greatly outweighed their initial value.¹³⁵

V. THE BIRTH OF ENVIRONMENTAL LAW AND NEW METHODS OF ENERGY EXTRACTION (1960s-2013)

A. Environmental Movement of the 1960s and the 1970s

From the latter half of the 1960s through the 1970s, citizens across the country "began to demand a cleaner environment."¹³⁶ Consequently, protecting public health and the integrity of the environment "became an article of faith and a political platform for a

129. See Abbott et al., *supra* note 7, at 328 (describing federal expenditures).

130. *Id.* at 323 (detailing federal spending).

131. *Id.* at 324 (explaining decline in demand).

132. Limerick & Hanson, *supra* note 65, at 211 (describing federal funding).

133. Abbott et al., *supra* note 7, at 320 (describing how boosters bragged about federal military facilities).

134. Abbott et al., *supra* note 7, at 320-21 (detailing manufacturing operations at federal facilities); see also *What is the history of Rocky Flats?*, COLORADO, https://www.colorado.gov/pacific/sites/default/files/HM_sf-rocky-flats-exposures-study-history-of-site.pdf (last visited Nov. 2, 2016) (discussing how "[e]arly operations were cloaked in secrecy to protect national security"); see also Len Ackland, *The Press, "National Security," And Nuclear Weapons: Lessons From Rocky Flats*, 24 J. LAND RESOURCES & ENVTL. 17, 17 (2004) (noting extent of U.S. detonators made at Rocky Flats).

135. For a further discussion on environmental legacies of RMA and Rocky Flats, see *infra* notes 201-206 and accompanying text.

136. See Hoyt, *supra* note 91, at 26 (discussing momentum for environmental movement); see also Abbott et al., *supra* note 7, at 350 (illustrating growth of environmental movement).

new generation” of government officials and citizen activists.¹³⁷ The environmental laws and regulations that came out of this era established “an entirely new set of ground rules” for natural resource development.¹³⁸ The transformation “challenged the inherited definition of progress” and was particularly dramatic for the American West.¹³⁹ It would take a concerted effort from government officials and newly established state and federal agencies, however, to translate these statutes and regulations “into court decisions and constructive advice for decision makers.”¹⁴⁰

In Colorado, leaders, such as Governor Richard Lamm, Attorney General J.D. MacFarlane, Deputy Attorney General Jean Dubofsky, and Assistant Attorney General Gregory Hobbs, made environmental protection one of their highest priorities.¹⁴¹ Governor Lamm fought hard against energy-resource exploitation by outside interests and demanded that the industry and federal government pay for their impact.¹⁴² For example, his administration established a severance tax on natural resource extraction designed to help mitigate the effects of the boom-bust cycle.¹⁴³

It also took the work of Colorado’s Attorney General’s office to ensure these efforts had teeth.¹⁴⁴ A new Natural Resources Section

137. See Hobbs, *supra* note 26, at 78 (showing effects of growing environmental awareness).

138. See Limerick & Hanson, *supra* note 65, at 176 (explaining fundamental shift in natural resource development). Important environmental laws enacted during this era include: the Wilderness Act of 1964, the Wild and Scenic Rivers Act of 1968, the Clean Air Act of 1970, the National Environmental Policy Act of 1970, the Clean Water Act of 1972, the Endangered Species Act of 1973, and the Federal Land Policy and Management Act of 1976. *Id.*

139. See *id.* at 176-79 (explaining environmental movement’s amplified effect in West).

140. See Hobbs, *supra* note 26, at 80–81 (explaining EPA’s early awareness of power). In its early years, no one at the EPA “had more than an informed guess of how extensive its powers would be, nor how much autonomy its officials would be given.” *Id.*

141. *Id.* at 82 (crediting attorneys who made up nucleus of Colorado Attorney General’s Natural Resources Section). Dubofsky and Hobbs would eventually serve as justices on the Colorado Supreme Court. *Id.*; see also McCarthy, *supra* note 18, at 269 (emphasizing Governor Lamm’s commitment to environmental protection). When running for Governor in 1974, Lamm “made environment the overriding issue of the election.” *Id.*

142. McCarthy, *supra* note 18, at 269 (illustrating Governor Lamm’s stance against federal government). Governor Lamm had his cabinet look into the boom and bust nature of the West and “fought against local communities financing the new infrastructure,” instead demanding that industry or the federal government pay for its impact. Richard D. Lamm, *Foreword to ANDREW GULLIFORD, BOOMTOWN BLUES* (1st ed. 1989) (discussing strategies to improve local communities).

143. COLO. REV. STAT. ANN. § 39-29-101 (West 1973) (describing severance tax).

144. Hobbs, *supra* note 26, at 87 (discussing impact of enforcement actions).

was stocked with a team of sharp young lawyers, who were devoted to ensuring that citizen demands for a cleaner environment were fulfilled.¹⁴⁵ Controlling Denver's notorious air pollution and bringing the state into compliance with the 1970 Clean Air Act (CAA) became a top priority.¹⁴⁶

1. *The Perpetual Struggle for Clean Air*

The air in Denver and Pueblo, Colorado's major hubs for heavy industrial activity, had been filthy since the early 1900s; the postwar boom in population and proliferation of the automobile made it even worse, however, as did oil refineries, coal-fired power plants, and backyard burn pits.¹⁴⁷ Industries along the Front Range had a habit of treating "the public's air resource as a dumping space."¹⁴⁸

The state focused on cleaning up stationary sources first, and then moved to the job of tackling mobile emissions.¹⁴⁹ Colorado implemented several innovative initiatives, such as establishing the country's first urban visibility standard in 1989, and restricting the use of wood burning stoves during high pollution days.¹⁵⁰ Much of Colorado's clean air restoration success is attributed to the formation of a coalition among local and state government officials, activists groups, and business leaders.¹⁵¹ Governors and the General Assembly "learned to compromise" on key issues, like air quality, an attempt to find the right balance in a state where partisan politics can be especially heated.¹⁵² Although federal legislation and the state's enforcement apparatus "provided the legal platform," it was the tenacious will of citizens that made restoring Colorado's clean air possible.¹⁵³

145. *Id.* at 82 (describing new team of lawyers).

146. *Id.* (discussing efforts to improve Denver air quality). The 1970 CAA required states to adopt and enforce an implementation plan for attainment and maintenance of the national ambient air standards. *Id.* at 82-87.

147. Abbott et al., *supra* note 7, at 372 (offering reasons for pollution).

148. Hobbs, *supra* note 26, at 80-81 (detailing poor business practices of Colorado industry).

149. *See id.* at 93-111 (discussing air emission control strategy). Efforts to cut down on mobile emissions included vehicle emission inspections, cleaner and alternative fuels for cars, and investments in improving public transportation. *Id.*

150. *Id.* at 110 (outlining innovative environmental initiatives).

151. *Id.* at 111 (describing leaders in clean air restoration).

152. Abbott et al., *supra* note 7, at 445 (describing compromises among government officials).

153. Hobbs, *supra* note 26, at 71 (illustrating success due to citizen involvement).

Denver's soiled air was a health risk, but it also morphed into "a political liability due to focused media attention" and intense citizen scrutiny.¹⁵⁴ Colorado's stunning mountain views were often cloaked behind a mask of pollution.¹⁵⁵ Although citizens, at first, were ignorant about their own contribution to the problem, they were outraged about not being able to see the mountains.¹⁵⁶ An intense public awareness campaign and five decades of relentless press coverage focused on improving air quality, however, turned citizen ignorance into citizen scorn for public inaction.¹⁵⁷ Thus, restoring Colorado's clean air became more than a public health issue; it was recognized as a "valuable community asset" and vital to the state's tourist industry.¹⁵⁸

With strong citizen support, a collaborative effort among state officials, and a push from the federal government, Colorado's mission to control its air pollution problem began to emit positive results.¹⁵⁹ By the start of the new millennium, Colorado started to comply with the national air quality standards prescribed by the EPA.¹⁶⁰ Yet, the struggle for clean air compliance is an ongoing battle.¹⁶¹ An influx of newcomers into Colorado and concerns about climate change has kicked off a new discussion in terms of evaluating Colorado's success in controlling air pollution.¹⁶²

2. Water Quality & Resource Management

Due to the state's semi-arid climate, "water has historically been a limiting factor" for human settlement and currently influences almost every economic activity in Colorado.¹⁶³ A diverse ar-

154. *Id.* at 73 (displaying will of Colorado citizens).

155. *Id.* (illustrating citizen frustration with not being able to see mountains).

156. *Id.* (discussing role of citizen advocacy and media coverage). A "pro-business attitude" in the General Assembly during these initial efforts also stunted any real progress in improving air quality. *Id.* at 72.

157. *Id.* at 69 (illustrating citizen unrest). Citizens were "[d]isgusted with air that looked and smelled like rotten soup." *Id.*

158. Hobbs, *supra* note 26, at 111 (depicting shift to ecotourism).

159. *Id.* at 87 (detailing effort behind environmental movement).

160. *Id.* at 111 (showing Colorado's progress towards regulatory compliance).

161. Abbott et al., *supra* note 7, at 373 (detailing difficulties in compliance). By the beginning of the 2000s, Denverites were experiencing better air than they had in years. *Id.* In 2003, however, Denver exceeded EPA ozone standards at least fifty times, and it continues to struggle in the face of rapidly increasing population numbers along the Front Range. *Id.*

162. *See id.* (discussing new climate awareness).

163. ANDREW GULLIFORD, BOOMTOWN BLUES: COLORADO OIL SHALE 10 (1989) (discussing importance of acquiring clean water in arid West); *see also Colorado Climate Plan*, *supra* note 1, at 7 (discussing impacts of climate change on water supply). The Arkansas, the Colorado, the Platte, and the Rio Grande are the

ray of water users competing for this scarce resource, including the agrarian farming and ranching activities that define so many communities across the state, depend on the availability of a clean and consistent water supply.¹⁶⁴ Colorado recognized its water quality problems several decades before it decided to purify its air.¹⁶⁵ During the 1930s and 1940s, public officials made cleaning up Denver's water supply a top priority.¹⁶⁶ Nonetheless, like air restoration, solving water quality issues is an ongoing battle.¹⁶⁷

A critical innovation in Colorado water law was the recognition of instream flow rights for "environmental purposes."¹⁶⁸ Historically, acquiring a water right under the doctrine of prior appropriation required a physical diversion, but in 1973, the General Assembly entrusted the Colorado Water Conservation Board (CWCB) with the authority to acquire minimum instream flow rights in order to protect certain natural waterways.¹⁶⁹ The Colorado Supreme Court upheld this authority, and since the statute's enactment, the CWCB "has appropriated instream flow water rights on more than [sixteen hundred] stream segments covering more than 9,250 miles of stream and 480 natural lakes."¹⁷⁰ The recognition of instream flow rights illuminates how the legal system is flexible and can adapt to incorporate new societal values.¹⁷¹

Another important event in the merging of environmental into natural resource decisions is the Two Forks Dam project (Two

juggernauts of Colorado's headwater heritage. *Id.* Together, these for major river systems produce "approximately [fifteen] million acre-feet of water" per year. *Id.*

164. See generally *Colorado's Water Plan*, COLORADO (2016), <http://www.colorado.gov/cowaterplan> (discussing state solutions to address competing water demands).

