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FRACKING AND FEDERALISM: A COMPARATIVE
APPROACH TO RECONCILING NATIONAL AND
SUBNATIONAL INTERESTS IN THE UNITED STATES AND
SPAIN

BY
ALBERT C. LIN*

Hydraulic fracturing presents challenges for oversight because its various effects occur at different scales and implicate distinct policy concerns. The uneven distribution of fracturing's benefits and burdens, moreover, means that national and subnational views regarding fracturing's desirability are likely to diverge. This Article examines the tensions between national and subnational oversight of hydraulic fracturing in the United States, where the technique has been most commonly deployed, and Spain, which is contemplating its use for the first time. Drawing insights from the federalism literature, this Article offers recommendations for accommodating the varied interests at stake in hydraulic fracturing policy within the contrasting governmental systems of these two countries.

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I. INTRODUCTION

Unconventional oil and gas activity—in particular, the combined use of hydraulic fracturing and horizontal drilling techniques to extract previously inaccessible resources—raises concerns at multiple scales and in different policy dimensions.¹ Such activity can generate local environmental hazards, including drinking water contamination, chemical spills, and air pollution.² These hazards often extend beyond the immediate vicinity of an individual fractured well, and the cumulative effects of multiple wells may be regionally or nationally significant. The concerns that accompany hydraulic fracturing, moreover, are not limited to conventional pollution. Hydraulic fracturing implicates other environmental concerns, most notably climate change, as well as nonenvironmental concerns regarding national security and the character of local communities. As attention turns to fracturing's more immediate hazards, its long-term repercussions for energy systems and fossil fuel reliance merit attention as well.

The concerns surrounding hydraulic fracturing have prompted controversy as various nations adopt the technology or contemplate doing so. In the United States, where these techniques were developed and have been widely deployed, some have called for stricter state oversight, whereas

¹ Although the term “unconventional oil and gas” also may refer to various extractive techniques employed in coalbed methane and other contexts, this Article uses the term and “hydraulic fracturing” interchangeably to refer to the technique of extracting oil or natural gas by drilling wells vertically and then horizontally into tight oil and shale gas formations, followed by injecting highly pressurized fluids into them. See MICHAEL RATNER & MARY TIEMANN, CONG. RESEARCH SERV., R43148, AN OVERVIEW OF UNCONVENTIONAL OIL AND NATURAL GAS: RESOURCES AND FEDERAL ACTIONS 1–2 (2014); CAL. ENVTL. LAW & POLICY CTR., U.C. DAVIS SCHOOL OF LAW, SENATE BILL 4: A PAST AND FUTURE LOOK AT REGULATING HYDRAULIC FRACTURING IN CALIFORNIA 7 (2014).

² See Thomas W. Merrill & David M. Schizer, *The Shale Oil and Gas Revolution, Hydraulic Fracturing, and Water Contamination: A Regulatory Strategy*, 98 MINN. L. REV. 145, 170–84 (2013) (discussing general and unique risks associated with fracking).

others contend the federal government is better situated to rein in potential hazards.³ In Europe, Spain and other countries are eyeing hydraulic fracturing as a means of accessing shale hydrocarbons but face public opposition, particularly in regions that expect to bear the brunt of drilling activity.⁴ The controversy in Spain exemplifies the conflict between national authorities eager to reduce reliance on volatile foreign energy supplies, and locals worried about environmental and social impacts.

This Article examines the tensions between local and national oversight of hydraulic fracturing in Spain and the United States. In the United States, current regulatory regimes treat hydraulic fracturing's hazards largely as if they were limited to local pollution.⁵ States are generally in charge of oversight, and the federal government passively provides support to fracturing activity through deregulation.⁶ In Spain, by contrast, the law treats hydraulic fracturing policy primarily as a matter for determination by the national government, which has focused on policy implications for energy security and economic development.⁷ Several of Spain's autonomous regions nonetheless have resisted the national government by enacting hydraulic fracturing bans. Consideration of the controversies surrounding hydraulic fracturing oversight in the United States and Spain yields a valuable comparison of how to incorporate national and local concerns regarding resources management.

Hydraulic fracturing activity ultimately implicates both national and local interests. Both sets of interests require representation. One approach to the matter involves the matching principle, which counsels matching regulatory jurisdiction to the geographic scope of an environmental problem. Dynamic federalism, a theory that recognizes federal and state authorities as alternative, overlapping centers of power, presents another approach. Drawing insights from both approaches, this Article offers recommendations for accommodating the varied interests at stake in hydraulic fracturing policy within the contrasting governmental systems found in Spain and the United States.

Part II of this Article discusses the controversy in Spain over hydraulic fracturing. Part III turns to the United States and examines the respective roles of the states and federal government in the oversight of hydraulic fracturing. Part IV canvasses the main arguments in the debate regarding the level of government that should be engaged in such oversight, drawing on insights from both the matching principle and dynamic federalism. Finally, Part V suggests legal modifications that can better account for regional and

³ See *infra* Part III.

⁴ See Griff Witte & Anthony Faiola, *Amid Showdown with Energy-Rich Russia, Calls Rise in Europe to Start Fracking*, WASH. POST, Apr. 7, 2014, http://www.washingtonpost.com/world/amid-showdown-with-energy-rich-russia-calls-rise-in-europe-to-start-fracking/2014/04/07/f3616058-2c24-4683-abe3-728a5572debf_story.html (last visited Nov. 22, 2014) (discussing the recent push for local energy sources and the fracking debate in Britain, Poland, and Germany).

⁵ See *infra* Part III.B.

⁶ See David B. Spence, *Federalism, Regulatory Lags, and the Political Economy of Energy Production*, 161 U. PA. L. REV. 431, 447 (2013).

⁷ See *infra* Part II.C.

local concerns as Spain crafts a hydraulic fracturing policy, and it also offers recommendations for more fully integrating relevant concerns into hydraulic fracturing policy in the United States.

II. HYDRAULIC FRACTURING IN SPAIN

One substantial difference between the legal systems of Spain and the United States involves the distribution of powers between different levels of government. Spain is a unitary state from which power can be devolved to subnational governments, whereas the United States is a federal state in which power is shared between the federal government and the states, which possess power independent of the federal government.⁸ Notwithstanding this difference, a comparison of these countries' respective approaches to hydraulic fracturing regulation can be instructive in developing options for allocating regulatory authority.

A. Spain's Governmental Structure

To appreciate the debate over hydraulic fracturing oversight in Spain, a basic understanding of the organization of Spanish government is useful. The Spanish Constitution, adopted in 1978, declares Spain to be a unitary state that "recognizes and guarantees the right to autonomy of the nationalities and regions of which it is composed."⁹ Although a unitary state is typically characterized by a supreme central government, the Spanish system has been described as "increasingly federal" in the sharing of power with subnational units.¹⁰ The constitution allows for the decentralization of power through a process in which Spain's Parliament (the Cortes Generales) recognizes autonomous communities (Comunidades Autónomas) and enacts statutes of autonomy (Estatutos de Autonomía).¹¹ The years following the adoption of the Spanish Constitution witnessed the creation of seventeen autonomous communities encompassing all of Spain's regions.¹² These and other developments have served as important means of devolving

⁸ See James A. Gardner & Antoni Abad I Ninet, *Sustainable Decentralization: Power, Extraconstitutional Influence, and Subnational Symmetry in the United States and Spain*, 59 AM. J. COMP. L. 491, 504–06 (2011) (comparing U.S. and Spanish governments).

