

REGULATING HYDRAULIC FRACTURING THROUGH LAND USE: STATE PREEMPTION PREVAILS

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Hydraulic fracturing enables oil and gas operators to maximize hydrocarbon extraction from unconventional reservoirs. The increasing prevalence of fracturing generates robust debate and review of the environmental and economic impacts of the practice. An unbiased political dialogue of fracturing proves challenging. The technical complexity of the process and the divergent perceptions of local and state decision-makers foment regulatory tension. A division-of-authority contest between the state government and home-rule cities ensues.

In Colorado, state-level preemption gives courts a tool to invalidate local regulation of oil and gas activities where an operational conflict exists between the state and local law. However, Colorado cities that enjoy “home-rule” status under article XX of the Colorado Constitution possess plenary power to regulate matters of local concern. Zoning and land use, traditionally areas of local concern, could be utilized to effectively regulate fracturing. This Comment proposes that, notwithstanding home-rule plenary power, zoning regulations that de facto regulate oil and gas should be invalidated under the operational preemption test.

The ambiguity between a permissible local land-use regulation and an impermissible local regulation of oil and gas needs greater clarity. Through express preemption, the state government can best provide this clarity by assembling the diverse collection of stakeholders required to implement the science-based regulations that fracturing demands.

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INTRODUCTION

Wherever a drilling rig pierces the ground, Colorado

communities inevitably ask: how will this operation impact the local environment?¹ Physical remoteness of drilling sites perhaps once tempered environmental concerns. Now, hydraulic fracturing and directional drilling in oil and gas extraction transect spatial boundaries, prompting a renewed environmental critique.² Mitigating the novel risks of advanced resource-extraction technologies demands a science-based approach, as well as the earnest participation of leaders at both the state and local levels.³

Effective mitigation remains unrealized principally because Colorado's Oil and Gas Conservation Act⁴ (OGCA)

1. See, e.g. El Paso County, EL PASO COUNTY OIL AND GAS EXPLORATION / FREQUENTLY ASKED QUESTIONS 1, available at <http://www.elpasoco.com/OilAndGas/Documents/FAQ%20%20El%20Paso%20County%20Oil%20and%20Gas%20Exploration.pdf>. (addressing resident concerns about oil and gas exploration).

2. Communities throughout Colorado increasingly scrutinize hydraulic fracturing and oil and gas regulation. See, e.g., Monte Whaley, *Commerce City Eyes Restrictions on Drilling*, DENVER POST, April 18, 2012, at 8A (discussing the City of Commerce City's proposals to "lighten the impact of hydraulic fracturing in the community" by imposing new oil and gas regulations); John Aguilar, *Lafayette to Pursue Moratorium on New Oil and Gas Permits*, DAILY CAMERA (Boulder, Colo.), Sept. 4, 2012, available at http://www.dailycamera.com/ci_21469536/lafayette-pursue-moratorium-new-oil-and-gas-permits (noting the City of Lafayette's desire to pass a moratorium on oil and gas drilling in order to update local oil and gas regulations for hydraulic fracturing concerns); Amy Bounds, *Boulder County Planning Commission Asks for Tougher Fracking Regulations*, DAILY CAMERA (Boulder, Colo.), Oct. 1, 2012, available at http://www.dailycamera.com/ci_21676416/boulder-county-planning-commission-asks-tougher-fracking-regulations (noting the Boulder County Planning Commission "asked for more restrictive regulations on oil and gas drilling"). Local political pressure also helped prompt renewed federal review of hydraulic fracturing at the Environmental Protection Agency (EPA). Denver Post Editorial Board, *Is West's Water Supply at Risk? Congress Should Revisit Whether a Controversial Natural Gas Drilling Method Pollutes Groundwater in Colo. and Elsewhere*, DENVER POST, Nov. 19, 2008 at B14; Cathy Proctor, *EPA to Study Impact of Hydraulic Fracturing*, DENVER BUSINESS JOURNAL, Mar. 18, 2010, available at <http://www.bizjournals.com/denver/stories/2010/03/15/daily52.html> (discussing EPA announcement to assess "adverse impact[s] on water quality and public health" with regards to hydraulic fracturing). Through directional drilling, the hydraulic fracturing process may occur directly beneath a residence or commercial structure that once enjoyed the perception of physical remoteness. See *infra* Part I.A.

3. See *infra* Part IV (asserting that while the State should affirmatively lead the regulation of oil and gas, the regulatory process must include community-specific information from local groups).

4. COLO. REV. STAT. ANN. §§ 34-60-101–129 (West, Westlaw through 2013 Legis. Sess.).

ambiguously preempts local land-use control.⁵ Fracturing in particular demands preemption clarity. The increased technical sophistication of natural-resource extraction mandates a comprehensive community response. The unclear delineation of authority between state and home-rule⁶ city governments exacerbates the underlying regulatory challenge because it encourages entrenched interests rather than “honest brokers.”⁷ This Comment analyzes the authority of home-rule cities to enact de facto oil and gas regulation through land-use regulation, notwithstanding the framework of Colorado state-level preemption. While home-rule cities enjoy broad plenary power to enact land-use regulations, operational preemption should bar land-use regulations that amount to a de facto technical regulation of oil and gas production.

Effective oil and gas regulations impartially incorporate an analysis of the environmental costs and the economic benefits of oil and gas development.⁸ The encroachment of drilling operations into more densely populated areas⁹ continues to prompt calls for additional regulations and outright bans of fracturing.¹⁰ But oil and gas regulations bereft of either scientific or economic understanding fail Colorado communities as much as the absence of regulation.¹¹ Fracturing and directional drilling represent neither inherently good nor

5. See *infra* Part II (discussing how the ad hoc operational preemption analysis yields inconsistent results).

6. COLO. CONST. art. XX, § 6 (establishing constitutional home-rule status of specially-chartered Colorado cities).

7. An “honest broker” provides basic information to decision-makers in “an effort to expand (or at least clarify) the scope of choice for decision-making in a way that allows for the decision-maker to reduce choice based on his or her own preferences and values.” RODGER A. PIELKE, *THE HONEST BROKER: MAKING SENSE OF SCIENCE IN POLICY AND POLITICS* 2–3 (2007). See also *infra* Part IV.B (noting that oil and gas regulation ultimately required both a foundational and unbiased technical understanding and a policy judgment).

8. See *infra* Part IV.B (noting that while regulation need consider both economic and environmental factors, the final regulatory decision inherently requires discretion).

9. JACQUELYN PLESS, NAT’L CONFERENCE OF STATE LEGISLATURE, *NATURAL GAS DEVELOPMENT AND HYDRAULIC FRACTURING: A POLICYMAKERS GUIDE* 3 (2012), available at http://www.ncsl.org/documents/energy/frackingguide_060512.pdf.

10. See, e.g., Aguilar, *supra* note 2; Bounds, *supra* note 2.

11. Hydraulic fracturing impacts both environmental and economic concerns. See PLESS *supra* note 9; *Editorial: Impacts of Fracking Go Beyond Well Drilling Area*, DAILY TIME-CALL (Longmont, Colo.), Feb. 28, 2012, available at 2012 WLNR 4306515.

inherently bad developments. As with any industrial process, diligent operation defines the environmental and economic outcomes,¹² while practical circumstances necessitate its use.¹³

Local governments do not promulgate fracturing regulations in a vacuum; rather, such regulations inherently exist in a broader economic context. Oil and gas operators (operators)¹⁴ meet increasing market demand for fossil fuels by employing more effective resource-extraction techniques.¹⁵ The United States consumes over eighteen million barrels of oil per day, accounting for approximately 22 percent of the world's total daily consumption.¹⁶ The national security, environmental, and economic costs of this rate of fossil fuel consumption are beyond dispute.¹⁷ But while technical professionals and public servants alike strive to reduce consumption,¹⁸ the immediate demand for fossil fuels will not soon cease.¹⁹ Operators can no longer supply this demand without advanced extraction technologies due to the depletion of hydrocarbon resources available for extraction through

12. See, e.g., *Hydraulic Fracturing*, EXXONMOBIL.COM, http://www.exxonmobil.com/Corporate/energy_production_hf.aspx (last visited Mar. 10, 2013) (noting that “[a]ll industrial processes have risks, and drilling for unconventional oil and gas is no different”); Bruce Finley, *Fracking-fouled Water Gushes from Broken Weld Well-head*, DENVER POST, Feb. 14, 2013, at 4A (mechanical failure at well head caused fracturing fluid spill).

13. See *infra* Part I.C (discussing why fracturing is required to maintain production levels).

14. Throughout this Comment, “operator” refers to “the person or company actually operating an oil well or lease, generally the oil company that engages the drilling, service, and workover contractors.” KATE VAN DYKE, A PRIMER OF OILWELL SERVICE, WORKOVER, AND COMPLETION 148 (The University of Texas at Austin, 1st ed. 1997).

15. See *infra* Part I.A (explaining how fracturing is a more effective production technique).

16. *How Much Oil Does the United States Consume Per Year?*, U.S. ENERGY INFORMATION ADMINISTRATION, <http://www.eia.gov/tools/faqs/faq.cfm?id=33&t=6> (last visited Feb. 22, 2013).

17. E.g. CHRISTOPHER BEDDOR et al., AM. PROGRESS, SECURING AMERICA'S FUTURE: ENHANCING OUR NATIONAL SECURITY BY REDUCING OIL DEPENDENCE AND ENVIRONMENTAL DAMAGE 7–10 (2009), available at http://www.americanprogress.org/wp-content/uploads/issues/2009/08/pdf/energy_security.pdf.

18. See, e.g., Darlene Superville, *Obama Calls for Big Fuel Vehicle Fuel Standards*, NBCNEWS.COM, http://www.nbcnews.com/id/44073788/ns/politics-white_house/t/obama-calls-big-vehicle-fuel-standards/#.UjtfdBn1ux4 (last updated Aug. 9, 2011).

19. See *Energy & Financial Markets: What Drives Crude Oil Prices?*, U.S. ENERGY INFORMATION ADMINISTRATION, <http://www.eia.gov/finance/markets/demand-nonoecd.cfm> (last visited Feb. 22, 2013) (projecting stable to increasing demand for crude oil in the immediate term).

conventional means.²⁰

The strong local and statewide interests in oil and gas development, combined with the underlying environmental, economic, and technological aspects of fracturing, generate a contest for regulatory authority between the Colorado State government and home-rule cities.²¹ Ambiguity at the intersection of state preemption and local land-use regulation further ensures conflict.²² Colorado, through both the General Assembly and the Colorado Constitution, endorses two, sometimes-conflicting policies:²³ (1) promoting oil and gas production in the state²⁴ and (2) empowering local municipalities to largely govern themselves.²⁵ Both policies can find common purpose in honoring the dominion of landowners over their property.²⁶ But a landowner's rights must yield to community rights where the harm caused by the landowner's use outweighs its social utility, especially as population densities increase.²⁷

20. See *infra* Part I.C.

21. See Complaint For Declaratory Relief, Colorado Oil & Gas Conservation Comm'n v. City of Longmont, (Boulder Cnty. Dist. Ct. filed July 30, 2012); see also Bruce Finley, *Oil and Gas Drilling Fuels Debate Over Self-Government, State Interest*, DENVER POST, Mar. 13, 2013, available at http://www.denverpost.com/environment/ci_22768807/oil-and-gas-drilling-fuels-debate-over-self (noting that “[s]tate attorneys are fighting local governments that try to impose their own rules.”).

22. See *infra* Part I.D (discussing the political constraints inherent in the fracturing debate).

23. Compare COLO. REV. STAT. ANN. § 34-60-102(1)(a)(I) (West, Westlaw through 2013 Legis. Sess.) (declaring state policy to “foster the responsible, balanced development, production, and utilization of the natural resources of oil and gas”), with COLO. REV. STAT. ANN. § 29-20-102(1) (West, Westlaw through 2013 Legis. Sess.) (describing state policy to “provide broad authority to local governments to plan for and regulate the use of land within their respective jurisdictions”) and COLO. CONST. art. XX, § 6 (establishing plenary “home-rule” authority).

24. COLO. REV. STAT. § 34-60-102 (2012).

25. COLO. REV. STAT. § 29-20-102 (2012); COLO. CONST. art. XX, § 6.

26. See generally D. Benjamin Barros, *Property and Freedom*, 4 N.Y.U. J.L. & LIBERTY 36, 47 (2009) (noting that “[p]roperty, in the words of Charles Reich, ‘draw[s] a boundary between public and private power . . . maintaining independence, dignity and pluralism in society by creating zones within which the majority has to yield to the owner. These zones are not inviolable; rather, they create areas where the state or community must justify interference with the private sphere.’”) (this theoretical foundation provides a framework for analyzing development on private property, and its regulation thereof).

27. See RESTATEMENT (SECOND) OF TORTS § 826 (1979) (describing the standard by which a landowners private enjoyment of her land becomes a public nuisance).

State-level preemption gives Colorado courts a tool to invalidate local oil and gas regulations that conflict with the OGCA regulatory program.²⁸ Invalidation through preemption depends first on identifying the issue in controversy as a matter of state or mixed concern.²⁹ Local matters remain the province of local government, but not all local governments are created equal.³⁰ Article XX of the Colorado Constitution establishes the legal authority for “home-rule” cities in Colorado,³¹ which the Colorado Supreme Court has held to “bestow upon the people of the municipality ‘every power possessed by the legislature.’”³² This means that a home-rule city enjoys plenary power to govern its own affairs.³³ While the preemption framework applies to home-rule cities, the constitutional basis for home-rule authority affords such cities greater deference to promulgate regulations that would otherwise operationally conflict with state law.³⁴ This deference may not sufficiently shield direct local regulation of oil and gas production from invalidation,³⁵ but it may allow de facto regulation through local land-use laws.³⁶ Further, local governments find solid statutory basis for exercising land-use regulation in Colorado’s Local Government Land Use Enabling Act (Enabling Act).³⁷ The conceptual challenge of

28. See *infra* Part II.A (analyzing Colorado preemption authority).

29. *Infra* notes 144–146.

30. Local governments established as “Home Rule” cities enjoy “plenary authority by the constitution to regulate issues of local concern,” *Town of Telluride v. Lot Thirty-Four Venture, L.L.C.*, 3 P.3d 30, 37 (Colo. 2000) (citing COLO. CONST. art. XX, § 6), whereas, statutory cities and counties “possess[] only the regulatory authority ‘expressly conferred upon [it] by the constitution and statutes, and such implied powers as are reasonably necessary to carry out such express powers,’” *Bd. of Cnty. Comm’rs, La Plata County v. Bowen Edwards Assocs., Inc.*, 830 P.2d 1045, 1055 (Colo. 1992).

31. COLO. CONST. art. XX § 6 (establishing home-rule authority); COLO. CONST. art. XX, § 9 (establishing the right of citizen to elect home-rule status and a home-rule charter). Home-rule status generally gives a city government more flexibility and autonomy from the state government in governing its affairs. *Id.*

32. *City and Cnty. of Denver v. Mountain States Tel. & Tel. Co.*, 184 P. 604, 606 (Colo. 1919).