165. Abbott et al., *supra* note 7, at 371 (discussing early efforts to address water quality issues).

166. *Id.* (describing efforts to clean Coloradan water).

167. See *Water Resource Management and Protection*, in *Colorado's Water Plan*, *supra* note 155 (examining water quality concerns).

168. See GEORGE SIBLEY, A "River No More" Becomes A River Again, in CITIZEN'S GUIDE TO COLORADO'S ENVIRONMENTAL ERA 19 (2005) (explaining environmental purposes behind water instream flow rights in Colorado law).

169. Emily Dowd, *Celebrating 40 years of Success and Challenges for Colorado's Instream Flow Program*, U. DENV. WATER L. REV. (April 15, 2014), <http://duwaterlawreview.com/celebrating-40-years-of-success-and-challenges-for-colorados-instream-flow-program/> (describing history of water right acquisition in Colorado law).

170. *Instream Flow Program*, COLORADO WATER CONSERVATION BD., <http://cwcb.state.co.us/environment/instream-flow-program/Pages/main.aspx> (last visited Nov. 11, 2016) (describing Colorado Water Conservation Board approval practices).

171. Dowd, *supra* note 169 (discussing evolution of instream flow rights).

Forks).¹⁷² For years, Denver water planners were accustomed to meeting the cities ever-growing water supply demands by diverting water across the continental divide without regard to the project's environmental footprint.¹⁷³ In the early 1970s, however, Denver Water, the public water supply entity who proposed Two Forks, met resistance from an environmentally-conscious public that was fed up with the old approach of relying on big reservoirs and technological rescues to meet demand.¹⁷⁴ The enactment of several federal environmental and land management statutes "created significant environmental review and approval requirements attendant to obtaining a federally required permit to build waterworks necessary to perfect a water right."¹⁷⁵ In 1989, the EPA vetoed Denver Water's Two Forks' permit petition under Section 404(c) of the Clean Water Act.¹⁷⁶

Two Forks also proved environmental groups' effectiveness at preventing or mitigating an environmentally-destructive project by organizing interdisciplinary teams that could challenge the scientific and legal analysis of the developer.¹⁷⁷ Perhaps even more important to their success was the environmental groups' willingness to find consensus and compromise.¹⁷⁸ Instead of adhering to the traditional environmentalist model of "fighting growth as evil," the environmental groups promoted economic efficiency and suggested less destructive alternatives to the proposed project.¹⁷⁹ This

172. See generally Marston, *infra* note 178 (discussing impact of Two Forks on environmental movement).

173. See Limerick & Hanson, *supra* note 65, at 209 (describing practices in Colorado prior to Two Forks Dam project).

174. *Id.* (discussing convergence of Two Forks and environmental movement). Professor Limerick explains that "Two Forks had come up for appraisal in an era when big dams, unconstrained growth, and technological rescues had lost credibility and persuasiveness, and in a new era, old habits were headed for the sunset." *Id.*

175. Justice Gregory J. Hobbs, Jr., *Colorado Water Law: An Historical Overview*, 1 U. DENV. WATER L. REV. 1, 23 (1997) (explaining effect of new environmental laws on water projects).

176. *Id.* (discussing Two Forks permitting controversy); see also Abbott et al., *supra* note 8, at 391 (explaining Denver Water "spent [thirty-eight] million [dollars] on environmental studies, but [] dollars . . . went for nothing").

177. See Limerick & Hanson, *supra* note 65, at 201 (explaining evolution of environmental groups' strategy). It eventually became apparent that "the old rhetorical playbook that had once worked so well was proving ineffective in a time when environmental groups had built impressive teams of scientific and legal experts who could challenge Denver Water's data and analyses." *Id.*

178. See ED MARSTON, *Two Forks: Revolution, Evolution, or Fluke?*, in CITIZEN'S GUIDE TO COLORADO'S ENVIRONMENTAL ERA 9 (2005) (noting environmental groups contemplating Two Forks Dam project).

179. See *id.* at 7 (discussing aims of environmental groups involved in Two Forks Dam project).

strategy had the effect of making the concerns of these environmental groups look more reasonable and “took the wind out of the sails of attempts to discredit the project’s opponents as wild-eyed and extreme dissidents who could not be taken seriously.”¹⁸⁰

3. *Wilderness Recreation and Wildlife Protection*

The fight over public land management in the West “is a classic case of history repeating itself.”¹⁸¹ Americans have fought fierce battles over wilderness ever since the forest reserve debate in the 1890s.¹⁸² Colorado’s citizens and open spaces were influential in the passage of the Wilderness Act in 1964.¹⁸³ The wilderness debate is relevant in the energy context because a wilderness designation effectively blocks any hope of extracting the resource.¹⁸⁴

In the 1970s, the federal government also officially ended its homesteading policy and adopted a stance that valued public land for more than just the value of its pecuniary exploitation.¹⁸⁵ This new policy had a disproportionate effect in the West, where most federal land ownership is concentrated and local economies depend heavily on natural resource extraction.¹⁸⁶ Some of these communities faltered, while others reinvented themselves in order to cash in on Colorado’s booming outdoor tourist economy.¹⁸⁷

4. *Economic Diversity and Outdoor Recreation*

By the early 1960s, Colorado diversified its economy as it shifted “from an extractive economy to a sophisticated service economy.”¹⁸⁸ Tourism was key to some communities that no longer saw opportunity in traditional jobs, such as manufacturing, mining,

180. See Limerick & Hanson, *supra* note 65, at 202 (discussing success of environmental groups advocating for Two Forks Dam project).

181. See McCarthy, *supra* note 18, at 262 (noting historical controversies over land management in American West).

182. See *id.* (discussing historical significance of forest reserve debate).

183. See STEVE SMITH, *Colorado Wilderness History*, in CITIZEN’S GUIDE TO COLORADO’S ENVIRONMENTAL ERA 29–30 (2005) (explaining impact of Wilderness Act in Colorado). The 1964 Wilderness Act immediately established five wilderness areas in Colorado, and many more have been added since then. *Id.*

184. See McCarthy, *supra* note 18, at 262–65 (discussing conflict between wilderness reservation and energy resource extraction).

185. See Hobbs, *supra* note 26, at 78 (noting end of homesteading policy).

186. See *id.* (discussing economic effect of government policy on communities with energy resource industries).

187. See Abbott et al., *supra* note 7, at 415 (discussing how traditional mining cities, like Aspen, transformed themselves into recreational annexes for wealthy out-of-state vacationers).

188. See *id.* at 318 (discussing change in Colorado’s economy).

farming, and ranching.¹⁸⁹ The Colorado tourist sector prospers with warm weather outdoor recreation, but it is the ski industry that “has been a bonanza.”¹⁹⁰ Skiing attracts visitors from around the world and provides a great boost to the mountain towns that capitalized on this continuously growing industry.¹⁹¹ Skiing still contributes to environmental degradation, however.¹⁹² Fortunately, Colorado mountain communities have been relatively active in demanding that developers take steps to minimize their environmental impact.¹⁹³ Still, some of the most dangerous threats are contaminants that remain from the carelessness of previous mining generations.¹⁹⁴

5. *Cleaning Up Abandoned Mine Waste and Federal Facility Contamination*

Former mining boomtowns, like Leadville, became hazardous waste sites through the lens of environmental law.¹⁹⁵ There are approximately twenty-three thousand abandoned mine sites throughout the state, and the EPA or the Colorado Division of Reclamation, Mining, and Safety has deemed only a fraction of them to be safe.¹⁹⁶ Some of Colorado’s most scenic waterways experience contamination from runoff of naturally-occurring acidic rock that becomes exposed from open pit mining and cyanide spills from gold

189. See Abbott et al., *supra* note 7, at 417–18 (highlighting importance of tourism in mountain communities).

190. See McCarthy, *supra* note 18, at 253 (explaining success of ski industry). A map of the mineral belt “looks remarkably like the ski belt of the 1970s.” Abbott et al., *supra* note 8, at 436–38 (noting prominence of ski industry in Colorado).

191. See Abbott et al., *supra* note 7, at 322, 436 (discussing economic boost provided to mountain communities).

192. See *id.* (noting environmental effects of ski industry); see generally MICHAEL W. CHILDERS, COLORADO POWDER KEG: SKI RESORTS AND THE ENVIRONMENTAL MOVEMENT (2012) (detailing skiing industry’s environmental impact).

193. See McCarthy, *supra* note 18, at 274 (discussing Colorado mountain communities’ effort to maintain minimized environmental impacts of development).

194. See *Gold King Mine-Watershed Fact Sheet*, EPA, <https://www.epa.gov/goldkingmine/gold-king-mine-watershed-fact-sheet> (last visited Dec. 12, 2016) (discussing extent of contamination from abandoned mines).

195. See Eryn Gable, *A Lesson in Leadville*, HEADWATERS 17 (2008), <https://www.yourwatercolorado.org/cfwe-education/water-is/water-law/81-headwaters-magazine/headwaters-summer-2008-public-land-issue/147-a-lesson-in-leadville> (discussing Leadville, Colorado hazardous waste site).

196. See *Gold King Mine-Watershed Fact Sheet*, *supra* note 185 (providing statistics on abandoned mines). According to Trout Unlimited, in the West, more than forty percent of all headwater streams are affected in one way or another by abandoned mine runoff. John Loftis, *Concepts Collide*, HEADWATERS 9 (2008), <https://www.yourwatercolorado.org/cfwe-education/81-headwaters-magazine/headwaters-summer-2008-public-land-issue/150-concepts-collide> (discussing ramifications of abandoned mine runoff).

leaching.¹⁹⁷ Coloradans are reminded of this legacy through infamous incidents, such as the 1991 Summitville disaster and 2015 Gold King accident.¹⁹⁸

Colorado is also home to urban hazardous waste sites.¹⁹⁹ With the passage of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), the extent of environmental contamination resulting from chemical waste disposal and nuclear weapons processing at two federal facilities came to light.²⁰⁰ Cleanup at the Rocky Mountain Arsenal site cost billions of dollars, and the extent of the remaining contamination was so large that federal officials deemed any sort of human development on the site highly unlikely and unadvisable.²⁰¹ Rather than allow the site to remain useless, however, federal officials turned five thousand acres into a wildlife refuge in the early 2000s.²⁰² The Rocky Flats cleanup was even more expensive and is recognized as one of the most difficult cleanups in the country's history.²⁰³ Realizing the success of converting Rocky Mountain Arsenal into a wildlife refuge, officials in charge of the Rocky Flats facility decided to

197. See Loftis, *supra* note 196, at 9 (discussing contamination of waterways in Colorado due to open pit mining and gold leaching cyanide spills).

198. *Id.* (discussing extent of abandoned mine contamination). In the early 1990s, the Summitville Mine in the San Juan Mountains drew significant attention after EPA declared the area a Superfund site and revealed the extent of the contamination in the surrounding Rio Grande National Forest and Alamosa River. *Id.*; see generally *Emergency Response to August 2015 Release from Gold King Mine*, EPA, <https://www.epa.gov/goldkingmine> (last visited Dec. 16, 2016) (explaining EPA's role in Gold King incident); see also *Gold King Mine-Watershed Fact Sheet*, *supra* note 185. The Gold King Mine, located near Silverton, Colorado, grabbed national headlines in August 2015 when nearly three million gallons of neon-orange wastewater spilled into a tributary of the Animas River. *Id.* EPA was conducting an investigation of the site to determine the feasibility of further remediation when a contractor accidentally drilled into a wall, which caused the release of the contaminated water. *Id.* There are some four hundred abandoned and inactive mine sites located in the Upper Animas Watershed. *Id.*

199. See Abbott et al., *supra* note 7, at 393–95 (discussing hazardous waste sites near Denver).

200. *Id.* (discussing extent of cleanup costs at federal weapons facilities).