⁹ CONSTITUCIÓN ESPAÑOLA [C.E.], B.O.E. n. 311, Dec. 29, 1978, art. 2 (Spain), translated at <http://www.boe.es/legislacion/documentos/ConstitucionINGLES.pdf>. Throughout this Article, reference to the "State" government of Spain is a reference to Spain's national government (Estado).

¹⁰ Robert Agranoff, *Federal Evolution in Spain*, 17 INT'L POL. SCI. REV. 385, 385 (1996).

¹¹ C.E. art. 144, 151 (Spain); see generally Gardner & Ninet, *supra* note 8, at 504–05 (comparing the balance of power between the federal government and its autonomous counterparts in the United States and Spain). A statute of autonomy in Spain functions as a subnational constitution, somewhat akin to a state constitution in the United States, except that the statute and any amendments must be approved by the Spanish Parliament. See *id.* at 505.

¹² Violeta Ruiz Almendral, *Fiscal Federalism in Spain: The Assignment of Taxation Powers to the Autonomous Communities*, 42 EUROPEAN TAXATION 467, 468 (2002).

power from the central state.¹³ Nonetheless, ongoing struggles for greater autonomy in several regions demonstrate that the creation of autonomous communities has not fully resolved the tensions between national and regional control.¹⁴

Autonomous communities may legislate according to the terms of their statutes of autonomy, and may assume exclusive competence over planning law and other specified matters.¹⁵ In addition, at the local level, municipalities lack comprehensive legislative power but may implement national or regional laws through municipal ordinances.¹⁶ In areas of overlapping competence, national law prevails if national and subnational law conflict.¹⁷ Moreover, the Spanish Constitution reserves to the national government the general authority to collect taxes, with limited exceptions, and provides for distribution of a portion of collected revenues to the autonomous communities.¹⁸ Thus, on paper at least, the power and funding of the autonomous communities—and indeed their very existence—are subject to the will of the national government.¹⁹ In crafting the Spanish Constitution, however, its framers deliberately left a number of matters

¹³ See Gardner & Ninet, *supra* note 8, at 507–12 (providing examples of how Spanish subnational units are expanding their authority).

¹⁴ The powerful autonomous community of Catalonia held a referendum on independence in November 2014, notwithstanding efforts by the national government to block it. See Matt Moffett, *Catalonia to Defy Spanish Court on Independence Vote*, WALL ST. J., Nov. 4, 2014, <http://online.wsj.com/articles/spanish-court-blocks-vote-in-catalonia-1415107768?KEYWORDS=spain> (last visited Nov. 22, 2014); Matt Moffett, *Spain's Parliament Rejects Catalonia Bid for Independence Vote, Outcome Unlikely to Quell Secessionist Movement*, WALL ST. J., Apr. 8, 2014, <http://online.wsj.com/news/articles/SB10001424052702304819004579489581081862634> (last visited Nov. 22, 2014). Another region, the Basque country, has long sought self rule. See David Román, *Self-Rule Drive Stalls in Spain's Basque Country*, WALL ST. J., Apr. 23, 2014, at A11.

¹⁵ C.E. art. 148, para. 1 (Spain) (outlining the areas over which autonomous communities have authority, including, but not limited to, land and urban development, promotion of economic development, and promotion and regulation of tourism within the territory).

¹⁶ Reguladora de law Bases del Régimen Local arts. 25, 26 (B.O.E. 1985, 7) (Spain), available at <https://www.boe.es/buscar/pdf/1985/BOE-A-1985-5392-consolidado.pdf>; MAR CAMPINS ERITJA ET AL., ENVIRONMENTAL LAW IN SPAIN 37 (2011).

¹⁷ C.E. art. 149, para. 3 (Spain); see also Gardner & Ninet, *supra* note 8, at 505 (explaining why the national government's power in Spain is greater than in standard European governments). It is worth noting that the various levels of government have a general obligation to cooperate and collaborate with each other. See *Administraciones Públicas y del Procedimiento Administrativo Común* art. 3.2 (B.O.E. 1992, 30) (Spain), available at <https://www.boe.es/buscar/pdf/1992/BOE-A-1992-26318-consolidado.pdf>.

¹⁸ C.E. art. 133, para. 1, art. 157, para. 1 (Spain). In recent years, the taxing authority of the autonomous communities has grown. See Almendral, *supra* note 12, at 472–75. See also ALBERT SOLÉ-OLLÉ, UNIVERSITAT DE BARCELONA, REGIONAL TAX AUTONOMY IN SPAIN: 'WORDS' OR 'DEEDS'? 4 (2013) (discussing the changes in Spanish regional tax systems from shared tax resources to greater autonomy). In addition, authorities in two autonomous communities—Navarre and the Basque Country—possess independent taxing power, which is a reflection of historical arrangements. See Gobierno de España, Foral System, <http://www.minhap.gob.es/en-GB/Areas%20Tematicas/Financiacion%20Autonomica/Paginas/Regimen%20foral.aspx> (last visited Nov. 22, 2014); see also ANDY SMITH & PAUL HEYWOOD, REGIONAL GOVERNMENT IN FRANCE AND SPAIN 29–30 (2000) (describing the tax systems of the Basque Country and Navarre).

¹⁹ See Gardner & Ninet, *supra* note 8, at 505–06.

unresolved.²⁰ It is therefore perhaps not surprising that in practice, the autonomous communities have claimed substantial powers in their respective statutes of autonomy, and have developed various means of exercising autonomy.²¹

B. Environmental Regulation

With respect to environmental matters specifically, the Spanish Constitution envisions a distribution of authority somewhat similar to the cooperative federalism approach predominant in U.S. environmental law.²² Namely, the national government enjoys the competence to enact “[b]asic legislation on environmental protection, without prejudice to the powers of the Autonomous Communities to establish additional protective measures.”²³ The autonomous communities have generally assumed the power to enact such additional measures and also possess the authority to execute and enforce national environmental laws.²⁴ The Spanish Constitution also specifies the distribution of authority for various other subject areas that affect the environment.²⁵ For example, the constitution declares the bases of the energy and mining regimen to be under exclusive national competence.²⁶ The coordination and oversight of general economic planning are likewise within the sole authority of the national government, as is the management of water resources extending beyond a single autonomous community.²⁷

In addition to more conventional forms of environmental regulation, such as pollution limits and permit requirements, Spain also employs environmental taxes, which are an increasingly important means of asserting

²⁰ Charles E. Ehrlich, *Ethno-Cultural Minorities and Federal Constitutionalism: Is Spain Instructive?*, 24 S. ILL. U. L.J. 291, 309, 314 (2000). Indeed, one commentator argues that Spain’s written constitution “has a very weak role in Spanish society” and that the compromises that created the constitution have been more important than the document itself in ensuring the country’s democratic stability. *Id.* at 292, 299.

²¹ See Gardner & Ninet, *supra* note 8, at 507–12 (describing extra-constitutional avenues of influence, such as political demonstrations and appeals to the European Union and the European Court of Human Rights).

²² For a brief description of cooperative federalism, see *infra* text accompanying notes 200–201.

²³ C.E., art. 149, para. 1.23 (Spain). One commentator has suggested that this provision is unique to the Spanish Constitution in expressly recognizing the shared authority of national and regional governments and spelling out regional authority to enact more stringent regulation. James J. Friedberg, *Views of Doñana: Fragmentation and Environmental Policy in Spain*, 3 COLUM. J. EUR. L. 1, 22 (Fall/Winter 1996/97).