33. *Lot Thirty-Four Venture, L.L.C.*, 3 P.3d at 37.

34. See *infra* Part II; see also *Voss v. Lundvall Bros., Inc.*, 830 P.2d 1061, 1069 (Colo. 1992).

35. See, e.g., *Voss*, 830 P.2d at 1069 (invalidating home-rule city oil and gas drilling ban on all property within the city).

36. *Infra* Part II.

37. The Enabling Act does not distinguish between statutory and home-rule cities. COLO. REV. STAT. ANN. § 29-20-101–306 (West, Westlaw through 2013

compartmentalizing an oil and gas regulation from a land-use regulation only adds to the conflict: oil and gas and land-use regulations inherently implicate each other, and both impact Colorado at the state and local level.³⁸

This Comment concludes that even though Colorado home-rule cities likely possess the authority to regulate the land-use impacts of oil and gas production,³⁹ the development of comprehensive oil and gas regulations belongs with the state.⁴⁰ Part I frames the context of the preemption analysis by describing the technical aspects of hydraulic fracturing and the environmental and economic issues that make the practice controversial.⁴¹ Part II synthesizes the Colorado state-level preemption doctrine and describes the inherent authority of home-rule cities to regulate the land-use impacts of oil and gas production.⁴² Part III asserts that the operational conflict test of preemption qualifies the grant of inherent authority where “impact” regulation amounts to a de facto technical regulation.⁴³ Finally, Part IV argues that oil and gas regulation development in Colorado belongs exclusively to the General Assembly, and suggests steps to accomplish statewide regulation in a balanced fashion that includes local stakeholders.⁴⁴

I. NEW CONTROVERSY, OLD DILEMMA: THE ENVIRONMENTAL AND ECONOMIC IMPACT OF FRACTURING ILLUMINATES “WHO” SHOULD DECIDE SCIENCE-BASED REGULATIONS

The technical, environmental, economic, and political factors associated with fracturing help answer the question of *who* defines the contours of oil and gas regulation. Operators employ fracturing, directional drilling, and facilitating technologies (e.g., GPS) to extract hydrocarbon resources unavailable through conventional means.⁴⁵ These extraction

Legis. Sess.).

38. See *infra* Part II.B (noting that oil and gas regulation necessarily impact land use).

39. See *infra* Part II.

40. See *infra* Part IV.

41. *Infra* Part I.

42. *Infra* Part II.

43. *Infra* Part III.

44. *Infra* Part IV.

45. *Infra* Part I.A.

practices introduce previously absent environmental hazards to the drilling process, such as increased water usage and chemical-infused waste.⁴⁶ Effective mitigation strategies reduce risks while maximizing the economic benefits derived from the process.⁴⁷ A sober analysis of the technical, environmental, and economic concerns proves difficult, however, because the political salience of each factor varies greatly between the state and local governments.⁴⁸

A. *Technical Process: Directional Drilling and Hydraulic Fracturing Maximize Hydrocarbon Extraction*

Directional drilling techniques facilitate resource extraction from specifically targeted geologic formations.⁴⁹ The subsurface geology of any given geographic location is comprised of layers of juxtaposed rock stratum.⁵⁰ An operator identifies a stratum that contains an economically recoverable volume of oil and gas, known as the “target formation.”⁵¹ The geometry and physical properties of each stratum vary greatly by location, however, and the target formation may exist between many different strata that do not contain oil or gas.⁵²

Factors such as the dip,⁵³ permeability,⁵⁴ and composition⁵⁵ of the target formation must be considered to formulate a drilling plan that extracts the maximum amount of

46. *Infra* Part I.B.

47. *Infra* Part I.C.

48. *Infra* Part I.D.

49. See *How Does Directional Drilling Work?*, RIGZONE, http://www.rigzone.com/training/insight.asp?insight_id=295&c_id=1 (last visited Mar. 8, 2013) (noting that directional drilling encompasses “drilling wells at multiple angles, not just vertically, to better reach and produce oil and gas reserves”).

50. VAN DYKE, *supra* note 14, at 2 (depicting in Figure 1.2 sample cross-sections of petroleum reservoir geology).

51. See STEPHEN A. HOLDITCH, DRILLING CONTRACTOR, HYDRAULIC FRACTURING: OVERVIEW, TRENDS, ISSUES 116 (2007), available at http://www.drillingcontractor.org/dpci/dc-julyaug07/DC_July07_SteveHolditch.pdf (discussing the idea of a “Resource Triangle” to describe the economic trade-offs between developing conventional and unconventional resources).

52. *Id.* See also VAN DYKE, *supra* note 14, at 2.

53. Angle of stratum inclination as measured from a horizontal surface. *E.g.*, *Dip and Strike*, STRUCTURAL GEOLOGY, http://www.geosci.ipfw.edu/PhysSys/Unit_4/structures_text.html (last visited Sept. 19, 2013).

54. Rate of flow through a permeable medium.

55. Physical properties.

hydrocarbons from a particular target formation.⁵⁶ Where recoverable oil and gas exist in a particularly thin stratum, or at a substantial dip, a vertically-drilled well proves problematic because it limits the potential of the production casing⁵⁷ to intersect with the target formation in a manner that maximizes extraction.⁵⁸ To the extent that stratum geometry limits extraction volume, the actual production of the well may not justify the capital expenditure required to drill the well.⁵⁹

Directional drilling helps maximize extraction by positioning the wellbore in a manner that aligns with the irregular geometry of the stratum.⁶⁰ Operators “directionally drill” by making minute adjustments in the angle of the drill bit over the course of drilling a well.⁶¹ Those minor

56. See HOLDITCH, *supra* note 51, at 116 (“Basic reservoir engineering calculations can be used to show that gas recovery and deliverability will be functions of formation permeability, net gas pay thickness, gas porosity, drainage area and propped fracture length and fracture conductivity in the reservoir interval.”).

57. The “production casing” refers to a “casing string that is set across the reservoir interval and within which the primary completion components are installed.” *Oilfield Glossary*, SCHLUMBERGER, <http://www.glossary.oilfield.slb.com/en/Terms.aspx?LookIn=term%20name&filter=production%20casing> (last visited Sept. 19, 2013). This is the portion of the well that typically receives the oil from the subsurface reservoir. *See id.*

58. Assuming a constant flow velocity, the volume of fluid that passes through a given surface area increases as the surface area increases. This principle of fluid mechanics suggests that a vertically-drilled well may be unable to intersect with the subsurface reservoir in a manner that creates a sufficient surface area between the production casing and subsurface reservoir to maximize production.

59. Compare *supra* note 58, with LISA SUMI, MARCELLUS CTR. FOR OUTREACH & RESEARCH, SHALE GAS: FOCUS ON THE MARCELLUS SHALE 7 (2008), available at <http://www.marcellus.psu.edu/resources/PDFs/Focusonthemarcellus.pdf> (Unconventional reservoirs of natural gas must produce large quantities to justify the expense of production, and thus each wellbore must intersect a maximum number of natural gas fractures to ensure the economic viability of the well).

60. See LISA SUMI, MARCELLUS CTR. FOR OUTREACH & RESEARCH, SHALE GAS: FOCUS ON THE MARCELLUS SHALE 7 (2008), available at <http://www.marcellus.psu.edu/resources/PDFs/Focusonthemarcellus.pdf> (discussing how a directionally drilled well is positioned to align with the greatest number of naturally occurring fractures. The naturally occurring fractures contain natural gas). See also ENERGY INFORMATION ADMINISTRATION, DRILLING SIDEWAYS – A REVIEW OF HORIZONTAL WELL TECHNOLOGY AND ITS DOMESTIC APPLICATION vii, available at http://www.eia.gov/pub/oil_gas/natural_gas/analysis_publications/drilling_sideways_well_technology/pdf/tr0565.pdf (noting that the “technical objective of horizontal drilling is to expose significantly more reservoir rock to the well bore surface than can be achieved via drilling of a conventional vertical well”).

61. RIGZONE, *supra* note 49.

adjustments over the course of thousands of linear feet allow the operator to position the wellbore in almost any direction, including horizontally.⁶² This flexibility allows drilling engineers to maximize production by positioning the wellbore to intersect with a greater number of production formations.⁶³ While the concept of directional drilling originated in the early 1920s,⁶⁴ recent advancements in GPS, geologic surveys, and real-time controls, among other technologies, now allow operators to utilize its full benefit.⁶⁵

Hydraulic fracturing allows an operator to increase the permeability of a target production formation.⁶⁶ Natural gas, in particular, often exists in extremely low-permeability strata, such as shale.⁶⁷ Low permeability impedes the flow of gas into the wellbore, which reduces actual production volume.⁶⁸ Fracturing induces gas flow by injecting a high-pressure combination of water, sand, and chemicals into the target formation to create fissures that increase the formation's permeability.⁶⁹ Like directional drilling, hydraulic fracturing is not novel.⁷⁰ Rather, hydraulic fracturing began in the 1940s⁷¹ but became more common in recent years due to technological advances.⁷²

Hydraulic fracturing may be performed on both vertical wells and wells drilled by directional methods.⁷³ The

62. *See id.*; *see also The Unsung Masters of the Oil Industry*, THE ECONOMIST, July 21, 2012, available at <http://www.economist.com/node/21559358> (depicting a chart that demonstrates the horizontal range of a directionally drilled well).

63. *See generally* SUMI, *supra* note 59, at 7–8 (discussing how a natural gas well becomes more economical as the wellbore intersects with a greater number of naturally-occurring natural gas fractures).

64. RIGZONE, *supra* note 49.

65. *Id.*

66. VAN DYKE, *supra* note 14, at 117–18.

67. *What is Shale Gas?*, ALBERTA GEOLOGICAL SURVEY, <http://www.ags.gov.ab.ca/energy/shale-gas/index.html> (last visited Mar. 8, 2013) (“[C]ompared to most conventional reservoirs like sandstone, limestone or dolostone, gas shales have extremely low permeability.”).

68. VAN DYKE, *supra* note 14, at 117 (“[L]ow permeability, whether natural or artificial, reduces productivity to a rate that is not economical.”).

69. *Id.* at 118.

70. *Id.* at 117 (stating that “[h]ydraulic fracturing . . . was introduced in 1948”).

71. *E.g.*, *A Historic Perspective*, FRACFOCUS, <http://fracfocus.org/hydraulic-fracturing-how-it-works/history-hydraulic-fracturing> (last visited Dec. 4, 2013).

72. *E.g.*, PLESS, *supra* note 9, at 1.

73. HOLDITCH, *supra* note 51, at Figure 1 (explaining that the principal of radial flow applies irrespective of the wellbore orientation. However, the precise

combination of both directional drilling and hydraulic fracturing allows for the economic extraction of minerals in thin, steep dip, and low-permeability strata.⁷⁴ Shale formations that contain natural gas in locations like Western New York⁷⁵ and Colorado⁷⁶ often fit this geologic profile. The combination of the two techniques enables increased natural gas production in these and similar locations.⁷⁷ But just as the technology undoubtedly helps to produce previously unrecoverable resources, it also creates new environmental risks. A broad, technical understanding of fracturing helps to clarify such risk and foster scientifically sound regulatory mitigation.

B. Environmental Risks of Fracturing: More Water, Chemicals, and Waste

Fracturing generates novel environmental and sustainability challenges. As compared to conventional drilling methods, fracturing uses a larger amount of water,⁷⁸ increases the risk of chemical contamination,⁷⁹ and produces additional chemical-laced water waste.⁸⁰ These challenges manifest in the local communities where fracturing occurs and contribute to citizen demands for more local control of fracturing.⁸¹

flow rate will depend on the pressure of the reservoir).

74. See, e.g., *id.*

75. U.S. GEOLOGICAL SURVEY, ASSESSMENT OF UNDISCOVERED OIL AND GAS RES. OF THE ORDOVICIAN UTICA SHALE OF THE APPALACHIAN BASIN PROVINCE, 2012 1 (2012), available at <http://pubs.usgs.gov/fs/2012/3116/FS12-3116.pdf>.

76. See Ronald Johnson, et al., *Assessment of In-Place Oil Shale Resources of the Eocene Green River Formation, Greater Green River Basin, Wyoming, Colorado, and Utah*, U.S. GEOLOGICAL SURVEY 2 (2011), http://pubs.usgs.gov/dds/dds-069/dds-069-dd/REPORTS/69_DD_CH_1.pdf.

77. Compare SUMI, *supra* note 60, with *What is Shale Gas?*, *supra* note 67, U.S.G.S., *supra* note 75, Johnson et al., *supra* note 76.

78. ENERGY INSTITUTE: THE UNIVERSITY AT TEXAS AUSTIN, FACT-BASED REGULATION FOR ENVIRONMENTAL PROTECTION IN SHALE GAS DEVELOPMENT 24 (2012), available at [http://www.velaw.com/UploadedFiles/VEsite/Resources/ei_shale_gas_reg_summary1202\[1\].pdf](http://www.velaw.com/UploadedFiles/VEsite/Resources/ei_shale_gas_reg_summary1202[1].pdf).

79. *Id.* at 25; U.S. DEP'T OF ENERGY, OFFICE OF FOSSIL ENERGY, MODERN SHALE GAS DEVELOPMENT IN THE UNITED STATES: A PRIMER 61 (2009), available at http://www.rrc.state.tx.us/does shale/Shale_Gas_Primer_2009.pdf (describing the nature and amount of chemicals used).

80. U.S. DEP'T OF ENERGY, *supra* note 79, at 66.

81. Finley, *supra* note 21 (documenting the sentiment of a Colorado Springs community activist who expressed that because the State of Colorado has failed to protect the residents of Colorado Springs, the community must assert its home-rule authority).

Fracturing requires large volumes of water. An operator can require between two and four million gallons of water to fracture a single well⁸² whereas a well drilled without fracturing typically requires only between sixty thousand and one million gallons of water.⁸³ Local sources such as surface water diversions, subsurface aquifers, and recycled fracturing waste fluid provide the necessary process-input water.⁸⁴ Accordingly, fracturing places high demands on local water resources.⁸⁵ In doing so, fracturing can restrict the water supplied to municipal systems, even in areas of abundant water resources, because a substantial volume of water is withdrawn in a relatively short amount of time.⁸⁶ Semi-arid climates, such as Colorado's climate, only exacerbate the impact.⁸⁷

In addition to water, fracturing requires hazardous chemical additives. Chemical additives reduce wellbore friction, prevent microorganism growth, reduce oxygen levels, and "remove drilling mud damage within the near-wellbore area."⁸⁸ While toxic in concentrate,⁸⁹ the cocktail of various chemicals constitutes only 0.5 to 2 percent of the injection fluid composition.⁹⁰ However, the production casing within which

82. U.S. DEP'T OF ENERGY, *supra* note 79, at 64.

83. *Id.*

84. *Id.* at 65.

85. *Id.* at 66.