201. See *id.* at 393 (discussing Rocky Mountain Arsenal site cleanup effort and aftermath).

202. See *id.* (noting federal decisions).

203. See *id.* at 395 (discussing expensive and difficulty of Rocky Flats cleanup); see also Electa Draper, *Feds raided Rocky Flats 25 Years Ago, signaling the end of an era*, DENVER POST (May 31, 2014), <http://www.denverpost.com/2014/05/31/feds-raided-rocky-flats-25-years-ago-signaling-the-end-of-an-era/> (discussing legacy contamination concerns at Rocky Flats).

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do the same.²⁰⁴ The Rocky Flats National Wildlife Refuge is expected to open to the public in 2017.²⁰⁵

B. Colorado Energy Booms and Bust (1960s–2013)

Whether this discussion is about air, water, wilderness, or contamination, the change in Americans' attitude surrounding the environment that came to head in the latter part of the twentieth century drastically altered the way citizens think about energy decisions.²⁰⁶ The extent of environmental law's influence falls on a spectrum.²⁰⁷ Sometimes, projects are derailed entirely by environmental considerations.²⁰⁸ Environmentalists use the process of conducting environmental impact assessments as a tool to delay or even prevent a project if such concerns make development too costly or unpredictable.²⁰⁹ Environmental considerations can also influence fuel choice by encouraging less polluting energy sources.²¹⁰ For example, concerns about air pollution and acid rain from electric utility emissions contributed directly to the resurgence in the production of low-sulfur western coal following the passage of the CAA.²¹¹

While environmental laws and regulations can have a considerable impact on energy development, other more traditional factors affecting energy decisions still override environmental concerns in certain situations.²¹² Economic downturn and events that affect en-

204. See John Aguilar, *Rocky Flats stirs strong emotions, pits sides 10 years after cleanup*, DENVER POST (Oct. 10, 2015), <http://www.denverpost.com/2015/10/10/rocky-flats-stirs-strong-emotions-pits-sides-10-years-after-cleanup/> (discussing decision to turn Rocky Flats into wildlife refuge).

205. See *id.* (discussing estimated opening date of Rocky Flats National Wildlife Refuge).

206. For a further discussion on the evolution of environmental law and policy, see *supra* notes 137–206 and accompanying text.

207. See Arnold W. Reitze, Jr., *The Role Of NEPA In Fossil Fuel Resource Development And Use In The Western United States*, 39 B.C. ENVTL. AFF. L. REV. 283, 285–86 (2012) (explaining how other factors, such as economics, may override environmental concerns).

208. See *id.* (discussing how environmental law can block energy projects).

209. See *id.* (discussing tactics environmental groups use). The National Environmental Policy Act (NEPA) is frequently used in conjunction with the Administrative Procedure Act and other environmental statutes to stop or delay fossil energy development. *Id.*

210. See Scamehorn, *supra* note 99, at 187 (discussing preference for less polluting fuels).

211. See *id.* (discussing production increase of low-sulfur western coal following CAA enactment).

212. See generally *EPA's Position on the Energy Crisis*, EPA (1974) http://www.agriculturedefensecoalition.org/sites/default/files/pdfs/140E_1974_EPA_Position_

ergy supply and demand, commodity prices, and national security are just a few of these factors.²¹³

1. *Unconventional Energy Boom in Colorado (1970s-1980s)*

Like past booms in the state, circumstances influenced by global events stimulated interest in developing Colorado's energy resources in the latter part of twentieth century.²¹⁴ For example, the Arab oil embargo in 1973 and the additional curtailment of oil supplies in 1979 signaled "the end of an era of inexpensive energy and stimulated a national effort to attain energy independence."²¹⁵ These events had a huge impact on Colorado's energy sector, as the federal government established programs to incentivize companies to make large investments to develop the state's resources.²¹⁶ High oil prices revitalized exploration and development of Colorado's hydrocarbon reserves.²¹⁷ While developing traditional energy sources, such as crude oil, natural gas, and coal, were key to this strategy, efforts to find unconventional energy sources by testing new technologies and extraction methods were more important.²¹⁸

2. *Coal Surface Mining*

Laws that improve the environment in one respect can have negative side effects in a separate context.²¹⁹ The switch by utilities to the use of low sulfur coal decreased air pollution, but it also required new methods to efficiently extract this resource from the vast deposits in the western United States.²²⁰ Surface mining opera-

Paper_January_1974_EPA_Position_on_the_Energy_Crisis.pdf (illustrating other factors that impact energy decisions).

213. *See id.* (discussing non-environmental factors that affect energy markets).

214. *See* Scamehorn, *supra* note 99, at 124 (describing outside influence on Colorado energy production).

215. *See id.* at 178 (speaking about Arab oil embargo).

216. *See id.* at 124 (discussing federal incentives for energy development in Colorado). Federal incentives included the Crude Oil Windfall Profits Tax Act of 1980, which "authorized tax credits for large-scale production from unconventional sources." *Id.* at 196.

217. *See id.* at 124 (noting correlation between high oil prices and development of alternative energy technology in Colorado).

218. *See id.* at 178 (detailing development of alternative energy sources and extraction methods in Colorado).

219. For more information on the negative side effects of laws that improve the environment, see *infra* notes 221-224 and accompanying text.

220. *See* Scamehorn, *supra* note 99, at 101 (explaining that "[b]y 1970[,] nearly two thirds of all coal produced in [] intermountain states came from these operations").

tions emerged as the quickest and most economic technique.²²¹ In the 1970s, widespread use of this technique resulted in much more significant environmental degradation as compared to traditional methods of coal extraction.²²² Increasing opposition by environmentalists eventually prompted Congress to act when it passed the Surface Mining Control and Reclamation Act of 1977, which created enforceable standards for land reclamation and pollution abatement.²²³

3. *Fracking with Nukes to Recover Natural Gas*

Since at least 1959, the oil and gas industry expressed interest in setting off underground nuclear explosions to free up natural gas in tight shale plays.²²⁴ This idea of using nukes “to frack wells” was first tested in 1967 as part of the federal government’s Operation Plowshare Project.²²⁵ Although the blast allowed gas to flow into the well, the gas contained high levels of radioactive material.²²⁶ Nonetheless, and in spite environmentalists’ efforts to stop this practice, the federal government went ahead with its next planned detonation two years later near Rulison, Colorado.²²⁷ Once again, the technique produced radioactive gas and prevented other mineral extraction activities in the surrounding area.²²⁸ The 1973 energy crisis, and the resulting natural gas shortage, provided the impetus for a third explosion in Rio Blanco County.²²⁹ It was also unsuccessful because the nuke failed to fracture enough rock

221. See McCarthy, *supra* note 18, at 250 (discussing development of surface mining operations in Colorado).

222. See Scamehorn, *supra* note 99, at 177 (noting impact of environmental degradation resulting from surface mining operations).

223. *Id.* (discussing passage of Surface Mining Control and Reclamation Act). Coal extraction had to be done in a manner to avoid groundwater pollution and the land had to be re-vegetated afterwards. *Id.* A tax was also levied to fund reclamation. See *id.*

224. See RUSSELL GOLD, *THE BOOM: HOW FRACKING IGNITED THE AMERICAN ENERGY REVOLUTION AND CHANGED THE WORLD* 80–81 (2014) (noting that first frack-nuke was donated near Farmington, NM).

225. See *id.* (discussing Operation Plowshare Project).

226. See *id.* at 81 (noting high levels of radioactive material present in natural gas from fracking blast).

227. See Abbott et al., *supra* note 7, at 394 (discussing Rulison, Colorado fracking operation).

228. See *id.* (discussing fall-out after nuclear stimulation experiments); see also Gold, *supra* note 215, at 81 (noting that Rifle and Aspen would have received highest dosage of radioactive gas).

229. See Gold, *supra* note 224, at 81 (discussing reasons for third fracking operation in Rio Blanco County).

to provide significant quantities of marketable gas.²³⁰ Coloradans, fed up with the government using its western slope as an atomic testing ground, passed a statewide referendum in 1974 that banned nuclear stimulation projects.²³¹

4. *Oil Shale Booms and Busts in the Colorado River Valley*

Perhaps the most infamous unconventional energy resource to receive extensive hype during this period is oil shale.²³² The Utes called it “the rock that burns,” and according to a legend, a nineteenth-century pioneer built a fireplace out of shale rock only to burn down his cabin when he put the fireplace to use.²³³ A number of techniques have been used to produce oil shale, and they all involve heating the sedimentary rock at extremely high temperatures for extended periods of time in order to convert kerogen into synthetic hydrocarbons.²³⁴ Western Colorado underlies oil shale deposits that some experts consider to contain “the world’s largest oil resource.”²³⁵

There have been three large scale attempts to produce this resource, all almost ending in a total collapse of the oil shale industry.²³⁶ The first attempts occurred in the 1920s and the second attempt occurred during World War II.²³⁷ The federal government withdrew large swaths of Colorado oil shale lands, and although these earlier attempts were unsuccessful at developing the resource, they resulted in substantial changes in land ownership.²³⁸ Large out-of-state oil corporations quietly purchased property and water

230. *Id.* (discussing Rio Blanco blast). The Rio Blanco blast took place in 1973 at a time when the energy crisis caused Denver public schools to temporarily close because there wasn’t enough gas to provide heating. *See id.* at 80–82. Today, “the main legacy of Rio Blanco fracking operation “is an official plaque at ground zero warning against digging the soil or drilling down without permission from the government.” *Id.* at 82.

231. Scamehorn, *supra* note 99, at 140 (describing how Colorado citizens were weary of nuclear projects leading to reform).

232. *Id.* at 180–81 (discussing boom-bust experience with oil-shale).

233. Gulliford, *supra* note 168, at 20 (explaining combustibility of oil shale).

234. JAN LAITOS, SANDY ZELLMER, & MARY WOOD, *NATURAL RESOURCES LAW* 884 (2nd ed. 2012) (illustrating manner of manufacturing oil shale).

235. *See Colorado State Energy Profile*, *supra* note 2 (discussing oil shale reserves in Colorado). USGS estimates there may be 1.525 trillion barrels of oil in the Green River formation in western Colorado. *Assessment of In-Place Oil Shale Resources of the Green River Formation, Piceance Basin, Western Colorado*, USGS (2009) (providing statistics on oil shale).

236. *See* Scamehorn, *supra* note 99, at 147 (laying out three major attempts to harvest oil shale deposits).

237. *Id.* (listing first two efforts to produce oil shale).