²⁴ See ERITJA ET AL., *supra* note 16, at 36–37; see also Agustín García-Ureta & Iñaki Lasagabaster, *Environmental Governance in Spain*, in ENVIRONMENTAL PROTECTION IN MULTI-LAYERED SYSTEMS: COMPARATIVE LESSONS FROM THE WATER SECTOR 113, 114 (Mariachiara Alberton & Francesco Palermo eds., 2012) (discussing the division of environmental powers and responsibilities between the autonomous communities and the State).

²⁵ See García-Ureta & Lasagabaster, *supra* note 24, at 115–17.

²⁶ C.E., art. 149, para. 1 (Spain).

²⁷ C.E., art. 149, para. 1.13, 1.22 (Spain).

regional control.²⁸ Although general taxing authority lies in the hands of the national government, autonomous communities can enact environmental taxes so long as they do not duplicate taxes imposed by the national or local authorities.²⁹ The national government has put in place relatively few environmental taxes, leaving substantial room for autonomous communities to adopt various duties on air pollution, water pollution, waste, and other environmental disamenities.³⁰

Finally, it is worth noting that European Union (EU) law serves as an overlay to Spanish domestic law. Binding EU law consists primarily of regulations and directives. EU regulations have binding legal force as soon as they are passed.³¹ EU directives, in contrast, require a member state to accomplish specified results but allow the state discretion regarding how to do so.³² Numerous EU directives govern environmental matters,³³ though none directly address hydraulic fracturing.³⁴

C. Hydrocarbons and Their Regulation in Spain

Hydraulic fracturing promises to reduce Spain's energy dependence and to stimulate its struggling economy. Legal moves by the national government to promote fracturing, however, have encountered strong regional opposition.

Spain imports approximately 99% of the oil and natural gas it uses.³⁵ Much of this supply comes from North Africa, the Middle East, and the former Soviet Union.³⁶ Despite recent growth in renewable energy

²⁸ See STEFAN SPECK & MIKAEL SKOU ANDERSEN, EUROPEAN ENV'T AGENCY, ENVIRONMENTAL FISCAL REFORM: ILLUSTRATIVE POTENTIAL IN SPAIN 9 (2012), available at http://www.eea.europa.eu/highlights/fiscal-reform-can-create-jobs/EEABriefingNoteforETRWorkshop_Madrid.pdf/view.

²⁹ See *id.* at 5 (discussing limitations of autonomous communities within the Spanish fiscal system); Almendral, *supra* note 12, at 472 (discussing prohibition of double taxation and noting enactment of "green taxes" designed to sidestep this prohibition).

³⁰ See ALBERT GAGO ET AL., ENVIRONMENTAL TAXES IN SPAIN: A MISSED OPPORTUNITY 7–19 (2006), available at <http://labandeira.eu/publicacions/glprg.pdf> (detailing the history of environmental taxation in Spain); SPECK & ANDERSEN, *supra* note 28, at 9–10, 14 (detailing the various duties imposed by Spain's autonomous communities); Almendral, *supra* note 12, at 472 (explaining that autonomous regions would have been precluded from enacting environmental taxes if the national government had already done so). The overall magnitude of these taxes remains relatively low compared to other western European countries. See SPECK & ANDERSEN, *supra* note 28, at 9.

³¹ Consolidated Version of the Treaty on the Functioning of the European Union art. 288, Oct. 26, 2012, 2012 O.J. (C 326) 01 [hereinafter TFEU].

³² *Id.*

³³ See, e.g., ERITJA ET AL., *supra* note 16, at 38, 80–82 (discussing EU directives pertaining to climate change).

³⁴ See *infra* text accompanying notes 75–77.

³⁵ See Stephen Burgen, *Spain's Oil Deposits and Fracking Sites Trigger Energy Gold Rush*, THE GUARDIAN, Mar. 26, 2014, <http://www.theguardian.com/world/2014/mar/26/spain-oil-deposit-fracking-sites-energy-offshore-gas> (last visited Nov. 22, 2014).

³⁶ See INT'L ENERGY AGENCY, OIL & GAS SECURITY: EMERGENCY RESPONSE OF IEA COUNTRIES: SPAIN 3, 14 (2011), available at http://www.iea.org/publications/freepublications/publication/spain_2011.pdf.

generation, oil and natural gas still supply over two-thirds of Spain's energy requirements.³⁷ Hydraulic fracturing could dramatically reduce the country's dependence on hydrocarbon imports. For example, estimated reserves of shale gas, which are concentrated in the northern regions of Cantabria and the Basque Country, would satisfy thirty-nine years of domestic natural gas demand.³⁸ Hydraulic fracturing also promises substantial economic benefits; one report estimates that the development of Spain's oil and gas resources could generate up to 44 billion Euros per year, or 4.3% of Spain's GDP, and 260,000 jobs.³⁹

Unconventional gas development in Spain is at a relatively early stage. Investigation of potential drilling sites is underway, but no unconventional drilling has occurred.⁴⁰ The prospect of hydraulic fracturing in Spain, however, has raised many of the same environmental and social concerns as in the United States. At least two distinct factors in Spain have magnified these concerns: Spain's scarce water supplies,⁴¹ and the country's greater population density in comparison to the United States.⁴² The Spanish public appears generally opposed to hydraulic fracturing.⁴³ Many politicians, particularly at the regional level, have likewise expressed disapproval.⁴⁴ Led by the conservative People's Party, the Spanish government nonetheless has demonstrated strong interest in unconventional oil and gas.⁴⁵ This interest spurred recent changes in the law to stimulate investment and exploration.⁴⁶

³⁷ See *id.* at 4.

³⁸ See MILIEU, LTD., REGULATORY PROVISIONS GOVERNING KEY ASPECTS OF UNCONVENTIONAL GAS EXTRACTION IN SPAIN 5 (2013), available at http://ec.europa.eu/environment/integration/energy/uff_studies_en.htm (click on "Country Reports" under the 2013 studies on regulatory provisions, then open the study named "ES report unconventional gas").

³⁹ DELOITTE & ACIEP, ANÁLISIS DEL IMPACTO DEL DESARROLLO DE LA EXPLORACIÓN Y PRODUCCIÓN DE HIDROCARBUROS EN LA ECONOMÍA ESPAÑOLA 10–11 (2014).

⁴⁰ See MILIEU, *supra* note 38, at 5.

⁴¹ See Nick Leiber & Todd White, *Foreign Frackers Now Find Comfort in Water-Hungry Spain*, BLOOMBERG, Apr. 3, 2014, <http://www.bloomberg.com/news/2014-04-02/foreign-frackers-now-find-comfort-in-water-hungry-spain.html> (last visited Nov. 22, 2014) (describing Spain as "Europe's most water-stressed nation").

⁴² See Elena G. Sevillano, *Government Gives Backing to Fracking*, EL PAIS (IN ENGLISH), Mar. 19, 2013, http://elpais.com/m/elpais/2013/03/19/inenglish/1363691267_285489.html (last visited Nov. 22, 2014).