86. *Id.* at 65–66 (noting that an operator typically withdraws the large quantity needed over the limited time span of the few days it takes to complete the fracturing operation).

87. LAURA BELANGER, W. RES. ADVOCATES, FRACKING OUR FUTURE: MEASURING WATER AND COMMUNITY IMPACTS FROM HYDRAULIC FRACTURING 9 (Mike Chiropolos et al. eds., 2012), *available at* http://www.westernresourceadvocates.org/frackwater/WRA_FrackingOurFuture_2012.pdf. *But see* COLO. OIL & GAS CONSERVATION COMM'N ET AL., WATER SOURCES AND DEMAND FOR THE HYDRAULIC FRACTURING OF OIL AND GAS WELLS IN COLORADO FROM 2010 THROUGH 2015 6–9 (2012), *available at* http://cogcc.state.co.us/Library/Oil_and_Gas_Water_Sources_Fact_Sheet.pdf (addressing the adequacy of water supplies for Colorado fracturing operations).

88. OFFICE OF FOSSIL ENERGY, U.S. DEP'T OF ENERGY, *supra* note 79, at 61.

89. U.S. ENVTL. PROT. AGENCY, DRINKING WATER PROT. DIV., EVALUATION OF IMPACTS TO UNDERGROUND SOURCES OF DRINKING WATER BY HYDRAULIC FRACTURING OF COALBED METHANE RESERVOIRS ch. 4, at 9–10 (2004), *available at* http://water.epa.gov/type/groundwater/uic/class2/hydraulicfracturing/wells_coalbedmethanestudy.cfm (Table 4-1 documents the "Characteristics of Undiluted Chemicals Found in Hydraulic Fracturing Fluids (Based on Material Safety Data Sheets, known as MSDSs)").

90. U.S. DEP'T OF ENERGY, *supra* note 79, at 61. The remainder of the fluid is composed of water and sand particles. *Id.* at 62. Sample chemicals include diesel,

the injection fluid flows may intersect with shallow freshwater aquifers as it travels to deep target formations.⁹¹ This creates a risk of subsurface contamination.⁹² Standard industry practice mandates substantial cement reinforcement of the shallow stages of the wellbore.⁹³ But a design or construction flaw in this reinforcement, though rare, could cause a failure that results in groundwater contamination.⁹⁴ The transportation and storage of the chemical concentrates in preparation for fracturing also creates a risk of surface contamination.⁹⁵ Once injected into the target formation, the risk of groundwater chemical contamination diminishes because the impermeable rock precludes the fracturing fluid from migrating vertically up through the subsurface to a groundwater source.⁹⁶

Finally, fracturing generates a large volume of chemical-laced water. Between 30 and 70 percent of the originally

fumaric acid, ethylene glycol, and sodium tetraborate. *E.g.*, U.S. ENVTL. PROT. AGENCY, *supra* note 89, at ch. 4, at 9–10.

91. See U.S. ENVTL. PROT. AGENCY, *supra* note 89, ch. 1, at 3 (noting that “[t]o extract coalbed methane [a type of natural gas], a production well is drilled through rock layers,” which could be co-located with ground water).

92. See *id.* ch. 1, at 1 (identifying the potential for groundwater “contamination based on two possible mechanisms”).

93. *Well Construction & Groundwater Protection*, FRACFOCUS: CHEMICAL DISCLOSURE REGISTRY, <http://fracfocus.org/hydraulic-fracturing-how-it-works/casing> (last visited Mar. 8, 2013) (referencing API standard 5CT). See generally VAN DYKE, *supra* note 14, at 17–18 (“[T]o prevent drilling mud and hydrocarbons from contaminating fresh water, which people use for drinking and irrigation, and also to keep loose sand or gravel from falling into the hole, the drilling crew runs *surface casing* inside the conductor casing.” This spans the vertical length of the ground water table.).

94. See, e.g., JOE ANDERS, SPE DISTINGUISHED LECTURE SERIES: IMPLEMENTING A WELL INTEGRITY MANAGEMENT SYSTEM (Mar. 17, 2008) (discussing failure mechanisms of surface casing).

95. N.Y. STATE DEP’T OF ENVTL. CONSERVATION, SUPPLEMENTAL GENERIC ENVIRONMENTAL IMPACT STATEMENT ON THE OIL, GAS AND SOLUTION MINING REGULATORY PROGRAM ch. 6, at 15 (Div. of Mineral Res., N.Y. State Dep’t of Env’tl. Conservation ed., 2011), *available at* <http://www.dec.ny.gov/data/dmn/rdsgeisfull0911.pdf> (“Spills or releases can occur as a result of tank rupture, piping failures, equipment or surface impoundment failures, overfills, vandalism, accidents (including vehicle collision), ground fires, drilling and production equipment defects, or improper operations.”). The larger volume of chemicals used in fracturing operations could increase the severity of surface contamination as compared to conventional drilling methods. *Id.*

96. U.S. ENVTL. PROT. AGENCY, *supra* note 89, ch. 7, at 3–4 (“If sufficiently thick and relatively unfractured shale is present, however, it may act as a barrier not only to fracture height growth, but also to fluid movement. A hydraulic fracture will propagate perpendicularly to the minimum principal stress. In some shallow formations, the least principal stress is the overburden stress; thus the hydraulic fracture will be horizontal.”).

injected fracturing fluid will return to the surface⁹⁷ through a compartment of the casing separated from the injection fluid.⁹⁸ A municipal wastewater treatment plant may not accept this fluid because it contains hazardous chemicals and dissolved compounds from the production formation.⁹⁹ Typically, this water is treated at the well site, re-injected into a disposal well, or reused in the fracturing process.¹⁰⁰ To the extent that this water is stored and treated at the well site, the potential for surface contamination may increase.¹⁰¹

Water demands, possible chemical contamination, and process waste of fracturing, among other environmental issues,¹⁰² rightly demand a critical appraisal of the process. But even where substantial risks may be involved, the economic benefits of fracturing must also be considered to develop balanced and responsible regulations.

C. Economic Benefits of Fracturing: Lower Energy Costs and Job Creation

Fracturing contributes to lower energy costs by bringing domestic oil and gas supplies to market. Absent hydraulic fracturing, United States oil and gas production would decline

97. U.S. DEP'T OF ENERGY, *supra* note 79, at 66.

98. VAN DYKE, *supra* note 14, at 30–31 (Figure 2.18 demonstrates the circulation of fluid in the different annuluses of a sample wellbore). Casing typically contains an inner concentric tube, known as the “tubing,” which extends the depth of the wellbore. *Id.* at 30. The annulus between the inner tubing and the outer casing allows fluid to be injected into the formation and circulated up to the surface inside of the same wellbore. *Id.*

99. *E.g.*, Stephen Rassenfoss, *From Flowback to Fracturing: Water Recycling Grows in the Marcellus Shale*, J. PETROLEUM TECH., July 2011, at 48, available at www.spe.org/jpt/print/archives/2011/07/12Marcellus.pdf. State environmental protection agencies continue to recognize this problem. The Pennsylvania Department of Environmental Protection ordered “15 public water treatment plants to stop handling waste water from wells” in April 2011. *Id.* In May of 2011, the EPA directed the Pennsylvania Department of Environmental Protection to make the order mandatory. *Id.*

100. U.S. DEP'T OF ENERGY, *supra* note 79, at 68.

101. N.Y. STATE DEP'T OF ENVTL. CONSERVATION, *supra* note 95, ch. 6, at 36–39 (noting “the risk that uncontained and unmitigated surface spills could reach the aquifer in a short amount of time, due to the permeable character of the soils above the aquifers”).

102. *E.g.*, *id.* ch. 6, at i–iv (listing various environmental issues associated with hydraulic fracturing including, inter alia, air quality, greenhouse gas emissions, and naturally-occurring radioactive materials).

precipitously.¹⁰³ The United States increasingly relies on unconventional oil and gas resources to meet production demands, “where over 95 percent of wells are routinely treated using fracturing.”¹⁰⁴ Because of this reliance, one study noted that if fracturing stopped as of 2009, after five years, domestic oil production would decline by 17 percent and natural gas by 45 percent.¹⁰⁵ Since a high percentage of new wells require fracturing, new wells drilled without fracturing would not supplant the production from existing wells, which naturally decline over time.¹⁰⁶ Depressed domestic oil and gas supplies ultimately impede economic growth through higher fuel and material costs.¹⁰⁷

In addition to fulfilling fuel needs, fracturing creates jobs and stimulates growth in local communities through increased tax revenue and local spending.¹⁰⁸ Fracturing requires the contribution of people with diverse skills, including engineers, drilling technicians, construction specialists, and production operators. Some positions continue after the initial fracturing process (e.g., to operate and maintain the fractured well and associated facilities, etc.) and pay salaries above the national average.¹⁰⁹ The aggregate effect of jobs added because of fracturing can positively impact a state’s employment rate.¹¹⁰

103. See IHS GLOBAL INSIGHT, MEASURING THE ECONOMIC AND ENERGY IMPACTS OF PROPOSALS TO REGULATE HYDRAULIC FRACTURING 1 (2009), available at <http://www.api.org/~media/Files/Policy/Exploration/IHS-GI-Hydraulic-Fracturing-Natl-impacts.pdf> (Figure 1, “Natural Gas Production Forecast by Scenario” illustrates various U.S. production forecasts based on the level of fracturing).

104. *Id.* at 5. “Unconventional resources” refers to a reservoir, such as a shale gas reservoir, “that cannot be produced at economic flow rates or that does not produce economic volumes of oil and gas without assistance from massive stimulation treatments.” HOLDITCH, *supra* note 51, at 117.

105. IHS GLOBAL INSIGHT, *supra* note 103, at 1.

106. See *id.* at Figure 1.

107. *E.g.*, Jeff Rubin, *How High Oil Prices Will Permanently Cap Economic Growth*, BLOOMBERG (Sept. 23, 2012), <http://www.bloomberg.com/news/2012-09-23/how-high-oil-prices-will-permanently-cap-economic-growth.html>.

108. See MOHSEN BONAKDARPOUR ET. AL., IHS GLOBAL INSIGHT, THE ECONOMIC AND EMPLOYMENT CONTRIBUTIONS OF SHALE GAS IN THE UNITED STATES v (2011), available at http://www.ihs.com/pdfs/Shale_Gas_Economic_Impact_mar2012.pdf.

109. *Id.* at 20–21.

110. *E.g.*, N.Y. STATE DEPT OF ENVTL. CONSERVATION, FACT SHEET: ECONOMIC IMPACTS OF HIGH-VOLUME HYDRAULIC FRACTURING IN NEW YORK STATE 1 (2011), available at http://www.dec.ny.gov/docs/materials_minerals_pdf/econimpact092011.pdf.

The New York State Department of Environmental Conservation recently concluded that the annual construction of 1,652 horizontal wells would result in an additional 54,000 full time jobs in the state and would generate employee earnings of almost \$2.5 billion, or \$46,000 per annum per employee, on average.¹¹¹ Employees spend some of their earnings on products and services in the local community, which may bolster—albeit sometimes only temporarily—rural and economically depressed regions.¹¹²

Notwithstanding such documented economic benefits, fracturing engenders deep political divisions because state and local actors may assess economic and environmental risks from divergent perspectives.

D. Political Impact: Ambiguity and Entrenchment Drive Division

The environmental and economic concerns of fracturing create deep political divisions. Entrenched political ideologies founded on specious claims that fracturing is either wholly beneficial or detrimental dominate the public discourse.¹¹³ An unbiased appraisal of the technical principles of fracturing fails to play a central role in either campaign.¹¹⁴ In reality, the precise political dynamics differ by region.¹¹⁵ In Colorado, local

111. *Id.* at 2.

112. Katharine Q. Seelye, *Gas Boom Aids Pennsylvania, But Some Worry Over the Risk*, N.Y. TIMES., Oct. 14, 2011, <http://www.nytimes.com/2011/10/15/us/hydraulic-fracturing-brings-money-and-problems-to-pennsylvania.html?pagewanted=all&r=0>.

113. *See, e.g.*, BELANGER, *supra* note 87 (detailing the impact of fracturing water requirements on local communities without discussing the positive externalities of fracturing); John Aguilar, *Fracturing Fury Reaches Fever Pitch in Erie*, DAILY CAMERA (Boulder, Colo.), Jan. 7, 2012, http://www.dailycamera.com/ci_19696245 (discussing a Town Hall meeting where a resident asserted that hydraulic fracturing is causing her illness because it cannot otherwise be explained). *See also* AM. PETROLEUM INST., HYDRAULIC FRACTURING: UNLOCKING AMERICA'S NATURAL GAS RESOURCES 2–4 (2010), *available at* http://www.api.org/~media/Files/Policy/Exploration/HYDRAULIC_FRACTURING_PRIMER.pdf (discussing the economic benefits of hydraulic fracturing with minimal mention of the environmental risks).

114. For example, *see* sources cited *supra* note 113.

115. *E.g.*, compare John Cox, *Oil Companies Agree to Post Fracking Data*, BAKERSFIELD CALIFORNIAN, May 15, 2012, <http://www.bakersfieldcalifornian.com/business/x243433713/Oil-companies-agree-to-post-fracking-data> (discussing oil and gas companies voluntary effort to post fracturing data in the state of California to slow the adoption of mandatory disclosures), *with* Matt

governments continue to adopt fracturing regulations, moratoriums, or complete bans through both ordinances and referendums,¹¹⁶ while the state asserts its authority to regulate oil and gas through the Colorado Oil and Gas Conservation Commission (COGCC).¹¹⁷ Ambiguous statutory and constitutional provisions only exacerbate the polarized dialogue and leave room for unbalanced regulations.¹¹⁸

Environmental groups may emphasize the potential environmental risks of hydraulic fracturing. Divisive rhetoric anchors the cause. Leading groups note that fracturing may “poison our families,”¹¹⁹ “lay[] waste to our nation’s forests . . . and shatter[] the bedrock of our nation.”¹²⁰ Such statements often find an active audience in communities where fracturing occurs, because it generates fear of harm to Coloradans’ everyday surroundings.¹²¹ The probability of such harm actually occurring becomes a distant secondary concern as local elected officials move to adopt similar positions to assuage voter concerns.¹²²

Watson, *Colorado Sets the Bar on Hydraulic Fracturing Chemical Disclosure*, ENVIRONMENTAL DEFENSE FUND (Dec. 13, 2011), <http://blogs.edf.org/energyexchange/2011/12/13/colorado-sets-the-bar-on-hydraulic-fracturing-chemical-disclosure/> (discussing the Colorado Oil and Gas Conservation Commission’s adoption of “a hydraulic fracturing fluid chemical disclosure rule”).

116. E.g., Bruce Finley, *Threat of Colorado Lawsuit Looms as Fracking Ban OK’d in Fort Collins*, DENVER POST, Mar. 5, 2012, http://www.denverpost.com/breakingnews/ci_22724633/threat-state-lawsuit-looms-fort-collins-votes-fracking (discussing the City of Fort Collins City Council’s decision to ban hydraulic fracturing, even though the State of Colorado has threatened to sue the home rule government).