238. Gulliford, *supra* note 163, at 6 (explaining in late 1920s, President Wilson withdrew 45,444 acres of Colorado oil shale lands . . . to establish permanent

rights from the public domain and ranching communities that had “long-standing cultural patterns of family land ownership.”²³⁹ For several decades, these companies “consolidated their holding up and down Parachute Creek [erected] fences, stocked the pastures with cattle, and waited” for the next oil shale boom.²⁴⁰

That opportunity arrived in the 1970s, when the federal government, in response to the Arab oil embargo, started subsidizing the extraction of oil shale deposits through federal leases.²⁴¹ Unfortunately, just like the earlier attempts, Colorado’s oil shale industry “went from boom to bust in less than a decade.”²⁴² The bust occurred primarily due to the same reasons: deficiencies in technology did not meet the need to process the rock into synthetic fuel and the gradual decline of oil prices.²⁴³ One major difference in the 1970s and 1980s, however, was the effect of environmental law regulations.²⁴⁴ As part of the federal leasing program, “the Bureau of Land Management (BLM) conducted an air quality assessment,” which factored into the Prevention of Significant Deterioration (PSD) permit that was issued by the EPA.²⁴⁵ The degree of air quality control required in the permit “shocked the industry because” it increased costs by as much as fifteen to twenty percent.²⁴⁶ Several prominent environmental groups targeted large-scale synthetic fuel developments, including oil shale, as one of its primary concerns.²⁴⁷ The environmental costs of oil shale development, while not the overriding factors that initiated the bust, were certainly relevant in making the projects less feasible.²⁴⁸ Unfortunately, oil shale com-

Naval Oil Shale Reserve”). Shortly thereafter, “prospectors filed [thirty thousand] oil shale claims on [four] million acres.”

239. *Id.* at 40 (discussing changing patterns in land ownership).

240. *Id.* at 6–7 (demonstrating corporate strategy in anticipation of next oil shale boom).

241. Scamehorn, *supra* note 99, at 180 (illustrating that federal government owned eighty percent of Western oil shale deposits).

242. *Id.* at 180 (stating ultimate broken attempt to oil shale industry).

243. *Id.* at 181 (explaining reason behind bust in Colorado’s oil shale industry).

244. *Id.* at 182 (explaining environmental threats posed by oil shale production).

245. Hobbs, *supra* note 26, at 92 (showing factor to receive EPA’s PSD permits).

246. *Id.* at 92 (describing reaction to increased costs associated with required standards).

247. Gulliford, *supra* note 163, at 12 (introducing protests against large-scale fuel developments).

248. *Id.* (presenting one of factors that led to bust).

panies did not conduct the same degree of mitigation planning for communities as they did for the environment.²⁴⁹

Exxon's Colony project was the largest, most expensive, and most aggressive of these oil shale ventures.²⁵⁰ The Colony Project may also be the most infamous "mining boom and bust in the history of the West."²⁵¹ On May 2, 1982, Exxon abandoned its one billion dollar investment, leaving 2,100 unemployed people in its wake without any sort of notice.²⁵² Yet, perhaps local residents should have been on notice from the historical legacy of the boom-bust cycle in Western resource exploitation.²⁵³ Once again, rural Coloradans "found themselves powerless to control the external economic forces dictating development."²⁵⁴

Still, not everyone's historical lens was blurred by the boom psychology.²⁵⁵ Unlike the nineteenth-century mining bonanza in ghost-towns and previous attempts at oil shale, Colorado River Valley communities in the 1970s and 1980s made positive infrastructure gains that mitigated some of the bust's local effects.²⁵⁶ Aside from the state passing a severance tax, the "hard-headed county commissioners," demanding that oil companies "pay front-end money to help mitigate their impact," softened the blow.²⁵⁷ Local governments in Garfield and Rio Blanco counties devised "significant legislative and zoning precedents that [have] alter[ed]" how the state issues permits for energy projects.²⁵⁸ The oil shale experi-

249. *Id.* at 218 (arguing that "[r]eclamation should exist for communities of people as well as for ecosystems"). Although Exxon planned to "spend [thirty] million [dollars] []vegetating the shale cliffs," the company had no shutdown plan to mitigate the bust's socioeconomic impacts. *Id.*

250. *Id.* at 201 (familiarizing size of Exxon's venture). After Exxon bought out the oil shale interests of ARCO in the mid-1980s, several other large oil companies followed suit. *See id.* at 8-9.

251. *Id.* at 201 (showing largest venture crashed hardest of bust).

252. Abbott et al., *supra* note 8, at 397 (explaining some effects of Exxon's bust); *see also* Gulliford, *supra* note 163, at 12 (describing job loss and devastation to local economy).

253. Scamehorn, *supra* note 99, at 185-86 (noting local dismay following bust). "Locals relearned lessons of their frontier past: that good times based upon extractive industries were usually short-lived. Booms were invariably followed by busts." *Id.*

254. Gulliford, *supra* note 163, at 13 (illustrating how local residents have little control over energy project decisions).

255. For a further discussion of ways communities demanded more mitigation, *see infra* 248-250 and accompanying text.

256. *See id.* at 206-07 (showing some upside in Colorado River Valley to bust of oil shale attempt).

257. *Id.* at 207 (demonstrating local governments' efforts to mitigate damages).

258. *Id.* (exhibiting further local governments' roles in energy projects).

ence is one of the most important lessons in energy boom-bust cycles and their impact on local communities.²⁵⁹ Although several BLM pilot projects still operate in western Colorado, the technology needed to develop oil shale remains economically inadequate.²⁶⁰

5. *Coalbed Methane*

Up until the 1990s, Colorado's natural gas sector exhibited "little capacity for growth;" that would soon change, however, with the new development of unconventional methods of producing gas.²⁶¹ Prior to the current fracking boom, the first of these unconventional gas sources to take off was coalbed methane (CBM).²⁶² Once feared by underground coal miners of an earlier generation, methane could be extracted by drilling vertical and horizontal wells in coal seams.²⁶³ Colorado holds more CBM reserves than any other state, accounting for over a quarter of the country's production of this resource.²⁶⁴ While CBM is integral to Colorado's natural gas industry, there continues to be significant controversy surrounding the risks of groundwater pollution and excessive uses of water needed to extract the gas.²⁶⁵

259. *Id.* at 3 (explaining "[] aftermath of one of [] largest localized mining boom and quickest bust in western history").

260. *Oil Shale*, COLORADO GEOLOGICAL SURVEY, <http://coloradogeologicalsurvey.org/energy-resources/oil-shale-2/> (last visited Nov. 6, 2016) (explaining insufficiency of projects).

261. Scamehorn, *supra* note 99, at 196 (showing perception of natural gas business sector).

262. *Id.* at 196 (pointing out success of coal-bed methane industry). Research in the 1970s stimulated interest in coal bed methane, but no commercial market developed until the 1990s. *See* Laitos et al., *supra* note 234, at 886.

263. Scamehorn, *supra* note 99, at 196 (introducing next of natural gas industry to take off). Just as nineteenth and early twentieth-century mining companies neglected to account for their environmental impact, they also had little concern for worker health and safety. *See* Andrews, *supra* note 5, at 140-48; *see also* Abbott et al., *supra* note 8, at 117 (describing how coal miners "toiled in air fouled by waste gases"). From 1884 to 1912, the rate of accidental deaths in CO coalmines was twice the national rate. *Id.* at 146.

264. *Colorado State Energy Profile*, *supra* note 2 (emphasizing Colorado holds over one-third of proved CBM reserves in U.S.); *see also* *Coalbed Methane*, COLORADO GEOLOGICAL SURVEY, <http://coloradogeologicalsurvey.org/energy-resources/natural-gas-2/coalbed-methane/> (last visited Nov. 6, 2016) (noting that CBM output accounts for nearly half of Colorado's natural gas production).

265. Laitos et al., *supra* note 234, at 892 (pointing out negative effects surrounding Colorado's natural gas industry).

6. *Relearning How to Use Renewables*

Humans have used renewable energy sources since ancient times, but the challenge today is finding a way to make them cost-competitive with fossil fuels on a large scale.²⁶⁶ Ramping up the integration of renewable energy, particularly for electricity generation, is a critical step in merging the fields of environmental and energy law.²⁶⁷ The United States started encouraging renewables in the 1970s both as an alternative response to the energy crisis and an initiative to locate cleaner sources of fuel.²⁶⁸ For some time, progress was slow and research and development into clean energy usually rose and fell depending on the economics of fossil fuels markets.²⁶⁹ A number of factors, however, including, most importantly, rising concerns over climate change, have recently placed renewables on a fast track for growth.²⁷⁰ A new clean energy transition is taking place, unsettling the traditional forces dictating fuel choice decisions as societies look for ways to align their energy profile with climate and other environmental considerations.²⁷¹

Colorado is emerging as a key player in this transition.²⁷² Nicknamed the “all of the above state” in terms of its energy resource potential, Colorado is tapping into its strong winds in the eastern plains and mountain vistas, solar potential in the south, and a cornucopia of other sources scattered throughout the state.²⁷³

266. History of Wind Energy, U.S. DEPT. ENERGY, <http://energy.gov/eere/wind/history-wind-energy> (last visited Dec. 12, 2016) (discussing ancient civilization use of wind power).

267. See Outka, *supra* note 19, at 1683 (discussing shift in preference for less polluting energy sources); see also Tomain, *supra* note 44, at 235-36 (discussing importance of renewable energy development).

268. See Yergin, *supra* note 11, at 527-50 (indicating efforts to find cleaner fuel).

269. *Id.* (explaining progress of research on cleaner fuels).

270. *Id.* (pointing out present time’s heavy pursuit for alternative energy).

271. See generally *Colorado State Energy Profile*, *supra* note 2 (discussing trends and patterns of energy production and consumption).

272. See *id.* (noting that in 2015, Colorado generated sixty percent of electricity from coal, twenty-two percent from natural gas, and eighteen percent from renewable energy sources). See also *Colorado State Profile and Energy Estimates*, U.S. ENERGY INFO. ADMIN., <http://www.eia.gov/state/analysis.cfm?sid=CO> (last visited Dec. 12, 2016) (illustrating an overview of Colorado energy resources). The state “has tripled its electricity generation from renewable sources since 2007.” *Id.*

273. See *Colorado State Profile and Energy Estimates*, *supra* note 272 (emphasizing that Colorado ranks within top ten nationwide in wind and installed solar capacity). Other renewable sources being developed include some sixty small-scale hydroelectric projects and a commercial scale woody biomass plant, which burns waste gathered from surrounding forests, including trees affected by pine beetle infestations. *Id.* Colorado also “has significant geothermal potential” and federal lands have been leased to develop these sources. *Id.*

Besides maintaining a diverse natural endowment of renewable sources, Colorado's clean energy leadership is attributed to the implementation of strong policies, programs, and financial incentives to accelerate the growth of this market.²⁷⁴ In 2004, Colorado became the first state to pass a voter-approved Renewable Energy Standard (RES).²⁷⁵ The National Renewable Energy Laboratory (NREL), nestled in the foothills west of Denver, has also played a role in making Colorado one of the most robust renewable energy markets in the country.²⁷⁶

Local communities and individual citizens are also finding innovative ways to spark this transition; shared renewables, also known as community power projects, offer an opportunity to facilitate clean energy implementation at the local level and allow individuals, who might not otherwise be able to afford a renewable system of their own, to participate.²⁷⁷ Community solar projects, in particular, have become extremely popular in recent years.²⁷⁸ After passing a "solar gardens" policy in 2010, Colorado quickly emerged as the country's leader in this arena.²⁷⁹

Several Colorado cities are also garnering recognition for implementing local utility initiatives designed to align environmental goals with electricity generation.²⁸⁰ Aspen recently became one of three United States cities to run entirely on renewable power, and Boulder also attempted to establish clean energy production through possibly operating its own electric utility.²⁸¹ These initia-

274. *Colorado Climate Plan*, *supra* note 1, at 26 (showing Colorado's success in the renewable sources industry). The past decade has seen "hundreds of new renewable energy projects" developed across the state, "generating thousands of jobs and helping to reduce the states GHG emissions." *Id.*

275. *See Colorado State Energy Profile*, *supra* note 2 (showing Colorado's RES by voter-initiative mandates investor-owned-electric utilities provide thirty percent of electricity sold come from renewable energy sources by 2020, with three percent coming from distributed generation).