⁴³ See BIO INTELLIGENCE SERV., ANALYSIS AND PRESENTATION OF THE RESULTS OF THE PUBLIC CONSULTATION "UNCONVENTIONAL FOSSIL FUELS (E.G. SHALE GAS) IN EUROPE" 22 (2013) (reporting results of online public opinion finding that nearly 80% of respondents from Spain believed unconventional fossil fuels "should not be developed in Europe at all"); Maria-Teresa Mercado et al., *The Fracking Debate in the Media: The Role of Citizen Platforms as Sources of Information*, 7 ESSACHESS. J. COMM. STUD. 45, 48–49 (2014), available at <http://www.essachess.com/index.php/jcs/article/view/234/260> (discussing citizen movement opposed to hydraulic fracturing in Spain).

⁴⁴ See Mercado et al., *supra* note 43, at 57–59; see also Leiber & White, *supra* note 41 (noting the "prevailing view among many Spanish politicians . . . that most voters remain wary of fracking").

⁴⁵ See Leiber & White, *supra* note 41.

⁴⁶ See *id.*

In contrast to the United States, subsurface resources in Spain and most other countries are owned by the national government.⁴⁷ Hydrocarbon resource development and exploitation therefore require authorization from that government and are generally governed by a national law, the Hydrocarbons Act.⁴⁸ This law requires a permit for initial prospecting activities and a further permit for more detailed exploration.⁴⁹ Such permits are issued by the autonomous community unless the activity would affect more than one autonomous community, in which case the permits are issued by the national authorities.⁵⁰ However, the Hydrocarbons Act gives the national government sole authority over all concessions to extract hydrocarbon resources.⁵¹ An affected autonomous community may issue a report expressing its views regarding a proposed concession, but it lacks the power to block the activity.⁵² The Hydrocarbons Act and other national laws also establish health, safety, and environmental requirements governing hydrocarbon exploitation.⁵³

The Hydrocarbons Act governs the hydrocarbon sector generally; as originally enacted, the law did not establish a regime specific to unconventional oil and gas.⁵⁴ Consequently, there initially existed some uncertainty regarding the legal requirements that would govern hydraulic fracturing activity in Spain.⁵⁵ A 2013 amendment, however, dispelled such uncertainty by expressly incorporating hydraulic fracturing within the Hydrocarbons Act regime and recognizing its potential use.⁵⁶ A further enactment expressly requires the preparation of environmental impact

⁴⁷ See Law 34/1998 of 7 Oct. of the Hydrocarbon Sector, Hydrocarbons Act art. 2 (B.O.E. 1998, 34) (Spain) [hereinafter Hydrocarbons Act] (declaring “hydrocarbon deposits and underground stores existing on State territory and in the territorial subsea and sea depths which are under the sovereignty of the Kingdom of Spain . . . to be public property belonging to the State”); Thomas W. Merrill, *Four Questions About Fracking*, 63 CASE W. RES. L. REV. 971, 977 (2013). The fact that hydraulic fracturing would nevertheless affect the interests of surface rights holders has led some prospective operators to purchase, or seek to purchase, surface rights in order to ameliorate local opposition. See Joseba Elola, *Fracking Firm’s Advances Raising Fear in Northern Spain*, EL PAÍS (IN ENGLISH), June 6, 2014, http://elpais.com/m/elpais/2014/06/05/inenglish/1401964788_858179.html (last visited Nov. 22, 2014).

⁴⁸ Hydrocarbons Act, *supra* note 47.

⁴⁹ See MILIEU, *supra* note 38, at 8–9 (discussing prospecting authorizations (autorizaciones de exploración) and exploration permits (permisos de investigación)); Hydrocarbons Act, *supra* note 47, arts. 9, 14 (outlining the circumstances and requirements necessary for obtaining a permit).

⁵⁰ See MILIEU, *supra* note 38, at 8; Hydrocarbons Act, *supra* note 47, arts. 3(2)(a), 3(3)(c).

⁵¹ See MILIEU, *supra* note 38, at 9; Hydrocarbons Act, *supra* note 47, arts. 3(2)(a), 24, 25.

⁵² Hydrocarbons Act, *supra* note 47, art. 25 (“Following a report from the affected Autonomous Region, the Government shall authorise the granting of the hydrocarbon deposit or underground storage mining concession by means of Royal Decree.”). This report apparently provides a means for the autonomous communities to provide input, but the decision to grant a concession remains in the hands of the State.

⁵³ See MILIEU, *supra* note 38, at 21–22 (discussing general requirements regarding the exploration and extraction phases of unconventional gas extraction in Spain).

⁵⁴ See *id.* at 7–8 (discussing laws regulating site identification and preparation phases prior to unconventional oil and gas extraction).

⁵⁵ See *id.* at 5, 41.

⁵⁶ See Law 17/2013, of 29 Oct. Preamble (B.O.E. 2013, 11,332) (Spain).

assessments for hydraulic fracturing operations.⁵⁷ While this latter enactment ensures that hydraulic fracturing will undergo environmental analysis and public comment, it was packaged within broader legislation that generally limits the environmental review process for all projects—whether related to hydraulic fracturing or not—to six months.⁵⁸ Together, these laws represent aggressive efforts by the national government to push hydraulic fracturing forward in hopes of boosting the ailing economy and promoting energy independence.⁵⁹

Various autonomous communities and municipalities in areas containing the most promising shale reserves, however, have expressed their opposition to contemplated hydraulic fracturing activity.⁶⁰ Some fifty municipalities in the regions of Cantabria and Castilla y León wrote a letter to Spain's Industry Minister to raise concerns about potential environmental impacts.⁶¹ In 2013, three regions with prospective fracturing activity—Cantabria, La Rioja, and Navarra—enacted statutes flatly prohibiting the use of hydraulic fracturing for the purpose of investigating or extracting unconventional hydrocarbons.⁶² And in January 2014, Catalonia, a region with relatively limited hydrocarbon potential, effectively banned hydraulic fracturing by amending an urban planning law to prohibit the installation of the required infrastructure for hydraulic fracturing.⁶³

The national government swiftly challenged these regional measures,⁶⁴ and Spain's Constitutional Court⁶⁵—whose judgments are final⁶⁶—recently

⁵⁷ See Law 21/2013, of 11 Dec. ch. II (B.O.E. 2013, 12,913) (Spain) (listing hydrocarbon projects involving use of hydraulic fracturing within annex identifying projects for which standard environmental assessments must occur); Law 17/2013, of 29 Oct. (B.O.E. 2013, 11,332) (Spain).

⁵⁸ See Law 21/2013, of 11 Dec. ch. II (B.O.E. 2013, 12,913) (Spain) (limiting the environmental assessment process to 4 months, with a possible 2-month extension); Sean McLernon, *Spain Rolls Out Red Carpet for Fracking Developers*, LAW 360, Dec. 12, 2013, <http://www.law360.com/articles/494362/spain-rolls-out-red-carpet-for-fracking-developers> (last visited Nov. 22, 2014).

⁵⁹ See *id.* (reporting legal commentators' observations that changes in the law have created more certainty and will encourage development); Todd White, *Spain Alters Environmental Law to Speed Up Energy Projects*, BLOOMBERG, Dec. 9, 2013, <http://www.bloomberg.com/news/2013-12-09/spain-alters-environment-law-to-speed-up-energy-projects.html> (last visited Nov. 22, 2014) (same); Leiber & White, *supra* note 41 (recounting steps taken by the national government to promote hydraulic fracturing).