117. COLO. REV. STAT. § 34-60-104 (2012) (creating the Colorado Oil and Gas Conservation Commission).

118. See Finley, *supra* note 116 (noting that Fort Collins passed the fracturing ban in part because of perceived inaction from state legislators).

119. ERIE RISING, <http://www.erierising.com> (last visited Oct. 6, 2012) (quoting Lee Allport).

120. *Our Mission*, THE MOTHERS PROJECT, <http://www.mothersfor-sustainableenergy.com/about/our-mission> (last visited Oct. 6, 2012).

121. This fear can stifle debate by intimidating opposing viewpoints in the community. See Vincent Carroll, Op-Ed., *The Anti-Fracking Goons in Boulder*, DENVER POST, Dec. 7, 2012, http://www.denverpost.com/carroll/ci_22141490/carroll-anti-fracking-goons-boulder (commenting that the verbal harassment of oil and gas employees at a Boulder County Commission may chill debate on fracturing regulations by dissuading proponents of the practice to voice their opinion).

122. E.g., Lizz Schumer, *Town of Colden Institutes a Moratorium on Hydrofracking*, METROWNY (Apr. 20, 2012), http://www.metrowny.com/news/502-Town_of_Colden_institutes_a_moratorium_on_hydrofracking.html (quoting the Town of Colden’s Emergency Manager: “I cannot find one benefit to hydraulic

Conversely, oil and gas industry groups may emphasize the benefits of fracturing while using similar rhetorical tactics. One leading trade group suggests that “hydraulic fracturing does not introduce new or unique environmental risks to exploration and production operations.”¹²³ These and other potentially misleading statements stifle honest debate. Despite this, industry-focused arguments often find an active audience at the state or national level.¹²⁴ On a macro level, the aggregate economic benefits of fracturing may be more politically salient than its potentially negative environmental effects.¹²⁵

A legal doctrine that produces a balanced regulatory scheme must temper the rhetoric of both sides. And as fracturing increases in Colorado, the need for such balance increases as well.

The technical, environmental, economic, and political factors associated with fracturing create the division-of-authority contest between the state government and home-rule cities. Fracturing allows oil and gas operators to maximize hydrocarbon extraction through a sophisticated technological process.¹²⁶ The process creates both novel environmental risks and economic opportunity.¹²⁷ Because local and statewide constituencies perceive environmental and economic impacts differently, parochial dialogue often controls the political debate.¹²⁸ The underlying technical complexity of fracturing

fracturing . . . [W]ho is going to be liable for the catastrophes that result?”).

123. *E.g.*, *The Challenges of Hydraulic Fracturing*, ENERGYFROMSHALE, <http://www.energyfromshale.org/print/5> (last visited Mar. 9, 2013).

124. This may be evidenced, in part, by the amount of money spent by the oil and gas industry lobbying national and state policy makers. *See infra* note 299. However, not all local communities oppose fracturing. Community support may be particularly strong where the economic benefits acutely impact a sufficient amount of residents. *See, e.g.*, David Spence, *Conflict over Hydraulic Fracturing: Politics vs. Policy*, UNIVERSITY OF TEXAS AT AUSTIN: ENERGY CENTER (Dec. 12, 2012), <http://www.utexas.edu/law/academics/centers/energy/2012/12/conflict-over-hydraulic-fracturing-politics-vs-policy/> (noting that “[s]ome people support shale gas production in their communities, because it brings economic benefits (royalty payments to landowners, jobs, local taxes, etc.)”).

125. *Compare* John Aguilar, *supra* note 113 (discussing the experience of a resident who experienced poor air quality in the area associated with a fracturing operation), *with* N.Y. STATE DEPT OF ENVTL. CONSERVATION, *supra* note 95 (discussing the macro economic benefits of fracturing in New York State).

126. *See supra* Part I.A.

127. *See supra* Parts I.B–C.

128. *See supra* Part I.D.

only exacerbates the tension between local and state decision-makers.¹²⁹

Local Colorado governments continue to adopt oil-and-gas and land-use regulations that may conflict with state law.¹³⁰ These local entities may prefer more stringent regulations¹³¹ whereas state actors, through the COGCC, may prefer more incremental regulatory change.¹³² Fracturing illuminates the question of who should decide oil and gas regulations—the state or the city. Though bolstered by the Colorado Constitution and the Enabling Act, preemption does not guarantee that the COGCC will always prevail against home-rule cities. Part II explains why preemption may be ineffective.

II. COLORADO HOME-RULE CITIES POSSESS THE AUTHORITY TO REGULATE THE LAND-USE IMPACTS OF HYDRAULIC FRACTURING THROUGH LOCAL REGULATION

The plenary power vested in home-rule cities in article XX of the Colorado Constitution (statutorily buttressed by the Enabling Act) establishes the authority of home-rule cities to regulate the land-use impacts of hydraulic fracturing. Yet the OGCA codified the Colorado General Assembly's desire to regulate oil and gas production at the state level.¹³³ However, preemption does not require automatic deference to a state statute;¹³⁴ a locally enacted regulation is preempted only after it is considered against a two-step preemption test that

129. See *infra* Part IV.B (discussing the need for technical understanding in developing science-based regulations).

130. E.g., Finley, *supra* note 116; Jack Healy, *With Ban on Drilling Practice, Town Lands in Thick of Dispute*, N.Y. TIMES, Nov. 25, 2012, http://www.nytimes.com/2012/11/26/us/with-ban-on-fracking-colorado-town-lands-in-thick-of-dispute.html?_r=0.

131. See e.g., Finley, *supra* note 116.

132. See *generally Amended Rules*, COLORADO OIL & GAS CONSERVATION COMM'N, <http://cogcc.state.co.us/> (last visited Mar. 9, 2012) (follow "Rule" hyperlink) (The COGCC must proceed through a ruling-making process to change policy. Because it conceivably involves a greater number of stakeholders changes occur incrementally.).

133. Colorado Oil and Gas Conservation Act, COLO. REV. STAT. ANN. §§ 34-6-101–130 (West, Westlaw through first Reg. Sess. of the Sixty-Ninth General Assembly (2013)).

134. See, e.g., *Bd. of Cnty. Comm'rs of Gunnison Cnty. v. BDS Int'l, LLC.*, 159 P.3d 773, 778 (Colo. App. 2006) (rejecting the contention that, because a local ordinance regulates in area of the same subject matter of the state, it is automatically preempted).

analyzes the subject matter of the regulation¹³⁵ and the type of conflict created between the state and local jurisdiction.¹³⁶

Under the preemption framework,¹³⁷ oil and gas regulations concern a mixed state and local interest.¹³⁸ Accordingly, a local oil and gas regulation must operationally conflict with the OGCA for a Colorado court to invalidate the local action.¹³⁹ Direct local regulation of oil and gas production often constitutes an operational conflict.¹⁴⁰ Indirect regulation of oil and gas production through land-use regulations, however, may not constitute a conflict.¹⁴¹ The broad power vested in home-rule cities, along with judicial recognition of “room” for local, nontechnical oil and gas regulations, affords land-use regulations the distinction of being deemed a local concern, which means the state may not preempt such matters.¹⁴² Because many of the environmental risks of fracturing concern land-use issues,¹⁴³ local governments may effectively regulate some aspects of fracturing through land-use regulation. However, the preemption framework may not adequately account for the incidental statewide impacts produced by a home-rule jurisdiction’s regulation of an area of local concern.

In this Part, Section A synthesizes the Colorado preemption framework and its application to oil and gas development. Section B analyzes the constitutional basis for land-use regulation with respect to home-rule authority, and examines the tensions between land-use regulation and the OGCA. Section C explains how a home-rule city can effectively use a land-use regulation to regulate the land-use impacts of oil

135. *E.g.*, *City & Cnty. of Denver v. State*, 788 P.2d 764, 767 (Colo. 1990).

136. *Bd. of Cnty. Comm’rs v. Bowen/Edwards Assocs.*, 830 P.2d 1045, 1056–57 (Colo. 1992); *Town of Frederick v. N. Am. Res. Co.*, 60 P.3d 758, 761 (Colo. App. 2002).

137. *See infra* Part II.A.

138. *See infra* notes 153, 154, 165.

139. *E.g.*, *Voss v. Lundvall Bros.*, 830 P.2d 1061, 1066 (Colo. 1992).

140. *E.g.*, *id.* at 1068.

141. *See Bd. of Cnty. Comm’rs*, 159 P.3d at 780–82 (discussing land-use controls that may not pose an operational conflict, notwithstanding the oil and gas impacts of the regulations).

142. *Voss*, 830 P.2d at 1068–69 (noting that the court does not conclude that “there is no room whatever for local land-use control over those areas . . . where drilling . . . is about to take place”).

143. *See supra* Part I.B (hydraulic fracturing water usage, potential for chemical contamination, and waste disposal inherently invoke land-use concerns).

and gas development.

A. *Two-Step Preemption Analysis as Applied to the OGCA*

Colorado courts determine the validity of a local action that potentially conflicts with state law by performing a two-step preemption analysis.¹⁴⁴ First, the court assesses whether a matter is of local, state, or mixed concern.¹⁴⁵ Second, if the matter is of mixed concern, the court must then determine whether an express, implied, or operational conflict exists between the local and state law.¹⁴⁶

Matters of purely local¹⁴⁷ or state concern remain the province of each respective jurisdiction.¹⁴⁸ Courts use totality of the circumstances,¹⁴⁹ rather than a formulaic or “litmus-like indicator,” to classify the subject policy as a matter of local, statewide, or mixed concern.¹⁵⁰ A legislative declaration that a matter relates to solely state or local concerns, while not conclusive,¹⁵¹ merits “great weight” in this determination.¹⁵² Where the equities indicate both state and local interests, the state must demonstrate *sufficient* interests to justify

144. See *Town of Telluride v. Lot Thirty-Four Venture, LLC.*, 3 P.3d 30, 37 (Colo. 2000) (discussing whether a matter concerns state, local, or mixed issues and the sufficient interest necessary for the state to preempt where the issue is of mixed concern).

145. *City & Cnty. of Denver v. State*, 788 P.2d 764, 767 (Colo. 1990) (recognizing three broad categories that define the regulatory authority between the state and home rule municipalities: “(1) matters of local concern; (2) matters of statewide concern; and (3) matters of mixed state and local concern”).

146. *Bd. of Cnty. Comm’rs v. Bowen/Edwards Assocs.*, 830 P.2d 1045, 1056–57 (Colo. 1992); *Town of Frederick v. N. Am. Res. Co.*, 60 P.3d 758, 761 (Colo. App. 2002).

147. Zoning, for example, is a matter of local concern. *City of Colo. Springs v. Securcare Self Storage, Inc.*, 10 P.3d 1244, 1247 (Colo. 2000).

148. *E.g.*, *Voss v. Lundvall Bros.*, 830 P.2d 1061, 1066 (Colo. 1992); *Lot Thirty-Four Venture, L.L.C.*, 3 P.3d at 37.

149. *Lot Thirty-Four Venture, L.L.C.*, 3 P.3d at 37.

150. *Id.* (quoting *Nat’l Adver. Co. v. Dep’t of Highways*, 751 P.2d 632, 635 (Colo. 1988)).

151. *Id.* (citing *City & Cnty. of Denver v. State*, 788 P.2d 764, 768 n.6 (Colo. 1990)).

152. *E.g.*, *Nat’l Adver. Co. v. Dep’t of Highways of Colo.*, 751 P.2d 632, 635 (Colo. 1998) (noting that the “recognized legislative authority to declare the public policy of the state” mandates deference to the state declaration of interest); *Century Elec. Service & Repair, Inc. v. Stone*, 564 P.2d 953, 954 (Colo. 1977) (holding that a “legislative determination that a matter is of state-wide interest is entitled to great weight”).

preemption in a matter of mixed concern.¹⁵³

The first step of the two-step preemption analysis presents a four-factor inquiry, which illuminates the presence of sufficient state interests. These factors include:

- (1) the need for statewide uniformity of regulation; (2) the impact of the measure on individuals living outside the municipality; (3) historical considerations concerning whether the subject matter is one traditionally governed by state or local government; and (4) whether the Colorado Constitution specifically commits the particular matter to state or local regulation.¹⁵⁴

Courts apply these four considerations on an ad hoc basis.¹⁵⁵ The extent to which each factor controls depends on the equities of each case.¹⁵⁶

State law does not automatically preempt matters of mixed concern.¹⁵⁷ In the second step of the two-step preemption analysis, an express, implied, or operational conflict between the local and state provision must exist for the state law to prevail.¹⁵⁸ A textual examination guides the determination of an express or implied conflict.¹⁵⁹ An express conflict exists when the language of the state law “indicate[s] state preemption of all local authority over the subject matter.”¹⁶⁰ An implied conflict exists where the language of the state action clearly shows a “legislative intent to completely occupy a given field by reason of a dominant state interest.”¹⁶¹ Absent such language, a fact-specific inquiry must determine whether the local and state provisions operationally conflict.¹⁶² In making

153. *Lot Thirty-Four Venture, L.L.C.*, 3 P.3d at 37. *See also Voss*, 830 P.2d at 1067.

154. *Lot Thirty-Four Venture, L.L.C.*, 3 P.3d at 37. *See also Voss*, 830 P.2d at 1067.

155. *Lot Thirty-Four Venture, L.L.C.*, 3 P.3d at 37.

156. *See Voss*, 830 P.2d at 1066–69.

157. *Bd. of Cnty. Comm’rs of Gunnison Cnty. v. BDS Int’l, LLC.*, 159 P.3d 773, 778 (Colo. App. 2006).

158. *Bd. of Cnty. Comm’rs, La Plata Cnty. v. Bowen/Edwards Assocs.*, 830 P.2d 1045, 1056–57 (Colo. 1992); *Town of Frederick v. N. Am. Res. Co.*, 60 P.3d 758, 761 (Colo. App. 2002).

159. *See Bd. of Cnty. Comm’rs, La Plata Cnty.*, 830 P.2d at 1056–57.

160. *Id.* at 1056.

161. *Id.* at 1056–57.

162. *See id.* at 1060 (refusing to decide the issue of whether an operational

such determinations, courts will try to “harmonize” the state and local actions so that both can co-exist.¹⁶³ However, if harmonization would “materially impede or destroy the state interest,”¹⁶⁴ the local action will be struck down.