276. Abbott et al., *supra* note 7, at 374 (discussing importance of NREL). Established in 1974 as the Solar Energy Research Institute, this facility, especially its public-private partnership program, has "spurred the development of solar and other non-fossil fuel energy sources." *Id.*

277. *See generally* Uma Outka, *Cities and the Low-Carbon Grid*, 46 ENVTL. L. 105, 111 (2016) (describing importance of shared renewables to poor communities).

278. *See* Michael P. Smith, *Colorado's Solar Energy Market*, 2/2/2015 GEO. INT'L ENVTL. L. REV. ONLINE 1 (Feb. 2, 2015) (demonstrating local community projects for renewable energy).

279. *See id.* (discussing solar garden policy).

280. For a discussion on renewable energy efforts by Aspen and Boulder, see *infra* notes 282-84 and accompanying text.

281. *Reaching 100% Renewable Energy, City of Aspen (Fact Sheet)*, NREL (Aug. 2015), available at <http://www.nrel.gov/docs/fy15osti/62490.pdf> (detailing Aspen renewable energy initiatives); *see also* Erica Robbie, *Aspen is third U.S. city to reach*

tives demonstrate “that a small, progressive community can work together to be a pathway for others” wishing to dictate their own fuel choice destiny.²⁸² These Colorado cities also show how local experimentation in merging environmental and energy values can increase citizen participation and make energy decisions more democratic.²⁸³

VI. HISTORICAL TRENDS IN COLORADO ENERGY AND ENVIRONMENTAL MATTERS

Having traced the history and convergence of energy development and the evolution of environmental law in Colorado, several consistent themes are apparent.²⁸⁴ This section lays out each observation before applying them in the modern context of unconventional oil and gas drilling along the Front Range.²⁸⁵

A. Mitigating Impacts of the Boom-Bust Cycle

Natural resource extraction in western United States provides a particularly instructive lesson on the effect of boom-bust economies—cycles that are “sometimes moderated but never tamed;” Colorado is no exception.²⁸⁶ Whether it is gold, silver, uranium, or oil shale, the boom-bust cycle continues from one extractive resource to the next.²⁸⁷ Local residents of boomtowns habitually experience

100% renewable energy, ASPEN TIMES (Sept. 1, 2015), <http://www.aspentimes.com/news/aspens-third-u-s-city-to-reach-100-renewable-energy/> (describing in 2004, City of Aspen enforced goal of supplying all electricity from renewables sources by 2015). Aspen achieved its goal “[t]hrough a combination of city-owned and operated hydroelectric projects and power purchase agreements,” with external entities to provide the remainder with wind, solar, and landfill gas. *Id.*; see also *Energy Future Background*, CITY OF BOULDER, <https://boulder.colorado.gov/energy-future/background> (last visited Dec. 12, 2016) (recognizing that dependence on Xcel Energy was significant limitation on ability to meet city’s carbon reduction goals).

282. See Erica Robbie, *supra* note 281 (praising local communities’ renewable energy efforts).

283. See Application for Approval of the Proposed Transfer of Assets, City of Boulder, 9 (Colo. Pub. Util. Comm’n of Colo. July 7, 2015) (initiating Boulder’s desire to “increase citizen participation in democratic decision making regarding use of electricity. . .”).

284. For a description of the various themes, see *infra* notes 287–327 and accompanying text.

285. For an analysis of Colorado energy production, see *infra* notes 287–327 and accompanying text.

286. Limerick & Hanson, *supra* note 65, at 25 (noting trend in extractive industries, including “mining, logging, ranching, oil drilling, and commercial farming”).

287. Gulliford, *supra* note 163, at 195 (discussing extensive nature of boom-bust cycle).

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“boomtown euphoria, a stimulating blend of greed, opportunity,” comradery, and blind exuberance.²⁸⁸

Rational economic theory suggests bonanza seekers, who are racing to extract the resource, will employ unsustainable practices that cause concern for overproduction, waste, and externalities on local communities.²⁸⁹ When the bust hits, it has the potential to leave a wake of social and environmental degradation.²⁹⁰ Thus, in order to keep the worst of the consequences at bay, some system of control is necessary.²⁹¹ Federal and state governments have gradually improved legal and regulatory mechanisms to control these negative externalities, but the roles the local governments and individual citizens play have also been influential.²⁹²

B. Local and Citizen Participation in Shaping Energy and the Environmental Agenda

1. Local Government Home Rule

As a result of the federal government’s legacy of conquest and the consolidated power of boosters and corporate entities, Coloradans have always been weary of outsider attempts to “undermine local control of local land and resources.”²⁹³ Thus, even though national and state interests sometimes trump local concerns, “deferring to local units of government” has been the preferred approach for addressing difficult social and environmental problems with localized effects.²⁹⁴ The adoption of municipal home rule authority in the Colorado Constitution in 1902 empowers communities to mitigate the externalities of energy and other natural resource extraction.²⁹⁵ Nonetheless, the legal profession has long since debated the extent to which local versus state govern-

288. *Id.* at 197 (noting emotions associated with boomtown euphoria).

289. Laitos et al., *supra* note 234, at 20 (discussing risks associated with quick extraction methods).

290. *Id.* at 21–22 (discussing negative externalities).

291. *Id.* (discussing need for system of control).

292. For a discussion on home rule and citizen initiative, see *infra* notes 296–308 and accompanying text.

293. McCarthy, *supra* note 18, at 259 (noting fear of Coloradans in response to federal action).

294. See generally Hobbs, *supra* note 26, at 74 (preferring local approach for addressing environmental issues). Air pollution is an example of a problem requiring a statewide approach since it doesn’t stick to jurisdictional boundaries. *Id.*

295. COLO. CONST. ART. 20, § 6 (codifying home rule doctrine in Colorado Constitution); see also Toan, *supra* note 5, at 64–65 (explaining that “Coloradoans have always placed [] high value on self-determination and local control”).

ments should be able to regulate activities that harm the environment.²⁹⁶

2. *State Citizen Initiative*

Sometimes, citizen activists, frustrated with the pace of bureaucratic inertia in the General Assembly, decide to bypass the legislative process by using the citizen initiative mechanism.²⁹⁷ Provisions added to Colorado's Constitution in 1910 allow citizens to amend it through a ballot initiative, in which a simple majority vote passes the measure into law.²⁹⁸ Colorado officials cannot retroactively disavow such initiatives, but courts can negate the amendments if they conflict with the United States Constitution.²⁹⁹

The citizen initiative is a creature originating from the Swiss model of direct democracy and may be thought of as a "legislative battering ham" when individuals are faced with an unresponsive centralized authority.³⁰⁰ The initiative process became especially popular in the late 1800s among progressives in the American West, who felt that "state legislatures were corrupt and controlled by powerful economic interests."³⁰¹ Colorado is among the five most popular states for citizen initiatives, and it has a long history of using this mechanism in areas where environmental and energy concerns collide.³⁰² Colorado's renewable energy standard and the ban on using nuclear stimulation to extract natural gas are two obvious examples.³⁰³

Proponents of the citizen initiative see it as an important way to facilitate political discourse in a modern democracy, essentially a way to implement the will of the people "without the legislative fil-

296. Joel Minor, *Local Government Fracking Regulations: A Colorado Case Study*, 33 STAN. ENVTL. L.J. 61, 69 (2014) (noting debate over which body of government should regulate activities that harm environment).

297. Abbott et al., *supra* note 7, at 444 (discussing Colorado citizen initiative).

298. *Id.* (discussing way in which Colorado Constitution can be amended).

299. *See id.* (noting authority given to accepted provisions).

300. Rebecca W. Watson & Jennifer Cadena, *Anti-Fracking Initiatives: Power To The People Or More Of The Same*, 28-SPG NAT. RESOURCES & ENV'T 44 1, 2 (2014) (noting history of citizen initiative provision).

301. *See id.* (discussing when citizen initiative process became popular).

302. *See id.* at 4 (discussing Colorado's predominance with regard to citizen initiatives); *see also* Abbott et al., *supra* note 7, at 444 (explaining how Colorado citizen initiative has been applied to every politicized and hotly debated issue). This includes abortion, same-sex rights, gun control, marijuana, term and tax limits, and immigration. *See id.*

303. *See Colorado State Energy Profile*, *supra* note 2 (explaining implementation of renewable energy standard); Scamehorn, *supra* note 99, at 140 (discussing state-wide referendum banning nuclear stimulation projects).

ter.”³⁰⁴ They also point out its usefulness as an incubator of social experimentation at the state level.³⁰⁵ Critics of the citizen initiative believe it has the opposite effect on political discourse because it allows zealots and special interest groups to hijack the legislative process by taking the law into their own hands.³⁰⁶ Opponents of the citizen initiative believe the process emasculates “the Framers’ vision of a representative democracy with the capacity to deliberate,” teases out unintended consequences, and charts a middle course on complex issues that demand trade-offs.³⁰⁷

C. Finding Compromises Through Diverse Interests and Threats of Outside Intervention

1. Acting Under the Federal Gun

The influence of external forces was central to inciting Colorado’s preference for local land use control and facilitating the pattern of expansion and contraction inherent in boom-bust energy extraction.³⁰⁸ In the context of the Colorado energy-environmental link, perhaps the most significant of these outside influences is the federal government’s legacy of conquest.³⁰⁹ The battle over federal versus state power is a theme that plays out in every western state, and Coloradans have not been shy “to express their fear of federal coercion in the area of resource development” and environmental protection.³¹⁰ Individuals pledging support to Governor

304. See Watson & Cadena, *supra* note 300, at 1 (noting rationale behind citizen initiative process).

305. See *id.* at 3 (noting additional uses of citizen initiative process).

306. See *id.* (criticizing use of citizen initiative); see also Abbott et al., *supra* note 8, at 444 (discussing arguments against citizen initiative process).

307. See Watson & Cadena, *supra* note 300, at 3 (explaining that elected officials have more time to research, meet in committees, hold hearings, hear public testimony, and “discover and ameliorate unintended consequences” of legislative actions).

308. See Gulliford, *supra* note 163, at 195–96 (discussing influence of out-of-state entities). Outside capital has always been critical to developing the American West—whether it involves resource extraction, the fur trade, completing the trans-continental railroad, irrigating arid farming regions, or building a frontier town. *Id.*

309. Limerick, *supra* note 96, at 24–25 (displaying dominance of federal government presence in western affairs). The U.S. Government conducted its conquest of the West through “permanent control of public lands;” subsidizing of resource extraction enterprises and other private businesses like railroads; constructing federal dams; and by “reckoning with treaty rights of Indian people as well as rights awarded Mexican Americans under the Treaty of Guadalupe Hidalgo.” *Id.*

310. McCarthy *supra* note 18, at 247 (stating contention between state and federal authority over resource development and environmental protection).