⁶⁰ See e.g., JOSE ANTONIO FERNANDEZ FERRERAS, HYDRAULIC FRACKING SUSTAINABILITY ASSESSMENT: CASE OF STUDY [sic] LUENA (CANTABRIA, SPAIN) 2, 6, 8 (2014), available at <http://repositorio.unican.es/xmlui/bitstream/handle/10902/4982/367743.pdf?sequence=1> (identifying the Basque-Cantabrian Basin as one of the main prospective areas in Spain for the existence of shale gas, and noting Cantabria's opposition to fracturing activities).

⁶¹ See Sevillano, *supra* note 42.

⁶² Ley de Cantabria art. 1 (B.O.E. 2013, 111) (Spain); Ley de La Rioja art. 1 (B.O.E. 2013, 163) (Spain); Ley Foral art. 1 (B.O.E. 2013, 268) (Spain).

⁶³ See Dani Cordero, *Cataluña Cambia la Ley Para Prohibir el 'Fracking'*, EL PAIS (IN ENGLISH), Feb. 1, 2014, http://ccaa.elpais.com/ccaa/2014/02/01/catalunya/1391210321_238105.html (last visited Nov. 22, 2014).

⁶⁴ See Todd White, *Spain Expands Its Constitutional Challenge to Allow Fracking*, BLOOMBERG, Mar. 21, 2014, <http://www.bloomberg.com/news/2014-03-21/spain-expands-its-constitutional-challenge-to-allow-fracking-1.html> (last visited Nov. 22, 2014) (noting the

invalidated the bans in Cantabria and La Rioja.⁶⁷ Discussion of these challenges will focus on the court's first decision, which struck down Cantabria's ban.⁶⁸ In that decision, the court explained that the ban invaded the exclusive jurisdiction of the national government to regulate the energy and mining sectors.⁶⁹ The court further found the ban to conflict with the national laws recognizing hydraulic fracturing as a legitimate technique for exploring and extracting hydrocarbons and mandating performance of an environmental impact assessment prior to its use.⁷⁰ Furthermore, the court specifically rejected Cantabria's argument that its ban was a permissible exercise of its authority to protect the environment or human health.⁷¹ The mandatory environmental assessment would adequately account for such concerns, the court reasoned, and thus obviated the need for a regional ban.⁷² The court added that an autonomous community may impose requirements and charges for matters not covered by national law, but it may not alter the basic regime for energy and mining resources.⁷³ Thus, although autonomous communities retain some ability to impose measures to protect the environment, they cannot do so in a manner that interferes with the national government's administration of the mineral concession laws. Indeed, the reasoning of the decision implies that the range of

expansion of the national government's legal challenges to include La Rioja's ban as well as Cantabria's ban). As mandated by Spanish law, the Standing Committee of the State Council (La Comisión Permanente del Consejo de Estado) was consulted in the process of challenging Cantabria's ban. See B.O.E., *Consejo de Estado: Dictámenes, Número de expediente: 1353/2013*, <http://www.boe.es/buscar/doc.php?id=CE-D-2013-1353> (last visited Nov. 22, 2014). The Standing Committee opined that the ban unconstitutionally regulated activities beyond the purview of the autonomous community and purported to alter the national mineral law. *Id.*

⁶⁵ Spain's Constitutional Court, which consists of 12 magistrates nominated by different parts of the Spanish government, is separate from the Spanish judiciary and dedicated primarily to examining the constitutionality of laws. Enrique Guillén López, *Judicial Review in Spain: The Constitutional Court*, 41 LOY. L.A. L. REV. 529, 530, 532, 534–35 (2008).

⁶⁶ See C.E., art. 164 (Spain) (establishing that the judgments are "subject to no remedy").

⁶⁷ S.T.C., B.O.E., n. 177, 75, 95, July 22, 2014 (Spain), available at <http://www.boe.es/boe/dias/2014/07/22/pdfs/BOE-A-2014-7787.pdf> (invalidating the Cantabria ban); S.T.C., B.O.E., n. 199, 101, 105, Aug. 16, 2014 (Spain), available at <http://www.boe.es/boe/dias/2014/08/16/pdfs/BOE-A-2014-8767.pdf> (invalidating the La Rioja ban).

⁶⁸ The subsequent decision invalidating La Rioja's ban relied heavily on the decision striking down Cantabria's ban and noted the similarities between the two laws. See S.T.C., B.O.E., n. 199, 101, 103, Aug. 16, 2014 (Spain), available at <http://www.boe.es/boe/dias/2014/08/16/pdfs/BOE-A-2014-8767.pdf>.

⁶⁹ See S.T.C., B.O.E., n. 177, 75, 77, July 22, 2014 (Spain), available at <http://www.boe.es/boe/dias/2014/07/22/pdfs/BOE-A-2014-7787.pdf> (establishing that the Cantabria ban infringes on the State's authority under the Spanish Constitution).

⁷⁰ *Id.* at 92–93; Andreas Walstad, *Spanish Court Overrules Local Fracking Ban*, NAT. GAS DAILY July 3, 2014, <http://interfaxenergy.com/gasdaily/article/11212/spanish-court-overrules-local-fracking-ban> (last visited Nov. 22, 2014).

⁷¹ See S.T.C., July 22, 2014 (B.O.E., No. 177, 75, 92) (Spain), available at <http://www.boe.es/boe/dias/2014/07/22/pdfs/BOE-A-2014-7787.pdf> (explaining that the prohibition on fracking cannot be deemed as additional environmental protection dictated by the autonomous community of Cantabria).

⁷² *Id.* at 93.

⁷³ *Id.*

environmentally protective measures that autonomous communities can enact may be somewhat narrow. An environmental impact assessment accounts for a wide spectrum of environmental impacts, at least in theory, and thus may arguably preempt regional regulation of any of those impacts.

Spain is one of several European nations that have expressed a growing interest in hydraulic fracturing.⁷⁴ This growing interest led to a 2014 European Commission recommendation “encourag[ing]” member states that undertake hydraulic fracturing to apply various principles for efficiently using resources, protecting public health and the environment, and informing the public.⁷⁵ The EU has not enacted legislation directly governing hydraulic fracturing, however, nor has it enacted a more general directive that regulates mining; rather, mining oversight is left largely to member states.⁷⁶ EU laws generally governing health and the environment may be pertinent, but the application of these laws to hydraulic fracturing may require the establishment of new national laws or regulations.⁷⁷

III. HYDRAULIC FRACTURING REGULATION IN THE UNITED STATES

Hydraulic fracturing has dramatically changed the energy landscape in the United States. Thanks largely to the technique, the United States is expected to become a net exporter of natural gas by 2020.⁷⁸ Hydraulic fracturing has boosted domestic oil production as well, reducing U.S. dependence on oil imports from 60% in 2005 to 40% in 2012.⁷⁹ The technique has been deployed in many different regions, and the specific methods and chemicals used vary according to whether oil or gas is being extracted, the nature and depth of formations where the resource is located, and the extent to which the resource is released when well pressure changes.⁸⁰

⁷⁴ See MARK BROOMFIELD, AEA TECH., SUPPORT TO THE IDENTIFICATION OF POTENTIAL RISKS FOR THE ENVIRONMENT AND HUMAN HEALTH ARISING FROM HYDROCARBONS OPERATIONS INVOLVING HYDRAULIC FRACTURING IN EUROPE i, 1 (2012) (indicating that many EU Member States have expressed interest in developing shale gas resources through the use of hydraulic fracturing for extraction).