The Colorado Supreme Court has found that oil and gas regulation is a matter of mixed concern because such regulation implicates sufficient state interests.¹⁶⁵ In *Voss v. Lundvall Bros., Inc.*, the home-rule city of Greeley, Colorado, enacted a ban on oil and gas production by popular referendum.¹⁶⁶ In finding the ban operationally preempted,¹⁶⁷ the *Voss* court first applied the four-part inquiry to show that sufficient state interest in oil and gas regulation existed to classify the matter as a mixed concern.¹⁶⁸ First, oil and gas regulation requires statewide uniformity because optimal resource production requires common extraction methodologies across jurisdictional boundaries.¹⁶⁹ Second, local regulation produces extraterritorial effects by limiting the production of resources that intersect multiple municipalities.¹⁷⁰ Third, the state traditionally controls oil and gas regulation.¹⁷¹ And, finally, the Colorado Constitution does not specifically commit oil and gas regulation to the state or local government.¹⁷² Under the totality of circumstances, therefore, the state

conflict existed until the lower court “develop[ed] an adequate evidentiary record on the preemption issue”).

163. *Bd. of Cnty. Comm’rs of Gunnison Cnty. v. BDS Int’l, LLC*, 159 P.3d 773, 779 (Colo. App. 2006).

164. *Bd. of Cnty. Comm’rs, La Plata Cnty.*, 830 P.2d at 1059. *See also Town of Frederick*, 60 P.3d at 761 (noting that the operational conflict must be resolved on an “ad hoc basis under a fully developed evidentiary record”); *Bd. of Cnty. Comm’rs of Gunnison Cnty.*, 159 P.3d at 779 (stating that “a county may not impose technical conditions on the drilling or pumping of wells under circumstances where no such conditions are imposed by state law or regulation”).

165. *See Voss*, 830 P.2d at 1069 (concluding the state has sufficient interest in oil and gas development to justify preemption); *see also supra* note 154.

166. *Voss*, 830 P.2d at 1062–63.

167. *See id.* at 1062.

168. *Id.* at 1066–68.

169. *Id.* at 1067 (discussing the irregularity of underground resource pools and how a patch work of local regulation might preclude extraction at the optimal location).

170. *Id.* at 1067–68 (i.e., this would prevent an adjacent landowner from drilling because, as a practical matter, it would drain resources from under Greeley).

171. *Id.* at 1068 (noting the 1915 creation by the General Assembly of the “office of the State Oil Inspector,” among other historical developments).

172. *Id.* at 1068.

demonstrated a “sufficiently dominant” interest in oil and gas regulation.¹⁷³

While the OGCA regulates an area of mixed concern,¹⁷⁴ the Colorado Supreme Court has found the statute to not expressly preempt local oil and gas regulation.¹⁷⁵ In *Board of County Commissioners, La Plata County v. Bowen/Edwards Associates, Inc.*, a county government enacted a county-level environmental review and permit-approval requirement for the construction of oil and gas facilities within the county.¹⁷⁶ The *Bowen/Edwards* court noted the absence of an express conflict with the OGCA, and remanded the case to the district court to develop a factual record to determine if there was an operational conflict.¹⁷⁷ According to the court, the OGCA contains no “clear and unequivocal statement of legislative intent” to expressly preempt a local municipality’s land-use authority.¹⁷⁸ The state’s interest “center[s] primarily on the efficient production and utilization of the natural resources,” whereas “land-use control” dominates the local interest.¹⁷⁹ Any attempt by the state to expressly assert authority over a distinct interest must appear in the language of the statute, and the statute does not “directly address the question of local land-use authority over oil and gas development.”¹⁸⁰

Similarly, the *Bowen/Edwards* court held that the OGCA does not impliedly preempt local oil and gas regulations, including the “land-use control over those activities.”¹⁸¹ The *Bowens/Edwards* court found that the “purpose and scope of the legislative scheme,” rather than the mere topic of the legislative enactment, determined a finding of implied

173. *Id.* at 1068 (the OGCA likely buttressed this holding, even if not directly enumerated in the factors). Notwithstanding the sufficiently dominant interests, the *Voss* court did not find oil and gas development to be an area of exclusive state concern. *Id.* at 1069 (noting that “[w]e thus do not conclude, as did the court of appeals, that there is no room whatever for local land-use control over those areas of a home-rule city where drilling for oil, gas, or hydrocarbon wells in about to take place”).

174. *Voss*, 830 P.2d at 1069.

175. *Bd. of Cnty. Comm’rs, La Plata Cnty. v. Bowen/Edwards Assocs.*, 830 P.2d 1045, 1057–59 (Colo. 1992).

176. *Id.* at 1050–51.

177. *Id.* at 1057–58.

178. *Id.* at 1057. *See also Voss*, 830 P.2d at 1066.

179. *Bd. of Cnty. Comm’rs, La Plata Cnty.*, 830 P.2d at 1057.

180. *Id.*

181. *Id.* at 1058. *See also Voss*, 830 P.2d at 1066.

preemption.¹⁸² The authorization under the OGCA for the “Oil and Gas Conservation Commission to promulgate rules and regulations to protect the health, safety, and welfare of the general public in the drilling, completion, and operation of oil and gas wells” fails to establish implied preemption over land-use regulations.¹⁸³ Consequently, a local oil and gas regulation must operationally conflict with the OGCA for a state regulation to prevail.¹⁸⁴

Municipality-enacted oil and gas regulations operationally conflict with the OGCA where an operator cannot simultaneously comply with both laws.¹⁸⁵ The *Voss* court found that a total ban on drilling operationally conflicted with the OGCA¹⁸⁶ because such a ban would “substantially impede . . . the interest of the state” in efficiently developing oil and gas resources.¹⁸⁷ In *Town of Frederick v. North American Resources Co.*, a city enacted a setback, noise, and visual impact ordinance that the court found operationally conflicted with state oil and gas law.¹⁸⁸ According to the court, because the *Frederick* regulations imposed conditions not found under state law, the local provisions could not stand.¹⁸⁹ In *Board of County Commissioners of Gunnison County v. BDS International, LLC.*, county-enacted regulations for oil and gas operators, which included financial guarantees and record-keeping requirements, created an operational conflict with state law because the local requirements could not be harmonized with

182. *Bd. of Cnty. Comm'rs, La Plata Cnty.*, 830 P.2d at 1058 (quoting *City of Golden v. Ford*, 348 P.2d 951, 954 (Colo. 1960)).

183. *Id.* at 1058–59.

184. *Compare Voss*, 830 P.2d at 1069 (establishing oil and gas regulation as an area of mixed concern), *with Bd. of Cnty. Comm'rs, La Plata Cnty.*, 830 P.2d at 1057–59 (establishing that the OGCA neither expressly nor impliedly preempts local government action).

185. *See Bd. of Cnty. Comm'rs of Gunnison Cnty. v. BDS Int'l, LLC*, 159 P.3d 773, 780–82 (Colo. App. 2006) (requiring an evidentiary hearing on local regulations where “it is not clear that every possible formation of these environmental regulations would operationally conflict with the state regulatory scheme”).

186. *Voss*, 830 P.2d at 1062.

187. *Id.* at 1068.

188. *Town of Frederick v. N. Am. Res. Co.*, 60 P.3d 758, 765–66 (Colo. App. 2002).

189. *Id.* at 765 (“[T]he ordinance provision imposing setback requirements for the location of wells within the Town limits, § 16-118, conflicted with COGCC Rule 603(a) and (b), 2 Code Colo. Regs. 404-1, which requires lesser setbacks in non-high-density areas.”).

state requirements.¹⁹⁰ The court held that the COGCC specified precise financial guarantee and record-keeping requirements that a local government could not alter.¹⁹¹

Local government regulations of oil and gas must therefore pass a high threshold to maintain validity through the operational-conflict test.¹⁹² The sufficiently dominant interest of the state to regulate oil and gas establishes the basis by which a court finds an operational conflict.¹⁹³ If the analysis begins with a local government's interest in land-use regulations, however, this foundation crumbles.¹⁹⁴ And if that local government is a home-rule city, such land-use regulations may enjoy wide latitude to affect oil and gas production.¹⁹⁵

B. Home-Rule Authority: Broad Legislative Power Equals Expansive Legislative Impact From the Local Level

The Colorado Constitution grants home-rule cities plenary power to “regulate issues of local concern.”¹⁹⁶ Article XX, section 6 of the Constitution vests a home-rule city with the “power to make, amend, add to or replace the charter of said city or town, which shall be its organic law and extend to all its local and municipal matters.”¹⁹⁷ Further, “[s]uch charter and the ordinances made pursuant thereto in such matters shall supersede within the territorial limits and other jurisdiction of

190. *Bd. of Cnty. Comm'rs of Gunnison Cnty.*, 159 P.3d at 777–79.

191. *Id.* at 779.

192. *See supra* notes 185–191 (even though a court will construe a local provision to coexist with state law, this construction proves challenging as a practical matter because of expansive state authority in oil and gas regulation).

193. *Voss v. Lundvall Bros.*, 830 P.2d 1061, 1068 (Colo. 1992).

194. *City of Colo. Springs v. Securecare Self Storage*, 10 P.3d 1244, 1247 (Colo. 2000) (recognizing zoning as a purely local matter that the State could not preempt).

195. *E.g.*, *Town of Telluride v. Lot Thirty-Four Venture, LLC.*, 3 P.3d 30, 37 (Colo. 2000) (noting that “[h]ome rule cities are granted plenary authority by the constitution to regulate issues of local concern. If a home rule city takes action on a matter of local concern, and that ordinance conflicts with a state statute, the home rule provision takes precedence over the state statute.” (internal citations omitted)).

196. *Id.* *See also* *City & Cnty. of Denver v. Qwest Corp.*, 18 P.3d 748, 755 (Colo. 2001) (noting the intent of article XX to grant “home rule municipalities *every power* theretofore possessed by the legislature,” in areas of local concern) (quoting *Four-County Metro. Capital Improvement Dist. v. Bd. of Cnty. Comm'rs*, 369 P.2d 67, 72 (Colo. 1962) (emphasis in original)).

197. Colo. Const. art. XX, § 6.

said city or town any law of the state in conflict therewith.”¹⁹⁸

The Colorado Supreme Court interprets article XX broadly.¹⁹⁹ Because constitutional provisions represent guiding principles “framed by the people themselves,” article XX cannot be applied in the same narrow or technical manner as a statute.²⁰⁰ Under article XX, a home-rule city possesses every power of the state legislature within the city’s jurisdictional boundaries.²⁰¹ Thus, home-rule autonomy buttresses the initial principle of state-level preemption by identifying the legal basis for leaving matters of local concern to local governments.

The Colorado Supreme Court has found zoning to be a “local and municipal matter” under the Colorado Constitution.²⁰² Article XX includes zoning power because land-use regulation affects matters literally contained within a home-rule city’s jurisdictional boundaries. Zoning regulations promulgate land-use requirements for specifically demarcated areas of land.²⁰³ Such regulations may range from general land-use pronouncements, such as residential, commercial or industrial, to more specific requirements, such as building size, visual impact, or noise constraints.²⁰⁴ For example, in *Securecare Self Storage*, the Colorado Supreme Court held that the City of Colorado Springs possessed the authority to deny the development of a 4.4-acre self-storage facility and convenience center because the plan was “‘incompatible’ with the surrounding residential neighborhood.”²⁰⁵

198. *Id.*

199. *See* *City of Ft. Collins v. Pub. Utils. Comm’n*, 195 P. 1099, 1099 (Colo. 1921) (interpreting article XX by “the will of the people that the power of a municipal corporation should be as broad as possible”).

200. *City and Cnty. of Denver v. Mountain States Tel. & Tel. Co.*, 184 P. 604, 606 (Colo. 1919), *overruled in part on other grounds* by *People ex rel. Pub. Utils. Comm’n v. Mountain States Tel. & Tel. Co.*, 243 P.2d 397 (Colo. 1952).

201. *See id.* (noting that article XX granted Denver “every power possessed by the Legislature”).

202. *E.g.*, *JAM Rest., Inc. v. City of Longmont*, 140 P.3d 192, 195 (Colo. App. 2006) (classifying zoning as a “local and municipal matter” in the context of a home-rule city zoning ordinance); *Voss*, 830 P.2d at 1064; *City of Colorado Springs*, 10 P.3d at 1247.

203. *Zoning*, BLACK’S LAW DICTIONARY (9th ed. 2009).

204. *E.g.*, DENVER ZONING CODE, SUMMARY OF ZONE DISTRICTS 2–6, available at <http://www.denvergov.org/Portals/646/documents/Zoning/Summary%20of%20Zone%20Districts.pdf>; CITY OF BOULDER, LAND USE REGULATION 9-1 (2013), available at <http://www.colocode.com/boulder2/title9.htm>.

205. *City of Colo. Springs v. Securecare Self Storage*, 10 P.3d 1244, 1245–46 (Colo. 2000).

The General Assembly codified land-use regulations as a matter of local concern in the Enabling Act.²⁰⁶ The Enabling Act embodies the state policy of granting “broad authority to local governments to plan for and regulate the use of land within their respective jurisdictions.”²⁰⁷ Section 104 of the Enabling Act, for example, enumerates the powers of local governments to regulate land use, including the power to regulate “the use of land on the basis of the impact thereof on the community or surrounding areas,”²⁰⁸ and the “location of activities . . . which may result in significant changes in population density.”²⁰⁹

Taken together, the Enabling Act and article XX further demonstrate that zoning does not implicate sufficient state interests and remains the domain of local governments.²¹⁰ However, zoning regulations do not exist in a vacuum. Even a bona fide attempt to regulate the use of land may impede state substantive policies by tangentially implicating sufficient state interests, such as those in oil and gas policy.²¹¹ While direct regulation of oil and gas production, including the regulation of the technical aspects of drilling, often fails the preemption test, Colorado courts have struggled to articulate a standard to determine when an otherwise permissible zoning regulation becomes an impermissible regulation of oil and gas production.²¹²

Even in striking down a local government regulation of oil

206. See COLO. REV. STAT. § 29-20-102 (2013).

207. *Id.* § 29-20-102(1).

208. *Id.* § 29-20-104(1)(g).

209. *Id.* § 29-20-104(1)(e).

210. See also *supra* notes 194, 195.

211. See, e.g., *Bd. of Cnty. Comm’rs of Gunnison Cnty. v. BDS Int’l, LLC*, 159 P.3d 773, 781 (Colo. App. 2006) (even if the county’s Wildlife and Vegetation regulation does not operationally conflict with the State scheme, the county regulation could practically force an operator to alter its extraction technique).