Lamm's philosophy "perceive the federal government as more dangerous to Colorado than Colorado is to itself."³¹¹

Perhaps it is this threat of federal control and intervention that prods Coloradans to rally around the common goal of finding a state solution, which, in turn, forces compromises on difficult decisions that affect the environment.³¹² For example, the EPA frequently uses its CAA authority to prompt the General Assembly to act more aggressively in controlling air pollution.³¹³ Rather than "cede air quality decision making to the EPA," state officials have mandated motor vehicle inspections, enforced standards for pollution control technology, and denied variance applications.³¹⁴

2. *Finding Consensus Through Convergence*

Colorado is a land "of extraordinary convergence, one of the great meeting zones" in terms of its geography and its people.³¹⁵ This diversity "has [not only] contributed to its fragmentation and its contradictions," but it has also forced the state to take a balanced approach that merges beliefs and opinions in a way that filters out extremes on both ends of the spectrum.³¹⁶ Colorado is known for its natural beauty and its resource wealth; for these reasons, there is

311. *See id.* at 270–71 (stating Governor Lamm's belief that "while Colorado resources should be developed, development should be carried out under state, not federal control"). Governor Lamm and his supporters were tired of the federal government "coming in and telling us how, what kind, and where to develop our natural resources," and encouraged westerners to stand up to prevent "the rape of Colorado . . . to satisfy the energy needs of the rest of the nation." *Id.* at 247.

312. *See* Hobbs, *supra* note 26, at 70 (explaining threat of federal intervention in air pollution context).

313. *Id.* (discussing EPA leveraging of Clean Air Act authority). Early state and local "efforts to control smoke could not get the job done." *Id.* With the enactment of the CAA and its amendments, however, "industries had no choice but to comply with national standards designed to force the development and installation of pollution technology as rapidly as possible." *Id.*

314. *See id.* (discussing Colorado response to threat of federal intervention). The General Assembly had created the air pollution Variance Board "for the very purpose of relaxing the Commission's regulations for as long as companies might need," but in 1976, EPA sued in federal district court to enforce Colorado's opacity standard at Pueblo's CF&I Steel Plant. *Id.* at 88. In 1980, EPA "threatened to cut off highway funding" in order to push the General Assembly into action; in 1981, Colorado started mandating motor vehicle inspections. Abbott et al., *supra* note 8, at 372.

315. Limerick, *supra* note 96, at 19–20, 22 (illustrating Colorado as historic meeting zone for landscapes and people); *see also* Abbott et al., *supra* note 7, at 47 (noting "long history of competition" in Colorado among dissimilar peoples).

316. Abbott et al., *supra* note 7, at 8 (highlighting Colorado's diversity and role in creating balance).

perhaps no better place to bring the concepts of environmental and energy law together than Colorado.³¹⁷

Indeed, the convergence of these two fields is occurring in several areas where the state has been a leader in developing proactive schemes that address environmental concerns in the context of energy.³¹⁸ Colorado's policy towards preventing air pollution and mitigating climate impacts from the energy sector is one example.³¹⁹ Colorado is aggressively developing renewable energy solutions and has organized comprehensive planning strategies to deal with the energy sector's contribution to climate change.³²⁰ Moreover, recognizing that maintaining clean air is the "yardstick of Colorado's leadership capability," the state enacted comprehensive regulations for the oil and gas sector by limiting volatile organic compounds (VOCs) and other emissions from extractive operations.³²¹ Colorado also adopted the nation's first methane control rule for oil and gas production activities.³²² Finally, Colorado officials took a

317. For a further discussion of Colorado's natural beauty and resource wealth, see *supra* notes 3–8 and accompanying text.

318. For more information on Colorado's leadership regarding environmental and energy issues, see *infra* notes 320–325 and accompanying text.

319. See *Executive Summary*, in *Colorado Climate Plan*, *supra* note 2 (discussing how Colorado has historically dealt with environmental issues). Besides its aggressive RES and other incentives, the state has developed a strong policy framework. *Id.* In 2007, Governor Bill Ritter, Jr., released a Climate Action Plan laying out goals for the state through 2050. *Id.* This led to the Clean Air Clean Jobs Act, which "serves as a roadmap to bring the state into compliance with air quality standards." *Id.*; see also *Gov. Hickenlooper Announces Colorado Climate Plan*, COLORADO (Sept. 16, 2015), <https://www.colorado.gov/governor/news/gov-hickenlooper-announces-colorado-climate-plan> (discussing Hickenlooper's plan to address climate change). In 2015, Governor Hickenlooper built on this framework with the release of the Colorado Climate Plan, "a statewide strategy of policy recommendations and actions to mitigate greenhouse gas emissions and to increase Colorado's level of preparedness." *Id.*

320. See *generally Colorado Climate Plan*, *supra* note 1 (laying out initiatives to address climate change).

321. See Hobbs, *supra* note 26, at 78 (noting one of Colorado's key environmental projects); see *generally* Colorado Air Quality Control Commission Regulations, Regulation 7, 5 CCR 1001-9, Sections XII, XVII, XVIII (requiring emission reductions from oil and gas sector). These regulations are designed to limit emissions of VOCs from venting and leaks in production operations. *Id.* They "require operators to implement leak detection and repair (LDAR) programs" and replace or modify certain outdated high polluting technologies. *Id.*

322. See Christine Buurma & Bradley Olson, *Colorado Tried Methane Caps on Drillers, And They Worked*, BLOOMBERG (Aug. 18, 2015), <https://www.bloomberg.com/news/articles/2015-08-18/colorado-already-tried-methane-caps-on-drillers-and-they-worked> (praising Colorado methane leak regulations). Colorado's measures to cap methane "are more stringent than those proposed by the EPA and other federal agencies that regulate oil and gas emissions. *Id.* The EPA's new rules only apply to existing wells, while those of Colorado cover existing sources. *Id.*

proactive stance toward limiting the risk of inducing earthquakes from oil and gas operations by requiring a seismic hazard review before issuing permits for wastewater injection wells.³²³ These are only a few examples of how far Coloradans have come in terms of blending environmental and energy concerns through law and policy.³²⁴

All these historical trends, including the boom-bust cycle, external dominance versus local control, and finding consensus through the convergence of diverse interests, are present in Colorado's most recent energy boom.³²⁵ Today's fracking dispute is to Coloradans what oil shale was to Coloradans in the 1970s and what the forest reserve debate was to Coloradans in the 1890s.³²⁶ Even though "the idea of repeating cycles of events can only work at a very abstract level," approaching the fracking issue from a historical perspective provides citizens with a framework to craft the best solution going forward.³²⁷ In recent years, nothing has been more polarizing in terms of separating environmentalists from energy advocates.³²⁸

323. See Lucas Satterlee, *Injecting Earthquakes in the Energy Debate*, 34 UCLA J. ENVTL. L. & POL'Y 221, 234–35 (2016) (discussing Colorado's regulatory response to induced seismicity); see also Colorado Geological Survey, *Earthquakes Triggered by Humans in Colorado*, available at <http://coloradogeologicalsurvey.org/wp-content/uploads/2013/08/Earthquakes-Triggered.pdf> (noting that Colorado is "world famous" for triggered earthquakes). A variety of human activities have contributed to induce seismic events throughout the state over the past half-century. *Id.* The injection of chemical wastes at Rocky Mountain Arsenal during the 1960s triggered a series of quakes that "made news around the world." *Id.* Subsequent and inspired by the events at Rocky Mountain Arsenal, USGS scientists conducted an experiment at the Rangely oil field where they "proved for the first time that humans could induce earthquakes by varying the injection pressure of underground water." *Id.* The fracking earthquakes in the 1970s and 80s also triggered strong seismic events. *Id.* Filling of Ridgeway reservoir in 1986 and coalbed methane production activities in 2011 are also suspected of inducing damaging earthquakes. *Id.* The media attention and scientific evidence suggesting the link between waste fluid disposal from oil and gas operations and earthquakes in the Central and Eastern U.S. has focused this issue squarely on the fracking industry. See generally MARK D. PETERSEN ET AL., *2016 one-Year seismic hazard forecast for the Central and Eastern United States from induced and natural earthquakes*, USGS (Mar. 28, 2016), <https://pubs.er.usgs.gov/publication/ofr20161035> (recognizing some places in U.S. may experience damage if induced seismicity continues unabated).

324. For a further discussion of Colorado's efforts to reconcile energy and environmental concerns, see *supra* notes 319–324 and accompanying text.

325. For a further discussion of controversies associated with the fracking boom in Colorado, see *infra* notes 330–358 and accompanying text.

326. See McCarthy, *supra* note 19, at 262 (relating importance of fracking to Coloradans).

327. Limerick, *supra* note 96, at 21 (noting importance of reviewing history in making future actions).

328. See Don C. Smith & Jessica M. Richards, *Social License to Operate: Hydraulic Fracturing-Related Challenges Facing the Oil & Gas Industry*, 1 OIL & GAS, NAT. RE-

VII. FRACKBOOM ON THE FRONT RANGE

Colorado's oil and natural gas production has risen dramatically in the past decade, primarily because of technological advances in directional drilling and hydraulic fracturing.³²⁹ For at least five decades, the industry tried fracking wells with "hydrochloric acid, nitroglycerin, napalm, thick gels, and even nuclear bombs."³³⁰ It turns out, however, that the missing engineering breakthrough was water, "the hydraulic heart of fracking."³³¹ Often referred to as "the shale revolution," tapping into these shale deposits results in many benefits, such as increased and more secure oil and gas supplies, jobs, and low energy prices for American consumers and businesses.³³² Natural gas is also a cleaner burning fuel and better in terms of mitigating climate change compared to coal.³³³ In fact, many experts point to natural gas as the "fuel of the future."³³⁴ Still, fracking also presents new and familiar challenges for local communities and the environment.³³⁵

While attitudes towards shale resource development fall on a spectrum, many communities have concerns about the potential impacts of fracking, like traffic, noise, dust, ground and surface water protection, air pollution, and wildlife disruption.³³⁶ Some

SOURCES, & ENERGY J. 1 (2015) (discussing tension of fracking in Colorado's Front Range communities).

329. See *Colorado State Energy Profile*, *supra* note 2 (explaining surge in Colorado fossil fuel production). Colorado's output of crude petroleum nearly doubled from 2012-2014, with substantial production coming from both sides of the Continental Divide. *Id.* Colorado is also now a major natural gas producing state with output nearly doubling in the last ten years. *Id.*

330. Gold, *supra* note 224, at 129 (noting methods historically used to frack).

331. *Id.* at 51, 129 (noting importance of water in fracking).

332. *Id.* at 307 (explaining that "to take off, [] shale revolution required consistent government policy, disruptive technologies, and [] healthy dose of market forces"). Oil and gas jobs pay well, but they also entail a high "risk of injury or exposure to toxic substances." Limerick, *supra* note 22, at 17.

333. Yergin, *supra* note 11, at 334-42 (discussing preference of natural gas to coal).

334. *Id.* at 342 (highlighting natural gas's potential use for future).

335. For a further discussion on the negative externalities associated with fracking, see *infra* notes 337-340 and accompanying text.