⁷⁵ Commission Recommendation of 22 Jan. 2014 on Minimum Principles for the Exploration and Production of Hydrocarbons (such as shale gas) Using High-Volume Hydraulic Fracturing, art. 1.1–2, 2014 O.J. (L 39) 72, 74 [hereinafter Commission Recommendation].

⁷⁶ DIRECTORATE-GENERAL FOR INTERNAL POLICIES, EUROPEAN PARLIAMENT, IMPACTS OF SHALE GAS AND SHALE OIL EXTRACTION ON THE ENVIRONMENT AND HUMAN HEALTH 48 (2011).

⁷⁷ See *id.* at 9, 51–60 (identifying relevant EU environmental and safety directives); Commission Recommendation, *supra* note 75, at 74 (noting that EU environmental legislation was adopted prior to development of hydraulic fracturing and thus does not address certain potential risks).

⁷⁸ U.S. ENERGY INFO. ADMIN., ANNUAL ENERGY OUTLOOK 2014, at MT-22 (2014).

⁷⁹ *Id.* at IF-10, IF-13.

⁸⁰ See Hannah Wiseman, *Untested Waters: The Rise of Hydraulic Fracturing in Oil and Gas Production and the Need to Revisit Regulation*, 20 FORDHAM ENVTL. L. REV. 115, 119–21 (2009).

A. State and Local Oversight

In the United States, states have historically been in charge of the oversight of oil and gas activity, and thanks to various exemptions to federal environmental laws, hydraulic fracturing is no exception to this general rule.⁸¹ In some states, oil and gas commissions possess primary regulatory authority, whereas in other states such authority belongs to environmental agencies.⁸² Often additional state agencies with jurisdiction over specific matters—water allocation, for example—may be involved as well.⁸³ State hydraulic fracturing regulations vary in terms of whom the states regulate, what risks they regulate, and how they regulate.⁸⁴ Further complicating matters, these regulations undergo constant change as regulators attempt to keep pace with new developments and expanded fracturing activity.⁸⁵ Notwithstanding these variations and changes, some general statements about state regulation can be made.

Fractured well development shares various environmental risk-generating steps in common with conventional oil and gas well development: constructing well pads and access roads, drilling and casing wells, and storing and disposing of waste.⁸⁶ The environmental risks associated with these steps include soil erosion, chemical spills, and well blowouts.⁸⁷ Such risks are largely familiar to state regulators and often can be addressed by applying or modifying existing requirements.⁸⁸

However, the fact that hydraulic fracturing has introduced new stages of well development and enabled higher drilling rates has given rise to other, less familiar concerns, as well.⁸⁹ These more novel concerns include the use

⁸¹ See Hannah Wiseman, *Fracturing Regulation Applied*, 22 DUKE ENVTL. L. & POL'Y F. 361, 367 (2012); Merrill & Schizer, *supra* note 2, at 197. For a summary of federal exemptions, see *infra* Part III.B.

⁸² See Wiseman, *supra* note 81, at 369 (“In most states, one agency—either an oil or gas or environmental agency—has primary authority over oil and gas development. Many state oil and gas commissions . . . originally held this authority . . .”).

⁸³ *Id.* at 370.

⁸⁴ See RATNER & TIEMANN, *supra* note 1, at 10–12 (discussing legislation in New York, Maryland, North Carolina, and California); Hannah J. Wiseman, *Risk and Response in Fracturing Policy*, 84 U. COLO. L. REV. 729, 761–807 (2013) [hereinafter *Risk and Response*] (discussing the environmental risks associated with fracturing and various state regulatory responses); Spence, *supra* note 6, at 453–59 (comparing the regulatory regimes in Texas, Pennsylvania, and New York); William J. Brady & James P. Crannell, *Hydraulic Fracturing Regulation in the United States: The Laissez-Faire Approach of the Federal Government and Varying State Regulations*, 14 VT. J. ENVTL. L. 39, 55 (2012) (describing the regulatory regime in Colorado).

⁸⁵ See Wiseman, *supra* note 81, at 367 (noting that several states have begun to update their hydraulic fracturing regulations and take enforcement action against violations of new and preexisting regulations).

⁸⁶ *Risk and Response*, *supra* note 84, at 736.

⁸⁷ See *id.* at 779–99 (discussing the environmental risks inherent to conventional oil and gas development).

⁸⁸ See, e.g., *id.* at 796–97 (discussing setback requirements used to separate drilling activity from surface waters or other natural resources).

⁸⁹ See *id.* at 754 (noting that new stages of well development introduced by fracturing and a rise in drilling activity have given rise to environmental risks, some of them unfamiliar).

of new and potentially hazardous chemicals, as well as the immense quantities of water consumed and wastewater generated.⁹⁰ To address concerns regarding chemical use, many states now require that operators disclose to state agencies the identity of chemicals used in hydraulic fracturing.⁹¹ Substantive restrictions on the use of chemicals are rare, however.⁹² Moreover, states generally allow operators to assert trade secret status regarding the identity and composition of fracturing fluids, thereby limiting public access to any information disclosed.⁹³

Water use has traditionally been a matter under state control; however, this is less true of wastewater.⁹⁴ States have taken different approaches to hydraulic fracturing's high water demand, ranging from the institution of reporting and monitoring obligations to the imposition of permitting requirements.⁹⁵ State regulation of wastewater storage and disposal also varies widely: Some states have established regulations governing the storage process and specifying permitted methods of disposal, while other states have yet to clarify how existing wastewater regulations might apply to hydraulic fracturing waste.⁹⁶

Although the details vary from one jurisdiction to the next, states serve as the chief regulators of hydraulic fracturing in the United States.⁹⁷ An additional layer of regulation is becoming more common, however, as localities enact zoning ordinances targeted at controlling where hydraulic fracturing may take place.⁹⁸ Not surprisingly, this development has triggered litigation, and in some instances courts have held such local ordinances to be preempted by state law.⁹⁹

⁹⁰ *Id.* at 758, 765–66, 775.

⁹¹ *Id.* at 764.

⁹² *See id.* (“Requiring disclosure of fracturing chemicals appears to be far more palatable to legislators and agencies than imposing limits on the chemicals used . . .”).

⁹³ *Id.*

⁹⁴ *See id.* at 768–71 (describing EPA's involvement in regulating flowback water in wastewater treatment facilities in Pennsylvania).

⁹⁵ *See id.* at 776–77.

⁹⁶ *See id.* at 772–73 (noting that Arkansas has regulations requiring transporters of flowback to obtain a permit, carry a visible sticker, and provide emergency telephone numbers, but Oklahoma's regulations only inform operators which existing oil and gas regulations apply to fracturing).

⁹⁷ *See* David Spence, *Fracking Regulations: Is Federal Hydraulic Fracturing Regulation Around the Corner?*, Sept. 22, 2010, <http://www.mcombs.utexas.edu/~media/Files/MSB/Centers/EMIC/EMIC%20Misc/Fracking-Regulations-Is-Federal-Hydraulic-Fracturing-Regulation-Around-Corner.PDF> (last visited Nov. 22, 2014) (“[W]hen it comes to fracking, much of the regulatory heavy lifting is left to the states.”).

⁹⁸ *See* CAL. ENVTL. LAW & POLICY CTR., *supra* note 1, at 13–14 (summarizing local regulation of hydraulic fracturing in the United States); Merrill & Schizer, *supra* note 81, at 199.