212. Compare *Voss v. Lundvall Bros.*, 830 P.2d 1061, 1068 (Colo. 1992) (stating that “[i]n so holding, we do not mean to imply the Greeley is prohibited from exercising any land-use authority over those areas of the city in which oil and gas activities are occurring or are contemplated” (emphasis added)), with *Town of Frederick v. N. Am. Res. Co.*, 60 P.3d 758, 763 (Colo. App. 2002) (noting that “technical aspects” of drilling, which require statewide uniformity under *Bd. of Cnty. Comm’rs, La Plata Cnty. v. Bowen/Edwards Assocs.*, 830 P.2d 1045 (Colo. 1992) “suggests that there are ‘nontechnical aspects’ that may yet be subject to local regulation”). While this implies that a zoning regulation is valid so long as it does not impose a technical regulation on oil and gas production, a broad reading of the word “technical” could then operate to invalidate most zoning regulations. See also *infra* Part III.A (proposing a definition of a “technical” regulation).

and gas production, the Colorado Supreme Court in *Voss* qualified its decision by recognizing “room” for local regulation.²¹³ While the boundaries of such “room” remain vague, it is clear that the nontechnical aspects of oil and gas production “may yet be subject to local regulation.”²¹⁴ In ruling that the OGCA operationally preempted the home-rule City of Greeley’s total ban on drilling, the *Voss* court noted that its decision could not be read to “imply that Greeley is prohibited from exercising *any* land-use authority over those areas of the city in which oil and gas activities are occurring or are contemplated.”²¹⁵ The court rejected the view that “there is *no room* whatever for local land-use control over” the land on which the drilling occurs.²¹⁶ The *Town of Frederick* court also alluded to room for local regulation.²¹⁷ In discussing the need for uniform technical regulations, the court noted that “‘technical aspects’ suggests that there are ‘nontechnical aspects’ that may yet be subject to local regulation.”²¹⁸ The court declined, however, to define the precise contours of a nontechnical regulation.²¹⁹

The lack of judicial clarity may be explained by the inherent tension between competing constitutional and statutory provisions. The General Assembly, through enactment of the OGCA, declared the “development, production, and utilization of . . . natural resources” to be in the public interest.²²⁰ But the OGCA is statutory, not constitutional.²²¹ The General Assembly cannot proscribe a right or power contained within the Colorado Constitution.²²² Therefore, to the extent that a nontechnical oil and gas regulation constitutes a land-use or zoning regulation, the OGCA may not have sufficient authority to counteract the regulation, irrespective of conflict preemption.²²³ An analogous

213. *Voss*, 830 P.2d at 1068–69.

214. *Town of Frederick*, 60 P.3d at 763.

215. *Voss*, 830 P.2d at 1068 (emphasis added).

216. *Id.* at 1069 (emphasis added).

217. *Town of Frederick*, 60 P.3d at 763.

218. *Id.*

219. *See id.*

220. COLO. REV. STAT. § 34-60-102 (2013).

221. *Compare* Colorado Oil and Gas Conservation Act, Colo. Rev. Stat. Ann. §§ 34-60-101–129 (West), *with* COLO. CONST. art. XX, § 6.

222. *Town of Telluride v. San Miguel Valley Corp.*, 185 P.3d 161, 171 (Colo. 2008).

223. The Colorado Constitution supports the authority of a home-rule city to

dynamic occurred in *Town of Telluride v. San Miguel Valley Corp.*, where the Colorado Supreme Court found that because article XX contains the authority for home-rule “extraterritorial condemnation of property for open space,” the General Assembly’s passage of a statute that restricted this authority was unconstitutional.²²⁴ The court refused to consider the state interest implicated in extraterritorial condemnation because “[t]he legislature cannot prohibit the exercise of constitutional home rule powers, regardless of the state interests which may be implicated by the exercise of those powers.”²²⁵ While some commentators suggest that the court limited the *Town of Telluride* holding to extraterritorial condemnation,²²⁶ others noted that the decision still represented a “far-reaching decision[] in favor of . . . local power.”²²⁷ The long tradition of finding zoning within the scope of article XX²²⁸ could provide the foundation to uphold a local government’s land-use regulation of oil and gas development, regardless of the state’s interest in the matter.²²⁹

Ultimately, whether the subject policy addresses local or mixed concerns may depend on the starting point of the analysis.²³⁰ A bona fide local government zoning regulation remains a local concern because the regulation does not invoke sufficient state interest.²³¹ In contrast, a bona fide local oil and gas regulation creates a mixed concern because the regulation

enact a zoning ordinance. *E.g.*, *JAM Rest., Inc. v. City of Longmont*, 140 P.3d 192, 195 (Colo. App. 2006).

224. *Town of Telluride*, 185 P.3d at 169.

225. *Id.* at 170.

226. Laurie Reynolds, *Home Rule, Extraterritorial Impact, and the Region*, 86 DENV. U. L. REV. 1271 (2009).

227. Richard B. Collins, *Telluride’s Tale of Eminent Domain, Home Rule, and Retroactivity*, 86 DENV. U. L. REV. 1433, 1450 (2009).

228. *City of Colo. Springs v. Securecare Self Storage*, 10 P.3d 1244, 1247 (Colo. 2000).

229. *Compare Town of Telluride*, 185 P.3d at 170 (noting that a statute may not proscribe a constitutional grant of authority, notwithstanding the state’s interest), *with JAM Rest., Inc. v. City of Longmont*, 140 P.3d 192, 195 (Colo. App. 2006) (classifying zoning as a “local and municipal matter” in the context of a home-rule city zoning ordinance).

230. *Compare City of Colorado Springs*, 10 P.3d at 1247 (analyzing the authority of a home-rule city to enact zoning policies), *with Voss v. Lundvall Bros.*, 830 P.2d 1061, 1066 (Colo. 1992) (analyzing the authority of a home-rule city to enact oil and gas regulations). *See also supra* notes 145–150 (discussing the general preemption analysis).

231. *See City of Colorado Springs*, 10 P.3d at 1247.

invokes sufficient state interests.²³² The broad scope of a permissible zoning regulation, however, may have the practical effect of regulating some aspects of oil and gas production.²³³

C. *Land-Use Regulations Regulate Fracturing*

Home-rule cities may argue that a land-use ordinance regulates only the land-use impacts of hydraulic fracturing.²³⁴ To be sure, the validity of each regulation depends on an ad hoc preemption analysis.²³⁵ However, the more a hypothetical regulation remedies a land-use issue, the more likely the validity of that regulation may be upheld.²³⁶ For example, a home-rule city may use land-use regulations to ban oil and gas production in specific zoning districts within the city.²³⁷ But, as a district-specific ban grows in scope, courts may invalidate it because it regulates more than the land-use impacts of the oil and gas production.²³⁸

Municipal land-use regulations may include, for example, provisions on water access and quality, soil erosion, wildlife and vegetation, livestock, wildfire protection, and permit duration.²³⁹ A land-use regulation regarding such concerns invariably affects the scope of activities permitted on the regulated land, either directly or indirectly.²⁴⁰ A local government precluded from regulating a disfavored activity directly may achieve similar results through land-use regulation that affects the activity. For example, a local municipality could hypothetically pass an ordinance limiting the amount of process-input water allowed for oil and gas

232. *Voss*, 830 P.2d at 1069.

233. *Bd. of Cnty. Comm'rs of Gunnison Cnty. v. BDS Int'l, LLC*, 159 P.3d 773, 781 (Colo. App. 2006).

234. *Cf. Voss*, 830 P.2d at 1068 (The court does not bar all land-use regulation over “areas of the city in which oil and gas activities are occurring or are contemplated.”).

235. *Town of Telluride v. Lot Thirty-Four Venture, LLC.*, 3 P.3d 30, 37 (Colo. 2000).

236. *E.g., Voss*, 830 P.2d at 1069.

237. *E.g., DENVER, CO, ZONING CODE §§ 9.5–12* (2010), available at https://www.denvergov.org/Portals/646/documents/Zoning/DZC_103112.pdf (discussing zone-specific requirements for oil and gas development within Denver).

238. *See Voss*, 830 P.2d at 1068 (invalidating a general ban on oil and gas production).

239. *Bd. of Cnty. Comm'rs of Gunnison Cnty. v. BDS Int'l, LLC*, 159 P.3d 773, 780 (Colo. App. 2006).

240. *See id.*

drilling to a level beneath that required for fracturing. However, such an ordinance would trigger the sufficient state interest in oil and gas production²⁴¹ and likely produce an operational conflict with state law. Alternatively, the same municipality could hypothetically pass an ordinance that set water extraction limits on local streams and wells in order to preserve the natural habitat of the local fish population. This ordinance would not stop fracturing per se, but it would impact the fracturing process by removing some local sources of process-input water.²⁴² Home-rule cities possess the authority to promulgate the latter ordinance because it regulates land use—a matter of concern within the province of the local government.

Land-use regulations include the ability to ban disfavored uses from specified zoning districts within the city.²⁴³ Indeed, zoning excludes by definition.²⁴⁴ For example, a residential zone implicitly excludes commercial and industrial usage. But in practice, such exclusion occurs on a more nuanced level.²⁴⁵ Oil and gas production may be appropriate in some zones, while not in others.²⁴⁶ A complete drilling ban in certain pre-specified zones would comport with the ruling in *Voss* because it functions as a specific “land-use control,” as opposed to a “*total exclusion* of all drilling operations” within the city limits.²⁴⁷ However, a city’s broad zoning power “does not generally include the right to ban disfavored uses from *all* zoning districts.”²⁴⁸

The line between a land-use control exclusion in a particular zone and a total exclusion of a disfavored activity may be particularly problematic for fracturing and directional drilling. Presumably, the “use” of land concerns both its surface

241. See *Voss*, 830 P.2d at 1068–69.

242. This hypothetical ordinance would not stop fracturing per se because an operator could presumably withdraw the water required for the fracturing operation from a source outside the jurisdiction of the municipality.

243. *E.g.*, BOULDER, CO CODE ch. 9-6, §§ 3–11 (2013), *available at* <http://colocode.com/boulder2/title9.htm> (Table 6-1 specifies appropriates uses for each respective zoning district in the City of Boulder).

244. See BLACK’S LAW DICTIONARY, *supra* note 203.

245. DENVER ZONING CODE, SUMMARY OF ZONE DISTRICTS 2–6.

246. See, *e.g.*, DENVER, CO, ZONING CODE, art. 3. div. 3.4, § 8 (noting that oil and gas is an inappropriate land use in suburban neighborhoods).

247. *Voss v. Lundvall Bros.*, 830 P.2d 1061, 1069 (Colo. 1992).

248. *Colo. Mining Ass’n v. Bd. of Cnty. Comm’rs*, 199 P.3d 718, 731 (Colo. 2009).

and subsurface uses.²⁴⁹ Because directional drilling allows a wellbore to extend thousands of subterranean feet from the surface drilling location, the wellbore may exist underneath many disparately zoned surface locations.²⁵⁰ While some of these surface locations may be highly inappropriate for drilling a well, it may be appropriate for a wellbore to pass thousands of feet below an otherwise inappropriate zone. Zoning regulations that precluded oil and gas drilling in such inappropriate zones may no longer be reasonable if construed to also preclude the subterranean horizontal well. Adapting regulation to technological change is paramount. More surface drilling bans may be reasonable if directionally drilled wells can pass through subterranean zones unencumbered because directional drilling reduces the surface footprint required to produce a given quantity of natural resources.

Home-rule municipalities must exercise due care in crafting properly focused land-use regulations that do not operationally conflict with Colorado oil and gas law. The ad hoc nature of preemption analysis guarantees no sure outcome. However, the construction of the Enabling Act and preemption case law indicate that home-rule cities possess the power to affect state substantive policies through land-use regulations. Part III, discusses how the effect of land-use regulation may be cabined to the extent that it practically impedes an area of mixed statewide and local concern.

III. LAND-USE REGULATIONS THAT IMPOSE DE FACTO TECHNICAL REGULATIONS SHOULD FAIL THE OPERATIONAL CONFLICT TEST

The validity of local government land-use regulations should not encompass de facto technical regulations of oil and gas production. A de facto technical regulation alters or augments the necessary requirements to develop an oil or gas well through means other than direct regulation, such as land-use regulation.²⁵¹ A land-use regulation that creates a de facto

249. *See, e.g.*, DENVER, CO, ZONING COD, art. 3. div. 3.4, § 8 (prohibiting the extraction systems impacts subsurface property right).

250. *See supra* Part I.A.

251. *Cf. De Facto*, BLACK'S LAW DICTIONARY 479 (9th ed. 2009) (defining that term as “[a]ctual; existing in fact; having effect even though not formally or legally recognized”).

technical regulation should be invalidated under the operational conflict test because it “materially impede[s] or destroy[s] the state interest”²⁵² by fostering non-optimal oil and gas extraction techniques that may negatively impact the “health, safety, and welfare”²⁵³ of the public.

Home-rule cities’ land-use power is broad and longstanding, but not absolute.²⁵⁴ The pragmatic effect of a regulation should govern. Where the operation of the zoning regulation materially impedes a state interest, the analysis cannot cease by merely declaring zoning within the province of local government. If a de jure regulation creates an operational conflict, so, too, should a de facto regulation, even when accomplished through land-use regulation. But, a local government ban on oil and gas production in certain pre-specified zones would not necessarily fail this test. While a narrowly tailored ban on fracturing inherently imposes different requirements on oil and gas production, the OGCA and the Enabling Act may be construed together to uphold such a ban, to the extent that it comports with the character and history of a particular zoning region.

Section A of this Part forwards a rationale for how land-use regulation may create de facto technical regulations. Section B analyzes why such de facto technical regulation should fail the operational conflicts test of preemption.

A. Land-Use Regulations May Create De Facto Technical Regulations

Because a land-use regulation invariably affects the activities permitted on the regulated land, such regulation may

252. Bd. of Cnty. Comm’rs, La Plata Cnty. v. Bowen/Edwards Assocs., 830 P.2d 1045, 1059 (Colo. 1992). *See also* Town of Frederick v. N. Am. Res. Co., 60 P.3d 758, 761 (Colo. App. 2002) (noting that the operational conflict must be resolved on an “ad hoc basis under a fully developed evidentiary record”); Bd. of Cnty. Comm’rs of Gunnison Cnty. v. BDS Int’l, LLC, 159 P.3d 773, 779 (Colo. App. 2006) (stating that “a county may not impose technical conditions on the drilling or pumping of wells under circumstances where no such conditions are imposed by state law or regulation”).

253. COLO. REV. STAT. § 34-60-102(1)(a)(I) (2012).

254. *See* City & Cnty. of Denver v. Quest Corp., 18 P.3d 748, 755 (Colo. 2001) (noting that even if a regulation is a valid exercise of home-rule police powers, it “in no way establishes that its substance is purely a matter of local concern and in no way alters its powers vis-à-vis statute statutes in matters of mixed or statewide concern”).

produce the practical effect of regulating the activity itself.²⁵⁵ To the extent that this practical effect forces an operator to execute a materially different oil and gas production technique, it creates a de facto technical regulation. Public policy demands uniform technical regulations of oil and gas production in order to uphold public health and safety.²⁵⁶ A patchwork of de facto oil and gas regulations creates inconsistency, which ultimately increases the risk of the operation,²⁵⁷ in contravention of the goal of the OGCA.²⁵⁸

The State of Colorado holds a sufficient interest in ensuring the uniformity of technical requirements of oil and gas extraction.²⁵⁹ The legislative declaration of the OGCA requires “uniform regulation of the technical aspects of drilling, pumping, plugging, waste prevention, safety precautions, and environmental restoration.”²⁶⁰ The development and maintenance of uniform technical safeguards help “minimize the risk of injury to the public.”²⁶¹ Accordingly, local ordinances that directly impose technical requirements different from

255. See, e.g., *Bd. of Cnty. Comm’rs of Gunnison Cnty.*, 159 P.3d at 780 (noting the impact of local land use regulations on oil and gas production).