336. Limerick, *supra* note 22, at 16-17 (noting that "[b]ecause [] workers are often transitory newcomers, interactions between them and long-term residents can be tense, even hostile"). Most people in the spotlight of the fracking debate are "white and middle or upper class." *Id.* The positions of other socioeconomic classes are less understood. *Id.*; see also Elena Pacheco, *It's a Fracking Conundrum: Environmental Justice And The Battle To Regulate Hydraulic Fracturing*, 42 *ECOLOGY L.Q.* 373, 393 (2015) (explaining "low-income and rural communities may find [] promise of high paying jobs and economic security too alluring to pass up[,] while more affluent communities arguably have more luxury to ban oil and gas activities).

property owners receive royalty checks, but the problem of split estates in the West presents a situation in which many residents live with “all of the nuisances without getting any compensation.”³³⁷ In addition to contributing to the state’s ozone problem, the production process also releases large amounts of methane, a potent greenhouse gas that has the potential to offset the climate benefits of natural gas if not kept in check.³³⁸ Some critics have suggested that fracking could become “one of the most contentious environmental movements of our time.”³³⁹

Though different in form and intensity, to a large extent, these communities are experiencing “the same disruptive elements of boomtown growth” that occurred with bonanzas of the past.³⁴⁰ Unlike most booms, however, a significant portion of this shale resource development takes place within urban communities.³⁴¹ This development is especially amplified along Colorado’s Front Range, where population growth and suburban sprawl make it increasingly more likely for conflicts to emerge.³⁴² In Colorado, the fracking debate “has been especially charged,” and has resulted in environmentalists and local officials severely scrutinizing the industry.³⁴³

337. See Gold, *supra* note 229, at 24 (discussing local externalities associated with fracking); see also *id.* at 211 (noting sometimes local residents are “gripped in [] form of seller’s remorse,” having second thoughts about leasing due to “sheer magnitude of [] change”).

338. See Smith & Richards, *supra* note 328, at 45 (discussing climate change concerns associated with methane leaks). CDPHE estimates that methane emissions from coal mining and abandoned mines in 2010 accounted for twenty-nine percent of CO’s methane emissions, while oil and natural gas systems contributed approximately thirty-nine percent. *Colorado Climate Plan*, *supra* note 1, at 31.

339. Smith, *supra* note 278, at 45 (noting contention surrounding fracking).

340. Gulliford, *supra* note 163, at 3 (listing elements as “drunkenness, depression, delinquency, and divorce”). A number of Front Range communities affected by the fracking boom “originated as coal mining towns or came into being with an extractive economy” and owe their postwar growth “to a festival of fossil fuel combustion.” Limerick, *supra* note 22, at 18; see also Gulliford, *supra* note 163, at 91 (warning that “boomtowns present enormous social problems[,]” such as inflated wages and “constant workforce turnover” that results in workers not integrating themselves into social fabric of local communities).

341. Smith, *supra* note 278, at 1 (noting that over “[three hundred] million people around world across six continents occupy land overlying [] shale reservoir”); see also Minor, *supra* note 296, at 61 (noting that fracking boom “is rapidly transforming communities nationwide”).

342. *Id.* (noting geographic area where shale resource development occurring).

343. Dan Frosch, *Colorado High Court Rules Local Bans on Fracking are Illegal*, WALL ST. J. (May 2, 2016), <http://www.wsj.com/articles/colorado-high-court-rules-local-bans-on-fracking-are-illegal-1462208729> (describing fracking debate in Colorado); Gold, *supra* note 225, at 26 (describing how fracking debate has caused industry to be scrutinized more closely).

When production occurs near large populations, the mere existence of potential dangers, regardless of merit, “creates a stigma of harm” that can prevent entities from developing energy resources.³⁴⁴ In other words, failure to obtain a “social license to operate” might prompt local officials to use their legal authority to limit or ban certain activities altogether.³⁴⁵ Some Colorado communities, fearing the Colorado Oil and Gas Conservation Commission (COGCC) was too intoxicated with boom euphoria to adequately address their concerns, tapped into the state’s long history of local governance to dictate how these resources are developed within their jurisdictions.³⁴⁶

In 2012, the citizens of Longmont passed a zoning ordinance that essentially banned the use of hydraulic fracturing and the storage and disposal of fracking waste within city limits.³⁴⁷ A year later, Fort Collins passed a five-year moratorium on the practice.³⁴⁸ These moves “set off a firestorm” of litigation that pitted environmentalists and local residents against the state and fracking advocates.³⁴⁹ After two district court judges ruled that state law preempted the regulations, the Colorado Supreme Court heard the cases on appeal in late 2015.³⁵⁰ The Colorado Supreme Court has weighed in on state versus local preemption before, and in the early 1990s, it decided two cases that established the boundaries for local government regulation in the context of oil and gas extraction.³⁵¹

On May 2, 2016, the Colorado Supreme Court struck down both measures in a pair of rulings.³⁵² The Court held that although Longmont’s ban “involves a matter of mixed state and local concern[,]” it operationally conflicts with state law, and is therefore,

344. Smith, *supra* note 278, at 3 (explaining how harm develops from production).

345. *Id.* at 2 (discussing legal activity of local officials).

346. For a further discussion on fracking bans, see *infra* notes 348–357 and accompanying text.

347. See *City of Longmont v. Colo. Oil and Gas Ass’n*, 369 P.3d 573, 577 (Colo. 2016) (describing zoning ordinance).

348. See *Minor*, *supra* note 297, at 63–65 (describing five-year moratorium).

349. *Id.* (discussing litigation after moratorium on fracking practices).

350. *Colo. Oil and Gas Ass’n*, 369 P.3d at 573; see also *City of Fort Collins v. Colo. Oil and Gas Ass’n*, 369 P.3d 586 (Colo. 2016); see also *Frosch*, *supra* note 332 (discussing when Supreme Court heard case).

351. *Watson & Cadena*, *supra* note 300, at 4 (citing *Bd of Cnty. Comm’rs v. Bowen/Edwards Assocs., Inc.*, 830 P.2d 1045, 1059 (Colo. 1992)) (discussing prior preemption cases).

352. *Colo. Oil and Gas Ass’n*, 369 P.3d at 577 (concluding fracking ban preempted by state law); see also *City of Fort Collins*, 369 P.3d at 589 (concluding fracking ban preempted by state law).

preempted and unenforceable.³⁵³ In clarifying the proper test to apply in operational conflict preemption, the Colorado Supreme Court held that the ban “materially impedes the application of state law.”³⁵⁴ The rulings were consistent with the state’s preemption jurisprudence and will likely have major implications across Colorado.³⁵⁵ The decision means that while local governments can regulate certain aspects of unconventional oil and gas development that affect land use and the wellbeing of the community, they cannot altogether ban hydraulic fracturing techniques that are required for extraction.³⁵⁶ Weighing into the merits of the decision, however, is beyond the scope of this article, primarily because the issue should never have reached this point in the first place.³⁵⁷

VIII. FINDING A BALANCED APPROACH TO FRACKING BY LOOKING AT HISTORY

The Colorado Supreme Court’s decision provided an important clarification regarding the proper test for conflict preemption; yet, perhaps the question should never have reached this stage of litigation.³⁵⁸ Instead of framing the issue as whether local governments can impose an all out ban on fracking, there should have been more robust collaborative efforts between the industry and the communities to figure out how local governments can reasonably regulate the externalities of shale development within the confines of state law.³⁵⁹

Enacting what amounts to an all-out ban on fracking and responding with a winner-takes-all litigation approach may have been the wrong approach by each side for several reasons.³⁶⁰ First, if the bans had been upheld, the companies and property owners wishing to develop these resources would have a strong Fifth Amendment

353. *Colo. Oil and Gas Ass’n*, 369 P.3d at 577 (discussing case law on preemption issue).

354. *Id.* at 585 (describing why fracking bans conflict with state regulatory framework).

355. See Frosch, *supra* note 343 (discussing broader implications of court’s ruling).

356. *Colo. Oil and Gas Ass’n*, 369 P.3d at 585–86 (discussing impossibility of banning certain fracturing techniques).

357. For a further discussion on why the issue should have never reached this point in the first place, see *infra* notes 359–368 and accompanying text.

358. For a further discussion of these decisions, see *supra* notes 351–57 and accompanying text.

359. For a discussion of the rights of local governments to enact fracking restriction, see *infra* notes 388–394 and accompanying text.

360. For an analysis of whether responding to fracking issues through litigation is effective, see *infra* notes 362–367 and accompanying text.

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takings claim for just compensation.³⁶¹ More importantly, the industry's victory in court may be short-lived if outraged citizens rally around efforts to amend the state's constitution.³⁶² Environmental groups believe the rulings provide momentum for several ballot initiative campaigns that "would effectively reinstate local control over fracking and other activities" and prohibit the practice within certain proximities to residential areas, buildings, waterways, and public spaces.³⁶³ Whether these anti-industry initiatives will ultimately be successful is unclear, but the initiatives highlight the short-sidedness of using only using the "letter-of-the-law" approach to resolve the disputes.³⁶⁴ Relying on litigation to overcome local opposition is "a very risky, and ultimately disconcerting" tactic to employ in an era in which environmental concerns can stop a project in its tracks.³⁶⁵ It is also much more likely to engender "frustration and resentment within the community" than local support for shale development.³⁶⁶ Therefore, addressing issues, like fracking, which constantly defy legal resolution, requires an alternative approach, one that encourages the industry, communities, and environmentalists to establish consensus-building frameworks based on a mutual understanding of where each party stands.³⁶⁷

A. Developing a Balanced Framework Based on Compromise That Addresses All Concerns

To politicize an issue means framing it "in a way that makes people less likely to agree" in order to further one's own political agenda.³⁶⁸ Unfortunately, like climate change and so many other

361. Watson & Cadena, *supra* note 300, at 5 (explaining takings argument).

362. Michael Wines, *Colorado Court Strikes Down Local Bans on Fracking*, NEW YORK TIMES (May 2, 2016), https://www.nytimes.com/2016/05/03/us/colorado-court-strikes-down-local-bans-on-fracking.html?_r=0 (predicting fallout from fracking ban litigation).

363. *Id.* (discussing potential ballot initiatives). The Colorado Supreme Court has approved signature-collecting for three of these initiatives. Limerick, *supra* note 22, at 19 (discussing strategy for ballot initiatives). Those in support of the amendments must gather one hundred thousand signatures by August to get them on the November 2016 ballot. *Id.* Proponents of the initiatives are unsatisfied with the progress made by the Governor's Task Force. *Id.*

364. See Smith, *supra* note 278, at 44 (discussing shortcomings of adversary approach).

365. *Id.* (explaining local tension stirred by litigation strategy).

366. *Id.* (discussing negative repercussions associated with litigation approach).

367. *Id.* at 45 (addressing alternative ways to approach legal resolutions).