⁹⁹ *See* Merrill & Schizer, *supra* note 81, at 199 (explaining how land use regulations are generally left to local governments, while oil and gas well regulations are preempted by state law).

B. A Limited Federal Role

Federal involvement in hydraulic fracturing regulation is limited in contrast to state oversight.¹⁰⁰ Federal statutes do generally govern many of the types of hazards associated with hydraulic fracturing. For example, the Safe Drinking Water Act (SDWA)¹⁰¹ regulates fluid injection into underground wells that endangers drinking water sources;¹⁰² the Resource Conservation and Recovery Act (RCRA)¹⁰³ regulates hazardous waste disposal;¹⁰⁴ the Clean Water Act¹⁰⁵ regulates the discharge of pollutants to waters of the United States;¹⁰⁶ and the Emergency Planning and Community Right-to-Know Act (EPCRA)¹⁰⁷ mandates disclosure of the use of designated toxic chemicals.¹⁰⁸

Many of these statutes, however, contain provisions that exempt hydraulic fracturing activity from federal oversight. Specifically, the SDWA excludes from its reach “the underground injection of fluids or propping agents (other than diesel fuels) pursuant to hydraulic fracturing operations related to oil, gas, or geothermal production activities.”¹⁰⁹ RCRA and its implementing regulations exempt drilling fluids and “produced water”—naturally occurring yet potentially hazardous subsurface water that rises to the surface during oil and natural gas production—from hazardous waste regulation.¹¹⁰ EPCRA regulations likewise exempt oil and gas production from the statute’s disclosure requirements.¹¹¹

Even where no such exemptions exist, the federal government has not acted swiftly to apply existing authority to hydraulic fracturing activities. Under the Clean Air Act, the U.S. Environmental Protection Agency (EPA) issued regulations governing emissions of volatile organic compounds and methane from new and modified hydraulically fractured wells—but only in

¹⁰⁰ See Spence, *supra* note 6, at 447 (noting that “[t]here is no comprehensive federal licensing regime for onshore oil and gas development” and that the regulation of such activity “has always been primarily a state matter”); Michael Burger, *Fracking and Federalism Choice*, 161 U. PA. L. REV. ONLINE 150, 153 (2013) (contending that hydraulic fracturing escapes federal regulation only as a result of “outdated and under-justified exemptions” to federal law).

¹⁰¹ 42 U.S.C. §§ 300f–300h (2012).

¹⁰² *Id.* §§ 300h–300h-8.

¹⁰³ Resource Conservation and Recovery Act of 1976, 42 U.S.C. §§ 6901–6992k (2012) (amending Solid Waste Disposal Act, Pub. L. No. 89-272, 79 Stat. 992 (1965)).

¹⁰⁴ *Id.* § 6921.

¹⁰⁵ Federal Water Pollution Control Act, 33 U.S.C. §§ 1251–1387 (2012).

¹⁰⁶ *Id.* §§ 1311(a), 1362.

¹⁰⁷ Emergency Planning and Community Right-to-Know Act of 1986, 42 U.S.C. §§ 11001–11050 (2012).

¹⁰⁸ *Id.* § 11023.

¹⁰⁹ 42 U.S.C. § 300h(d)(1)(B) (2012). This exemption does not apply to the disposal of hydraulic fracturing waste via injection wells. See Spence, *supra* note 6, at 449–50.

¹¹⁰ 42 U.S.C. § 6921(b)(2)(A) (2012) (creating temporary exemption); Regulatory Determination for Oil and Gas and Geothermal Exploration, Development and Production Wastes, 53 Fed. Reg. 25,446–47 (July 6, 1988) (extending exemption by regulation). Such wastes are subject to regulation as solid waste under the less stringent requirements of RCRA Subtitle D. See Brady & Crannell, *supra* note 84, at 46–47.

¹¹¹ See Burger, *supra* note 100, at 157, n.55 (citing 40 C.F.R. § 372.23 (2011)).

2012, well after the hydraulic fracturing boom was underway.¹¹² Under the Clean Water Act, the discharge of fracturing wastewaters to wastewater treatment plants remains the subject of ongoing rulemaking.¹¹³ The potential effects of hydraulic fracturing on drinking water supplies—which are of perhaps the greatest public concern but are yet to be federally regulated—are the subject of an ongoing and protracted EPA study.¹¹⁴

Of course, the federal government has the power to enact new laws specifically directed toward hazards of hydraulic fracturing. Hydraulic fracturing clearly falls within Congress's Commerce Clause authority to regulate things in interstate commerce and activities having a substantial relationship to interstate commerce.¹¹⁵ Recent efforts to enact such legislation, however, have made little progress.¹¹⁶ The lack of new legislation is consistent with the federal government's general "hands off" approach to fracturing policy.¹¹⁷

Ultimately, Spain and the United States present different political dynamics in terms of national and regional preferences concerning hydraulic fracturing. Spain's national government strongly favors fracturing activity, whereas the regions where such activity would take place are opposed.¹¹⁸ In the United States, by contrast, the states generally favor fracturing activity, and many advocates of more stringent regulation call on the federal

¹¹² Oil and Natural Gas Sector: New Source Performance Standards and National Emission Standards for Hazardous Air Pollutant Reviews, 77 Fed. Reg. 49,490, 49,490 (2012); see U.S. ENVTL. PROT. AGENCY, OVERVIEW OF FINAL AMENDMENTS TO AIR REGULATIONS FOR THE OIL AND NATURAL GAS INDUSTRY 1–4 (2012), available at <http://www.epa.gov/airquality/oilandgas/pdfs/20120417fs.pdf>.

¹¹³ See U.S. Env'tl. Prot. Agency, *Unconventional Extraction in the Oil and Gas Industry*, <http://water.epa.gov/scitech/wastetech/guide/oilandgas/unconv.cfm> (last visited Nov. 22, 2014) (noting that the proposed rule was scheduled for publication in 2014). The Clean Water Act generally requires a permit for the direct discharge of pollutants into waters of the United States. 33 U.S.C. § 1342(a) (2012).

¹¹⁴ U.S. ENVTL. PROT. AGENCY, EPA/600/R-11/122, PLAN TO STUDY THE POTENTIAL IMPACTS OF HYDRAULIC FRACTURING ON DRINKING WATER RESOURCES 1, 7 (2011) (outlining the timetable for the study, commencing in 2010, with EPA's anticipated completion of a draft report in late 2014); Ratner & Tiemann, *supra* note 1, at 14–15.

¹¹⁵ See *United States v. Lopez*, 514 U.S. 549, 558–59 (1995) (holding what many believe to be the outer bounds of the "substantial relation to commerce" necessary for Congress to regulate through the Commerce Clause).

¹¹⁶ See, e.g., Fracturing Responsibility and Awareness of Chemicals Act of 2009, H.R. 2766, 111th Cong. (2009); Fracturing Responsibility and Awareness of Chemicals Act of 2011, H.R. 1084, 112th Cong. (2011); see also Adam Garmez, *Balancing Hydraulic Fracturing's Environmental and Economic Impacts: The Need for a Comprehensive Federal Baseline and the Provision of Local Rights*, 23 DUKE ENVTL. L. & POL'Y F. 405, 412–13 (2013) (discussing the Fracturing Responsibility and Awareness of Chemicals Act); RATNER & TIEMANN, *supra* note 1, at 20–21 (discussing pertinent legislation in the 113th Congress).