256. E.g., *Bd. of Cnty. Comm’rs, La Plata Cnty.*, 830 P.2d at 1058.

257. See, e.g., *American Petroleum Institute Standards*, Am. Petroleum Inst. 2 (2004), <http://www.api.org/publications-standards-and-statistics/~media/Files/Publications/FAQ/valueofstandards.pdf> (noting that uniform “[s]tandards enhance the safety of industry operations, assure quality, help keep costs down, reduce waste, and minimize confusion” by ensuring operations meet industry best-practices).

258. Cf. *Colo. Min. Ass’n v. Bd. of Cnty. Comm’rs*, 199 P.3d 718, 731 (Colo. 2009) (noting that a “patchwork of county-level bans on certain mining extraction methods” would limit the legislative intent to develop “Colorado’s mineral resources”). The same principle should apply to oil and gas development – a patchwork of local government bans may impede the state purpose.

259. *Bd. of Cnty. Comm’rs, La Plata Cnty.*, 830 P.2d at 1058. Uniformity is also important because of the extraterritorial impacts of oil and gas production. *Voss v. Lundvall Bros.*, 830 P.2d 1061, 1067 (Colo. 1992) (noting that “[o]il and gas are found in subterranean pools, the boundaries of which do not conform to any jurisdictional pattern”).

260. *Bd. of Cnty. Comm’rs, La Plata Cnty.*, 830 P.2d at 1058. See also *Town of Frederick v. N. Am. Res. Co.*, 60 P.3d 758, 763 (Colo. App. 2002); *Bd. of Cnty. Comm’rs of Gunnison Cnty. v. BDS Int’l, LLC*, 159 P.3d 773, 779 (Colo. App. 2006) (noting that “a county may not impose technical conditions on the drilling or pumping of wells under circumstances where no such conditions are imposed by state law or regulation”); *Voss*, 830 P.2d at 1068 (quoting *Bd. of Cnty. Comm’rs, La Plata Cnty.*, 830 P.2d at 1058).

261. *Bd. of Cnty. Comm’rs, La Plata Cnty.*, 830 P.2d at 1059. See also *Transcript of Preliminary Discussion of S. Comm. on Agric., Natural Res. and Energy*, January 10, 1985, pp. 14, 21 (as discussed in *Bd. of Cnty. Comm’rs, La Plata Cnty.*, 830 P.2d at 1059).

those promulgated by the COGCC likely will fail the operational preemption test.²⁶²

The boundaries of a “technical requirement” remain elusive. Instead of directly defining the term, the Colorado Supreme Court merely acknowledges the existence of the “technical aspects” within various stages of the oil and gas production process.²⁶³ Under the OGCA, the COGCC may establish expansive regulatory requirements, which could be viewed as technical requirements.²⁶⁴ However, the court in *Town of Frederick* made clear that the existence of a technical requirement does not depend on a statewide regulatory pronouncement: “the local imposition of *technical conditions* on well drilling where *no such conditions* are imposed under state regulations . . . gives rise to [an] operational conflict[]”²⁶⁵ At its most generic level then, a technical requirement might be viewed as the imposition of a technique or manner in which something is to be accomplished.²⁶⁶ Given the totality of definitional support,²⁶⁷ a technical regulation is one that requires an operator to follow a series of steps or complete certain requirements to develop an oil and gas well that, absent the regulation, the operator may not have completed.

While this definition of technical regulations may seem broad, Colorado courts endorse a substantially similar

262. *Town of Frederick*, 60 P.3d at 765–66; *Bd. of Cnty. Comm’rs of Gunnison Cnty.*, 159 P.3d at 777–79.

263. *Bd. of Cnty. Comm’rs, La Plata Cnty.*, 830 P.2d at 1058 (noting that “equitable development and production of oil and gas resources within the state requires uniform regulation of the *technical aspects* of drilling, pumping, plugging, waste prevention, safety precautions, and environmental restoration”) (emphasis added).

264. *See* 2 COLO. CODE REGS. § 404-1 (LexisNexis 2013) (specifying requirements for preplanning safety, financial guarantees, abandonment, and remediation procedures, among other requirements).

265. *Town of Frederick*, 60 P.3d at 765 (emphasis added). *See also Bd. of Cnty. Comm’rs, La Plata Cnty.*, 830 P.2d at 1059–60.

266. *Technical Definition*, DICTIONARY.COM, <http://dictionary.reference.com/browse/technical?s=t> (last visited Mar. 9, 2013) (“of, pertaining to, or showing technique”); *Technique Definition*, DICTIONARY.COM, <http://dictionary.reference.com/browse/technique> (last visited Mar. 9, 2013) (“the manner and ability with which an artist, writer, dancer, athlete, or the like employs the technical skills of a particular art or field of endeavor”). To illustrate, a hypothetical ordinance that restricted the operation of drilling equipment to certain times of day would constitute a technical requirement. In order to drill the well under such a restriction, the operator would necessarily need to modify the manner in which it drilled the well.

267. *Supra* notes 263–266 and accompanying text.

definition with regard to municipal de jure technical regulations—that is, local regulations that on their face attempt to impose different standards than those imposed under the State of Colorado statutory scheme. In *Town of Frederick*, for example, a city enacted noise and setback regulations²⁶⁸ even though the OGCA already established noise and setback allowances.²⁶⁹ This de jure technical regulation failed the operational conflict test because it specifically imposed conditions not found in state law.²⁷⁰

Land-use regulations may also impose conditions on oil and gas production not found in state law.²⁷¹ To the extent that a home-rule enacted land-use regulation mandates a different program for oil and gas extraction than is found in state law, it would create a de facto technical regulation of oil and gas production. A local land-use ordinance that limits water extraction,²⁷² for example, would force an operator to obtain fracturing water from more distant sources. This ordinance, while not preventing fracturing, may adversely impact the public welfare of the state. One consequence, for example, would be an increase in the volume of heavy-duty trucks transporting hazardous materials on state highways.²⁷³ Even if state law does not explicitly address traffic volume, the local ordinance may force oil and gas production to proceed in a manner contrary to the OGCA by increasing the risk to the general public.

A land-use regulation might also impose more direct technical conditions by limiting certain “nuisances” in a particular zone within a city. An ordinance that limited noise to a maximum decibel within a particular zone might preclude certain drilling operations that cannot operate below that limit. As opposed to the invalid noise ordinance in the *Town of Frederick*,²⁷⁴ this hypothetical ordinance limits noise generally. While the impact of both ordinances may indeed be the same, the hypothetical ordinance creates a de facto technical regulation, whereas the *Town of Frederick* regulation was de

268. *Town of Frederick*, 60 P.3d at 765–66.

269. *Id.* at 764–65.

270. *Id.* at 765.

271. *E.g.*, Bd. of Cnty. Comm’rs of Gunnison Cnty. v. BDS Int’l, LLC, 159 P.3d 773, 779–80 (Colo. App. 2006).

272. *See supra* Part II.B.

273. *Id.*

274. *Town of Frederick v. N. Am. Res. Co.*, 60 P.3d 758, 765 (Colo. App. 2002).

jure.²⁷⁵ But under current law, while each ordinance produces substantially the same impact, the de facto ordinance may stand on the broad authority of home-rule cities to regulate land use,²⁷⁶ while the de jure ordinance may not meet the test of operational preemption.²⁷⁷

B. De Facto Technical Regulations Create an Insurmountable Operational Conflict

Colorado courts should restrict the presumption of validity afforded to land-use regulations, such that a de facto technical regulation fails the operational conflict test. Even if a home-rule city has the authority to enact a land-use regulation, the regulation should not stand when it materially interferes with substantive state policy. The competing state policies under the OGCA and the Enabling Act must be resolved in light of the totality of the circumstances, and the respective legislative declarations must be construed in a manner that produces a coherent policy objective.

The pragmatic impact of a regulation provides an effective interpretation guide because it incorporates a more comprehensive view of the substantive policies impacted by the regulation. Home-rule autonomy cannot be so broad that it obstructs state substantive policies.²⁷⁸ Rather, home-rule autonomy should extend only to the point at which land-use regulation sufficiently implicates or imposes requirements on an area of state substantive policy.²⁷⁹ If de jure regulation of the impacts of land-use regulation would create an operational conflict, the boundary of home-rule should be deemed reached. At this point, the pragmatic effects of the de facto technical regulation and de jure technical regulation merge, and the

275. *Id.* at 765–66.

276. *See* Voss v. Lundvall Bros., 830 P.2d 1061, 1068 (Colo. 1992); *see also* Town of Telluride v. Lot Thirty-Four Venture, LLC., 3 P.3d 30, 37 (Colo. 2000).

277. *Town of Frederick*, 60 P.3d at 765.

278. *Town of Telluride v. San Miguel Valley Corp.*, 185 P.3d 161, 170 n. 8 (Colo. 2008) (noting that “although the legislature may not *prohibit* the exercise of article XX powers, it may *regulate* the exercise of those powers in areas of statewide or mixed state and local concern”). *See also* City & Cnty. of Denver v. Quest Corp., 18 P.3d 748, 755–56 (Colo. 2001).

279. *Town of Telluride*, 185 P.3d at 170 n.8 (distinguishing between a home-rule municipality’s exercise of article XX powers in matter of local concern and matters of “statewide or mixed state and local concern”).

totality of the state interest should be considered.

A de facto technical regulation of oil and gas materially impedes state policy because it potentially forces an operator to act in a manner contrary to the intent of the OGCA. Oil and gas production, like any industrial process, poses public health, safety, and welfare risks.²⁸⁰ Standardization and technical expertise mitigate these concerns by establishing routine operating procedures that align with current scientific understanding.²⁸¹ To the extent that local land-use regulations require oil and gas operators to depart from technical-based routines, public health, safety, and welfare concerns may not be mitigated to the extent envisioned under the OGCA. To be sure, the state is not the sole arbiter of technical-based routines, nor is local input devoid of merit. The state, however, must be able to take a lead role in facilitating a process that establishes the best requirements for Colorado.²⁸²

Even if a de facto technical regulation conflicts with the intent of the OGCA, it may still be within the scope of the Enabling Act.²⁸³ Competing state legislative declarations should be read to complement, rather than contradict, one another. The state can effectuate the Enabling Act's mandate to shepherd "planned and orderly development" through land-use regulation²⁸⁴ while complying with the OGCA's declaration to develop oil and gas resources in a manner that promotes the public welfare.²⁸⁵ Such a result occurs where local government land-use regulations do not impose technical regulations over oil and gas production.

This construction does not prioritize oil and gas production over local government land-use controls, but rather provides room for oil and gas regulation within the broad sweep of land-use regulation. Land-use regulation potentially affects many

280. *See supra* Part I.B (discussing the environmental risks of hydraulic fracturing).

281. *E.g.*, FRACFOCUS, *supra* note 93 (establishing standard practices of surface casing cementing reduces risk).

282. *See infra* Part IV (suggesting the state can facilitate this process by representing local and state interests).

283. An example of such a hypothetical regulation is a zoning regulation that banned all oil and gas production in particular zone districts, but those particular zone districts also contain the safest mineral extraction points for the city's given geology.

284. COLO. REV. STAT. § 29-20-102 (1) (2012).

285. *Id.* § 34-60-102 (1)(a)(I) (2012).

areas of state substantive policy, including affordable housing, flow of commerce, historic preservation, and oil and gas. Conversely, oil and gas regulation targets a specific matter of concern that exists within the sphere of land use. To harmonize the two provisions, land use must be pared back to allow for state control of oil and gas production. Notwithstanding the substantive state interests,²⁸⁶ oil and gas production cannot be pared back so as to not implicate land-use regulation—i.e., the physical process of oil and gas production inherently alters the natural landscape to some extent, and thus it necessarily impacts land-use policy.

A de facto technical regulation, however, does not automatically fail the operational conflict test. Certainly some land-use regulations will establish too tenuous a link to oil and gas regulations, or will be substantive in their own right and create an operational conflict. Few would argue, for example, that drilling operations should proceed in a high-density urban corridor or an elementary school playground. Under the broadest definition, a land-use regulation that precluded oil and gas activity from such locations would create a de facto technical regulation because an operator would need to follow a different drilling program to extract resources in that general area. But despite the de facto technical regulation, the zone-specific ban would likely stand because it substantially relates to land use.²⁸⁷

Further, public policy recognizes the right of local governments to segregate land use within the community.²⁸⁸ As such, zone-specific limitations cannot be viewed in isolation. The totality of zoning limitations within a city may illuminate a program that effectively operates as an outright ban on oil and gas production. To the extent that the aggregate effects of the zone-specific exclusions do not materially impede the

286. See *Voss v. Lundvall Bros.*, 830 P.2d 1061, 1069 (Colo. 1992).

287. *Nectow v. City of Cambridge*, 277 U.S. 183, 188 (1928) (holding that “the governmental power to interfere by zoning regulations with the general rights of the land owner by restricting the character of his use, is not unlimited, and, other questions aside, such restriction cannot be imposed if it does not bear a *substantial relation* to the public health, safety, morals, or general welfare.”) (emphasis added).

288. *Vill. of Euclid v. Ambler Realty Co.*, 272 U.S. 365, 395 (1926) (holding that so long as the reason for the land-use restriction is not “clearly arbitrary and unreasonable” and bears a “substantial relation” to the restriction, it cannot be deemed unconstitutional).

“efficient production and utilization of . . . natural resources,”²⁸⁹ those exclusions should remain valid.

Colorado courts must still decide on an ad hoc basis the point at which a valid land-use regulation becomes an invalid technical regulation. The practical ability of land-use regulation to regulate de facto a sufficient state interest shows that land-use regulations cannot receive a presumption of validity by merely claiming home-rule authority. Rather, zoning regulations deserve scrutiny equal to that of other local government actions that would impede state interests on their face.

An equitable analysis of a land-use regulation identifies its practical effects and determines the authority of the local government to regulate those effects directly. Where the effect of a land-use regulation amounts to a de facto technical regulation, such that a de jure regulation designed to produce the same effect would fail the operational conflicts test, so too should the de facto technical regulation fail. The authority vested in home-rule cities to enact land-use and zoning regulations is not so broad as to diminish state substantive goals. The failure of the State of Colorado to expressly preempt oil and gas regulation and create a comprehensive regulation system that considers local input needlessly generates much of the preemption ambiguity. Amending the OGCA to expressly preempt local government oil and gas regulations, as suggested in Part IV, could help clarify some of this ambiguity.