368. *Politicize*, MERRIAM-WEBSTER, <http://www.merriam-webster.com/dictionary/politicize> (last visited Dec. 14, 2016) (defining word "politicize"); see also Limerick & Hanson, *supra* note 66, at 281 (explaining that "politicizing something

issues in the cross-section of energy and the environment, fracking has been politicized in a way that pollutes constructive conversation and, instead, perpetuates “an atmosphere thick with resentment, defensiveness, and cynicism.”³⁶⁹ The two extreme groups at the forefront of this debate refuse to look objectively at the issues.³⁷⁰ They “do [not] speak the same language[,]” and finding common ground can be elusive, if not impossible, for those wishing to find a balanced legal solution.³⁷¹

One of the most frustrating obstacles to building consensus is the way in which each side frames the science surrounding fracking’s environmental impact.³⁷² For example, some ‘fracktivists’ will accept the slightest hint of a scientific link between fracking and groundwater contamination as affirmative proof that pollution is occurring on a large scale, while certain industry advocates interpret scientific uncertainty to mean that a problem does not exist.³⁷³ Skepticism, however, is an inherent feature of the scientific method.³⁷⁴ As with any new technological method used in natural resource extraction, uncertainties will inevitably arise.³⁷⁵ It takes scientific peer review, not politicians and media coverage, to hash out the degree of a causal link.³⁷⁶ Therefore, one of the first steps in bringing the opposed sides together is for both parties to disallow their respective political agendas to trump reality.³⁷⁷ Once that

means using [] otherwise noncontroversial event or occurrence to further [] political agenda”).

369. Limerick, *supra* note 22, at 15 (discussing polarized advocacy groups). The media would have citizens believe that Americans are split “into two clearly defined and rigidly opposed cohorts,” but the reality is much more complicated, with “a very sizable portion of citizenry that has not yet made up its mind.” *Id.*; see also Tomain, *supra* note 45, at 235-36 (explaining that politicization of energy and climate issues makes “reasonable conversation difficult”); see also Yergin, *supra* note 11, at 388 (explaining how “short term politics overwhelm [] needs of sound policy”).

370. Gold, *supra* note 224, at 233 (discussing lack of compromise between advocacy groups).

371. *Id.* at 296-97 (explaining mootness of finding common ground).

372. *Id.* at 233 (explaining difficulties of finding common ground).

373. *Id.* (describing local officials’ frustration when dealing with two extreme groups).

374. See generally Michael Shermer, *What Skepticism Reveals about Science*, SCIENTIFIC AMERICAN (July 1, 2009), <https://www.scientificamerican.com/article/what-skepticism-reveals/> (illustrating role of skepticism in science).

375. For a further discussion of experimental development with unconventional energy sources, see *supra* notes 215-266 and accompanying text.

376. See Gold, *supra* note 224, at 233 (expressing frustration with unwillingness to compromise).

377. For a further discussion on advocating for objectivity when debating fracking science, see *infra* notes 390-94 and accompanying text.

happens, there needs to be a way to foster respect for the other sides' respective positions; history provides one such avenue.³⁷⁸

B. Learning From The Past to Develop New Ways of Approaching Energy Issues

The history of resource development in Colorado reveals that, if left unchecked, extractive industries and the boom psychology can wreak havoc on local communities and the environment.³⁷⁹ It is also a reminder that Colorado is a resource-rich state; development of this bounty has and continues to be an important driver of the state's economy, and any large-scale extraction operation will always pose problems.³⁸⁰ The difference between the bonanzas of the nineteenth century and the energy booms in more recent decades is the degree of degradation and how it is mitigated.³⁸¹ It is also important to understand that "energy choices are social constructions" reflected in law and policy.³⁸² Although technological and economic momentum lock in certain types of extraction for a time, decisions about how society develops energy resources are, in the long run, "driven by cultural debates, [] human choices[,] and consciousness regarding their consequences."³⁸³ Those decisions are also increasingly driven by environmental concerns.³⁸⁴

If the industry looks at the history of using ballot initiatives to curtail or promote certain types of energy resources, it will realize that "the future of Colorado lies in the hands of its people," and not in the strict adherence to current legal precedent and politicians swayed with aggressive lobbying.³⁸⁵ For local communities searching for ways to address their concerns about fracking, Governor Lamm's 1976 comments on rapid population growth are instruc-

378. For more information on historical perspectives in addressing fracking issues, see *infra* notes 380–394 and accompanying text.

379. For a further discussion of the boom psychology and its impact on local communities, see *supra* notes 287–293 and accompanying text.

380. See *Colorado Climate Plan*, *supra* note 1 (discussing importance of energy industry to Colorado economy).

381. For a discussion of the historical context surrounding Colorado energy production, see *infra* notes 83–93 and accompanying text.

382. Sachs, *supra* note 51, at 14 (quoting David Nye's theory concerning shifts in fuel choice).

383. *Id.* (explaining driving forces behind environmental decisions).

384. Yergin, *supra* note 11, at 720–21 (discussing factors that drive energy policies).

385. McCarthy, *supra* note 18, at 274 (discussing future of Colorado energy resources).

tive.³⁸⁶ Similar to worries about population growth, local communities might not be able to stop fracking altogether, but they “can guide it,” “plan for it,” “cushion its impacts,” and protect “against some of its costs” by dealing with its implications proactively.³⁸⁷ This means acting before, and not in response to, boom conditions, and “separating issues of substance and consequence from the noise of fevered dispute.”³⁸⁸

Colorado has a proud history of collaborating on important environmental issues.³⁸⁹ When environmental activism, however, takes on a “no-compromise defense of Mother Earth” attitude towards an industry that has strong historical roots in Western economies, like mining, agriculture, ranching, and energy, “the result has been to marginalize environmentalism.”³⁹⁰ Instead, the more successful approach has been to “forge Two Forks-like solutions” by promoting reasonable alternatives to how and where the practice can take place, instead of rejecting the practice altogether.³⁹¹ Adhering to a pragmatic policy that acknowledges the benefits of fracking, yet suggests ways to mitigate its impact, prevents fracking proponents from characterizing them as out of state “impractical lovers of nature unable to think” realistically about the needs of a modern society.³⁹² Therefore, Two Forks stands for the notion that in order to promote an outcome that protects the environment, while also allowing the development of a resource that is critical to maintaining our modern way of life, “cooperation in pursuit of a common interest holds a more impressive moral stature and a much more positive image than contention and competition.”³⁹³

C. Alternatives to Litigation and Ballot Initiatives: Obtaining a Social License to Operate

Building on that framework, the experience with oil shale suggests a need to think about energy development mitigation, not just in terms of its environmental impact, but also in terms of its social

386. *Id.* at 273 (explaining that “Colorado cannot stop new population growth” and citizens must deal with implications).

387. *See id.* at 273 (explaining worries communities might face).

388. Limerick, *supra* note 22, at 18 (discussing how to deal with implications).

389. For a further discussion on the efforts by Coloradans to compromise, see *infra* notes 392–94 and accompanying text.

390. *See* Marston, *supra* note 178, at 9 (discussing environmentalist approach).

391. Limerick & Hanson, *supra* note 65, at 204 (suggesting alternative approach to fracking bans).

392. *Id.* (explaining pragmatic policy of fracking).

393. *Id.* at 205 (explaining Two Forks idea).

impact on communities during and after the boom period.³⁹⁴ The COGCC should consider allowing local officials to require “bust mitigation plans and procedures” in issuing permits.³⁹⁵ Over the past several years, the glut of natural gas and oil supplies has caused the price of these resources to drop considerably.³⁹⁶ The result has been massive layoffs for thousands of workers in Colorado’s energy sector, in addition to declining tax revenues at the state and local level.³⁹⁷ Unlike the oil shale busts, however, the slump will eventually end with companies significantly ramping up production once again along the Front Range.³⁹⁸

Colorado cities, like Longmont and Fort Collins, may have lost their day in court, but they were successful in drawing significant attention that is likely to hold companies more accountable in the future for their negative environmental footprint.³⁹⁹ Other cities and interest groups across the state are also unlikely to throw up the white flag in response.⁴⁰⁰ Colorado citizens will continue to demand that energy developers reduce their environmental footprint and do more than comply with their state issued permits.⁴⁰¹

Rather than brandishing threats of litigation as deterrence against local government attempts to limit energy development, oil and gas companies would be wise to obtain what energy scholars call a “social license to operate[,]” in addition to their legal permit to extract.⁴⁰² The social license to operate is a “risk management tool” of sorts that involves ongoing communication, “transparency and engagement in decision-making,” and the creation of “effective conflict resolution mechanisms.”⁴⁰³ By agreeing to a set of reasonably implicit or explicit rules in a contract with local communities or environmental groups, companies can assess their socio-political

394. Gulliford, *supra* note 163, at 222 (discussing social impact of boom period).

395. *Id.* at 222 (suggesting mechanisms to mitigate impact of boom-bust cycle).

396. Limerick, *supra* note 22, at 19 (describing resources price drop).

397. *Id.* (discussing massive layoffs of Colorado’s energy sector workers).

398. *See* Wines, *supra* note 362 (explaining timing of company production).

399. *See* Bruce Finley, *Colorado Supreme Court rules state law trumps local bans on fracking*, DENVER POST (May 2, 2016), <http://www.denverpost.com/2016/05/02/colorado-supreme-court-rules-state-law-trumps-local-bans-on-fracking/> (discussing fallout post-fracking ban decisions).

400. *Id.* (stating other cities potential to ban fracking).

401. Smith, *supra* note 278, at 45 (stating Coloradan’s demand on energy developers to reduce environmental footprint).

402. *See* Finley, *supra* note 399 (discussing fallout post-fracking ban decisions). A social license “describes the latitude or freedom that society allows the business to use land and its resources without interference.” Smith, *supra* note 278, at 45.

403. Smith, *supra* note 278, at 3 (discussing best practices for transparency).

risk and take measures to reduce it before it bubbles into expensive and prolonged litigation or a state referendum.⁴⁰⁴ Companies, particularly those with large financial resources, should adopt a proactive approach now while prices are low, so that when the next boom hits, they will be in a better position to define themselves as part of the community before conflicts arise.⁴⁰⁵

IX. CONCLUSION

The fields of energy and environmental law will only continue to coalesce.⁴⁰⁶ Colorado, with its rich history of cultural and energy resource wealth, its strong ethic of environmentalism, and its legacy of finding consensus through the convergence of diverse interests, is the perfect place to effectuate this marriage.⁴⁰⁷ Finding solutions in the space where environmental and energy issues converge is never easy.⁴⁰⁸ There will always be scientific uncertainties, technological breakthroughs, unforeseen costs, legal impediments, necessary evils, and immense pressure to pledge allegiance to one side or the other.⁴⁰⁹ Using a historical lens to wade through the complexities of the fracking issue will help Colorado clear the fog that prevents diverse stakeholders from reaching balanced solutions.⁴¹⁰

404. *Id.* at 7 (discussing how better measures can be taken).

405. Watson & Cadena, *supra* note 300, at 5 (arguing better approach is to “define yourself as part of [] community before [] opponents demonize you as [] profit-seeking, polluting outsider”); *see also* Tomain, *supra* note 46, at 235 (explaining that energy decisions should be “progressive as to new ideas; non-partisan as to [] implementation; and pragmatic as to [] solutions”); *see also* Limerick, *supra* note 22, at 16 (explaining that larger companies have greater “financial resources to invest in precautions and protections against pollution, as well as in compensation to affected communities”).

406. For a discussion of the evolving nature of energy production, see *supra* note 47 and accompanying text.

407. For a discussion of Colorado history and culture, see *supra* notes 15–21 and accompanying text.

408. For a discussion of the difficulties surrounding energy productions and environmental concerns, see *supra* notes 369–379 and accompanying text.

409. For a discussion of the nature of solutions in energy conflicts, see *supra* notes 369–379 and accompanying text.

410. For a discussion of the importance of history in coming to understand the key players and consequences of energy production, see *supra* notes 380–394 and accompanying text.