IV. STATEWIDE REGULATION OF HYDRAULIC FRACTURING PERMITS A MORE BALANCED MEETING OF STAKEHOLDERS

Colorado should strive for science-driven oil and gas regulations that include comprehensive input from local and state leaders. This necessitates a state-facilitated process. Statewide regulation may incorporate the concerns of a more balanced meeting of stakeholders because it may represent both local and non-local interests. Further, technical expertise exists at the state level.²⁹⁰ An oil and gas regulation that leverages that expertise while accounting for local conditions

289. Bd. of Cnty. Comm’rs, La Plata Cnty. v. Bowen/Edwards Assocs., 830 P.2d 1045, 1057 (Colo. 1992).

290. See, e.g., COLORADO OIL AND GAS CONSERVATION COMMISSION, <http://cogcc.state.co.us> (last visited Sept. 19, 2013).

benefits both state and local actors alike.

But while a statewide regulatory process exists, as administered by the COGCC, the preemption ambiguity fosters a contentious regulatory environment that does not result in comprehensive, science-driven oil and gas regulations.²⁹¹ Some of this ambiguity can be resolved by amending the OGCA to expressly preempt local government oil and gas regulation.²⁹² Express preemption would simplify the analysis by removing fact-sensitive operational conflict determination,²⁹³ while still leaving open the option for local input through administrative channels, such as a variance proceeding.

A. *A More Balanced Meeting of Stakeholders*

A state-level oil and gas regulatory process permits a more balanced meeting of the stakeholders because it lessens insular interests by opening up the regulatory process to a broader group of decision-makers. Fracturing tends to promote consideration of insular concerns.²⁹⁴ Environmentalist groups may find a captive audience in local communities by focusing on the perceived negative public-welfare consequences of fracturing.²⁹⁵ To be sure, environmental concerns must be considered. But consideration of environmental issues to the exclusion of the economic impacts and the underlying technical understanding of fracturing may produce overly burdensome regulations that do not benefit the community.²⁹⁶ Even where local governments consider the economic impacts and technical components of fracturing, the lack of appreciation for broader, statewide impacts and lack of local experts reduces the possibility for balanced regulations.²⁹⁷ This is because environmental impacts, real or imagined, may receive greater

291. *See, e.g.*, Finley, *supra* note 116.

292. *See infra* Part IV.C (noting that express preemption would remove the ad hoc analysis required under the operational conflict test).

293. *Bd. of Cnty. Comm'rs, La Plata Cnty.*, 830 P.2d at 1060.

294. *See supra* Part I.D.

295. *Id.*

296. *See generally supra* note 130 (regulations that ban hydraulic fracturing may deprive the local economy of jobs and revenue).

297. *See, e.g.*, Healy, *supra* note 130 (noting that the drive to ban hydraulic fracturing in Longmont, CO “focused less on climate change and environmental concerns than on hitting voters where they lived: Do you want oil wells venting near your backyard? Do you want drilling near your schools?”).

deference at the local level.²⁹⁸

A state-level process is not immune to shortsighted concerns. Oil and gas industry groups, in particular, may exert an oversized influence on statewide regulatory decisions.²⁹⁹ Therefore, even if the statewide process brings more stakeholders together, the economic resources of each stakeholder may inequitably influence the outcome.³⁰⁰ Further, important environmental concerns may not receive an appropriate hearing at the state level, particularly where geography narrowly confines a potential environmental harm of fracturing.

But while problems exist at both the local and state level, the negative aspects of the statewide process do not pose the same structural challenges present at the local level. Local governments focus on direct local concerns; their purview inherently excludes the broader impact of fracturing regulations.³⁰¹ Conversely, the state may consider both the broad and specific impacts of fracturing regulation.³⁰² Through this dual focus, the state-level process mitigates representation

298. See *id.* (discussing that while arguments in favor of the ban “were based on fear-mongering, deception and antifracking hysteria, . . . [it] resonated with voters. The ban passed 60 percent to 40 percent, with broad bipartisan support.”).

299. See JAMES BROWNING & ALEX KAPLAN, COMMON CAUSE, DEEP DRILLING, DEEP POCKETS: IN CONGRESS 1 (2011), available at <http://www.commoncause.org/atf/cf/%7Bfb3c17e2-cdd1-4df6-92be-bd4429893665%7D/DEEP%20DRILLING%20DEEP%20POCKETS%20NOV%202011.PDF> (finding that “[f]rom 2001 through 2011, the fracking industry gave \$20.5 million to current members of Congress and spent \$726 million on lobbying”). The oil and gas lobby also spends money targeted at the state-level. See SUSAN LERNER ET AL., COMMON CAUSE, DEEP DRILLING, DEEP POCKETS: EXPENDITURES OF THE NATURAL GAS INDUSTRY IN NEW YORK TO INFLUENCE PUBLIC POLICY 7 (2010), available at <http://www.commoncause.org/atf/cf/%7Bfb3c17e2-cdd1-4df6-92be-bd4429893665%7D/LOBBYING%20REPORT%20-%20JULY%20UPDATE%20-%20FINAL.PDF> (finding that “[f]rom 2006 to 2009, natural gas industry lobbying expenditures jumped from \$109,747 to \$668,984, a more than 6-fold increase”).

300. See LERNER, *supra* note 299, at 12 (“If large lobbying expenditures by the natural gas industry and contributions from industry PACs and gas company executives to state legislatures’ campaigns become a deciding factor in legislative action on shale drilling, it poses a serious problem for the state’s ability to impartially determine the best interest of the people.”).

301. COLO. CONST. art. XX, § 6 (establishing that a home-rule city “shall have . . . all other powers necessary, requisite or proper for the government and administration of its *local and municipal* matters”) (emphasis added).

302. See, e.g., *Town of Telluride v. Lot Thirty-Four Venture, L.L.C.*, 3 P.3d 30, 37 (Colo. 2000) (noting the power of the state legislature actions to supersede local action in areas of “mixed local and statewide concern”); see also *supra* Part II.A.

concerns.³⁰³ The Colorado Supreme Court has recognized that because oil and gas resources do not conform to jurisdictional boundaries,³⁰⁴ local government oil and gas regulations might affect Coloradans not within the local government's jurisdiction. This violates the fundamental principle of representative government.³⁰⁵ The state represents the rights of oil and gas interest holders that span multiple local jurisdictions.

B. Technical Expertise at the State Level

Oil and gas regulations require technical expertise.³⁰⁶ A regulatory body must understand the technical-based risks of fracturing to promulgate regulations that protect the public welfare. Because local governments may not have the same access to technical experts as the state,³⁰⁷ the ability of local governments to establish a technical foundation on which to base their regulations may be limited. An operator who seeks to drill in multiple communities could bear the burden of educating several local governments by hiring technical experts to augment each city's regulatory staff. This could prove

303. See *Voss v. Lundvall Bros., Inc.*, 830 P.2d 1061, 1067 (Colo. 1992) (because oil rights do not conform to “jurisdictional patterns,” the regulation of these rights by one city may adversely impact the same rights that an owner enjoys in the neighboring city, which creates an extra-territorial affect). By extension of this argument, oil and gas development may also create extra-territorial effects among various state governments, which suggests a regulatory role for the federal government. A discussion of federal government regulation of hydraulic fracturing is beyond the scope of this Comment.

304. *Id.*

305. A citizen whose oil rights are adversely impacted may not have proper redress in the city government that enacted the regulations.

306. See *HOLDITCH*, *supra* note 51, at 116 (understanding the technical functionality and constraints of hydraulic fracturing requires the understanding of a “reservoir engineer”).

307. Compare *CITY OF BOULDER, COLORADO, 2013 ANNUAL BUDGET VOLUME I 79* (2012), available at https://www-static.bouldercolorado.gov/docs/2013_Annual_Budget_Vol1-1-201305231600.pdf (noting a projected “2013 Annual Budget total [of] \$255 million”), with *THE STATE OF COLORADO, STATE TAXPAYER ACCOUNTABILITY REPORT (STAR) FISCAL YEAR 2011 2* (2011), available at <http://www.colorado.gov/cs/Satellite?blobcol=urldata&blobheadername1=Content-Disposition&blobheadername2=Content-Type&blobheadervalue1=inline%3B+filename%3D%22STAR+Report+FY11.pdf%22&blobheadervalue2=application%2Fpdf&blobkey=id&blobtable=MungoBlobs&blobwhere=1251851511865&ssbinary=true> (noting that the State of Colorado collected over \$25.6 billion in revenue for fiscal year 2010–2011).

problematic, however, because it unjustly places an economic burden on the first company that enters a community. It could also present a conflict of interest, since the operator is vested in an outcome that reduces its regulatory burden.

Access to technical expertise at the state level does not necessarily mean it will be adequately utilized. Technical expertise underlies an understanding of the various environmental risks because it quantitatively defines the risk of process failure and the severity of each type of failure.³⁰⁸ This understanding does not remove the need for judgment. The risks can be quantified, but the level of mitigation through regulation depends on balancing an appropriate tolerance for risk against the potential negative economic and environmental consequences of the regulation.³⁰⁹ Because such judgments inherently require discretion, a pre-defined metric cannot easily balance the economic and environmental factors in an unbiased manner.³¹⁰ Even if the state does not always adequately leverage technical expertise, however, its greater access to such expertise allows for a more thoroughly vetted set of regulations.

C. Express Preemption and Local Input at the State Level

Colorado recognized the importance of deciding oil and gas regulations at the state-level in the OGCA and through the establishment of the COGCC.³¹¹ Because the OGCA neither

308. *E.g.*, Brian R. McCulloch, *A Practical Approach to HSE Risk Assessments Within E&P Operations*, 54 J. PETROLEUM TECH. 36, 37 (2002), http://www.spe.org/jpt/print/archives/2002/10/JPT2002_10_hse_horizons.pdf (explaining different models used to quantitatively define risk in oil and gas exploration and production).

309. For a sample decision-making model see Stephen Sundlof, *The Role of Science in Regulation and Decision Making*, 3 AGBIOFORUM 137, 138 (2000), <http://www.agbioforum.org/v3n23/v3n23a11-sundlof.pdf> (proposing in “Figure 1” that reaching a regulatory decision based on science depends on both the certainty of the science and the value of outcome the society. The more societal values diverge on the instance issue, the more certain the science should be).

310. *See, e.g.*, Bruce Ho, *Webinar Recap: An Industry Perspective on The Shale Gas Debate*, YALE CTR. FOR ENVTL. LAW & POLY (Jan. 29, 2013), <http://environment.yale.edu/envirocenter/post/webinar-recap-an-industry-perspective-on-the-shale-gas-debate/> (noting that “science cannot, on its own, determine the best regulatory approach when faced with uncertainty or questions of socially acceptable levels of risk”) (paraphrasing Mark Boling).

311. COLO. REV. STAT. § 34-60-104 (2012) (creating the Colorado Oil and Gas Conservation Commission).

expressly nor impliedly preempts local government oil and gas regulation, Colorado courts can invalidate local government regulation only where it creates an operational conflict.³¹² The ad hoc determination of operational preemption needlessly creates ambiguity. Local government regulation of oil and gas must pass a high bar to withstand the operational conflict test.³¹³ Yet the bar is not so high as to preclude local governments from trying to regulate in this area. And the often-unpredictable preemption outcome gives local governments few incentives to not try.

Amending the OGCA to expressly preempt oil and gas regulation removes this ambiguity by making local government oil and gas regulations per se invalid. Given the dominant state interest in oil and gas development,³¹⁴ express preemption would represent an express codification of OGCA principals³¹⁵ rather than a significant policy shift. Express preemption would additionally simplify the analysis of land-use regulations that impact oil and gas production. A Colorado court would still need to perform an ad hoc analysis to determine the extent to which the land-use regulation in effect regulated an aspect of oil and gas production. With express preemption, however, the court could find the land-use regulation invalid if it sufficiently implicated oil and gas production, without conducting the operational conflict analysis.

In the quest for regulatory uniformity, local input cannot be divorced from the process. Effective regulation incorporates local input before and after the state promulgates the regulation. Local input during the regulatory development process helps technical experts understand the unique constraints that may limit a regulation's practicality. Local input after the state enacts a regulation may take the form of a variance petition to the COGCC, for example.³¹⁶ A regulation

312. *Compare* *Voss v. Lundvall Bros., Inc.*, 830 P.2d 1061, 1069 (Colo. 1992) (establishing oil and gas regulation as an area of mixed concern), *with* *Bd. of Cnty. Comm'rs, La Plata Cnty. v. Bowen/Edwards Assocs.*, 830 P.2d 1045, 1057–59 (Colo. 1992) (establishing that the OGCA neither expressly nor impliedly preempt local government action).

313. *See, e.g., Voss*, 830 P.2d at 1069.

314. *Id.*

315. *Bd. of Cnty. Comm'rs, La Plata Cnty.*, 830 P.2d at 1058.

316. A “variance” represents a request for a deviation from a regulation. *See* David L. Callies et al., *Land Use* 188 (West, 6th ed. 2012) (in the context of land use, a variance may be granted “where, owing to special conditions, a literal

cannot possibly consider every circumstance at the time of enactment. Local conditions at a proposed fracturing site, for example, may warrant more restrictive regulatory controls than the blanket regulations. Allowing local governments to petition for stricter controls on top of the state regulations can help account for local conditions under the general guidance of the state.

CONCLUSION

Because fracturing raises environmental concerns through an industrial process not widely understood by the public, its increasing prevalence stimulates intense debate. Balanced regulatory controls of fracturing require an unbiased assessment of the economic and environmental impacts of the process. But an assessment of the impacts requires a technical understanding of fracturing.

The question of “who” should regulate must be considered in light of this already challenging backdrop. Preemption recognizes that the sufficient interest of the state in regulating oil and gas production permits the invalidation of local government regulations that operationally conflict with COGCC regulations. Oil and gas regulations, however, are inextricably linked to land-use regulation—an area of local concern with home-rule authority. The plenary power of home-rule governments grants them the right to enact *de facto* technical regulations of oil and gas production through land-use regulations that impact oil and gas. A Colorado court may still be able to invalidate these *de facto* regulations, however, if they impact oil and gas in a way that would have been operationally preempted had the regulations been promulgated *de jure*.

The state should bear foremost responsibility for developing oil and gas regulations because it can represent both statewide and local concerns. While a state-centered process may be susceptible to undue influence from lobbying

enforcement of the provisions of the ordinance will result in unnecessary hardship, and so that the SPIRIT OF THE ORDINANCE SHALL BE OBSERVED AND SUBSTANTIAL JUSTICE DONE”) (quoting DEP’T OF COMMERCE, ADVISORY COMM. ON ZONING, A STANDARD STATE ZONING ENABLING ACT UNDER WHICH MUNICIPALITIES MAY ADOPT ZONING REGULATIONS 11 (1926), *available at* <https://www.planning.org/growingsmart/pdf/SZEnablingAct1926.pdf>).

groups and grant deference to economic arguments, these issues do not pose the same structural problem that the lack of technical expertise and extra-jurisdictional effects do at the local level. A robust state process exists through the COGCC. This process could be further strengthened by amending the OGCA to expressly preempt local government oil and gas regulation, and by amending the COGCC regulatory development process to include greater local input through variances. Fracturing presents an opportunity to reject extreme positions and work collectively to develop science-based regulations that both protect the environment and allow for continued economic development.