¹¹⁷ See Scott Waldman, *U.S. Energy Secretary Says Fracking Brings Prosperity*, CAPITAL, Feb. 18, 2014, <http://www.capitalnewyork.com/article/albany/2014/02/8540411/us-energy-secretary-says-fracking-brings-prosperity> (last visited Nov. 22, 2014) (reporting Secretary of Energy's remarks, which were supportive of hydraulic fracturing yet deferential to state and local community decisions on whether to allow it).

¹¹⁸ See Leiber & White, *supra* note 41.

government to provide greater oversight.¹¹⁹ Local preferences in the United States arguably offer a more suitable point of comparison to regional preferences in Spain because many local ordinances, like the autonomous community bans in Spain, reflect fears about concentrated environmental and social harms.

IV. DEBATES OVER FEDERALISM & HYDRAULIC FRACTURING REGULATION IN THE UNITED STATES

Concerns regarding the risks of hydraulic fracturing activity have prompted a debate in the United States over the level of government best suited to oversee those risks.¹²⁰ This Part examines that debate through the broader federalism controversies in which the debate is situated. Matching principle proponents contend that each of fracturing's effects should be managed by the level of government whose jurisdiction best matches the scope of that effect, whereas dynamic federalism proponents advocate overlapping regulatory jurisdiction. The discussion here recognizes the insights contributed by both schools of thought and lays a foundation for Part V, which develops recommendations for better integrating national, regional, and local concerns regarding fracturing policy in Spain and the United States.

A. Efforts to Match Hydraulic Fracturing to the "Right" Regulator

At first glance, the matching principle offers a straightforward approach to assigning regulatory responsibility. Hydraulic fracturing implicates a range of interests, however, that complicates efforts to match the activity to a single level of regulatory authority.

¹¹⁹ See generally Mark Weinstein, *Hydraulic Fracturing in the United States and the European Union: Rethinking Regulation to Ensure the Protection of Water Resources*, 30 WIS. INT'L L.J. 881 (2013) (discussing the threats posed to drinking water by allowing states to exclusively control regulation, and comparing with fracturing laws in Europe); Ellen Burford, *The Need for Federal Regulation of Hydraulic Fracturing*, 44 URB. LAW. 577, 586–88 (2012) (advocating tighter federal control over fracturing due to susceptibility of state governments to be influenced by fracturing industry).

¹²⁰ See, e.g., Nick Snow, *Hydraulic Fracturing Has Moved to Several Local Ballot Boxes*, OIL & GAS J., Oct. 6, 2014, <http://www.ogj.com/articles/print/volume-112/issue-10/general-interest/hydraulic-fracturing-battle-has-moved-to-several-local-ballot-boxes.html> (last visited Nov. 22, 2014) ("When opponents [of hydraulic fracturing] can't gain traction at the federal or state level, they approach city and county councils."); Pat Rizzuto, *Chemical Makers, Energy Companies Tell EPA Not to Mandate Fracking Fluid Disclosure*, BLOOMBERG BNA: CHEMICAL REG. REP., Sept. 29 2014, http://news.bna.com/chln/CHLNWB/split_display.adp?fedfid=56841002&vname=chenotallissues&split=0 (last visited Nov. 22, 2014) ("Public health laboratories and environmental advocates told the EPA that mandating disclosure [of chemicals used] will help protect the public and environment.").

1. Background

Federal involvement in environmental regulation is a fairly recent phenomenon, as such matters historically were left to the states.¹²¹ State primacy in general rests on a presumption that state control is preferable to federal control, all else being equal, because it is closer and more responsive to the people.¹²² Proponents of this view contend that the U.S. Constitution supports this presumption by spelling out limited federal powers while reserving general powers to the states.¹²³ A related idea, the matching principle, supports state primacy over environmental matters specifically. The matching principle provides that “regulatory jurisdiction generally should correspond to the geographic scope of the externality.”¹²⁴ Accordingly, unless circumstances otherwise warrant, federal standards should address interstate pollution and state standards should address intrastate pollution.¹²⁵ Advocates argue that the matching principle promotes full consideration of costs and benefits “while simultaneously preserving flexibility to account for local conditions, traditions, and preferences.”¹²⁶

Applying the matching principle and the presumption in favor of state control, Professor David Spence concluded that general federal oversight of hydraulic fracturing was not warranted.¹²⁷ Instead, Spence asserted, the federal role should be limited “to those aspects of the industry that produce

¹²¹ Richard B. Stewart, *Pyramids of Sacrifice? Problems of Federalism in Mandating State Implementation of National Environmental Policy*, 86 YALE L.J. 1196, 1196 (1977).

¹²² See *id.* at 1210 (“[S]tate and local governments can better reflect geographical variations in preferences for collective goods like environmental quality and similar variations in the costs of providing such goods.”).

¹²³ Jonathan H. Adler, *Jurisdictional Mismatch in Environmental Federalism*, 14 N.Y.U. ENVTL. L.J. 130, 134 (2005); see also U.S. CONST. amend. X (“The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people.”). The Treaty on European Union expresses a similar principle of subsidiarity: “in areas which do not fall within its exclusive competence, the [European] Union shall act only if and in so far as the objectives of the proposed action cannot be sufficiently achieved by the Member States, either at central level or at regional and local level . . .” Consolidated Version of the Treaty on European Union, Oct. 26, 2012, 2012 O.J. (C 326) art. 5.3, available at <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:12012M/TXT&from=EN>.

¹²⁴ Merrill & Schizer, *supra* note 81, at 254; see also Adler, *supra* note 123, at 133 (“By matching jurisdiction with the scope of a given problem, the institutional structure can ensure the greatest ‘match’ between a given problem and the institutional response. Environmental protection efforts are most likely to be optimal where those who bear the costs and reap the benefits of a given policy determine how best, and even whether, to address a given environmental concern.”).

¹²⁵ See Stewart, *supra* note 121, at 1210.

¹²⁶ Merrill & Schizer, *supra* note 81, at 254; see also Adler, *supra* note 123, at 135–36 (footnotes and internal quotation marks omitted) (“For example, an apple orchard in Washington State has different requirements than an orchard in upstate New York because . . . [of] differences in climate, topography and local conditions. Federal mandates that municipalities treat stormwater like industrial pollution discharges . . . may make sense in the northeast, but such requirements are ill-suited to arid regions . . .”).

¹²⁷ Spence, *supra* note 6, at 507.

interstate effects or implicate established national interests.”¹²⁸ Spence’s conclusion triggered a vigorous debate, and subsequent analyses have generated varying proposals concerning the level of government best suited to regulate hydraulic fracturing.¹²⁹ Largely based on the matching principle, the analyses debate the applicability of various rationales for federal or state environmental regulation.¹³⁰ These rationales, discussed below, provide useful starting points but not necessarily the basis for a complete analysis of the level—or levels—of government that should be engaged in hydraulic fracturing oversight.¹³¹

2. Applying the Matching Factors to Hydraulic Fracturing

Rationales that may be relevant in attempting to match hydraulic fracturing to federal or state regulation include the presence of environmental or social spillover effects, promotion of energy security and other national interests, benefits derived from uniform standards and economies of scale, and states’ inability or unwillingness to regulate powerful industries.

¹²⁸ *Id.*

¹²⁹ See, e.g., Michael Burger, *The Re(Federalization) of Fracking Regulation*, 2013 MICH. ST. L. REV. 1483, 1487 (2013) (contending “that a federalism-choice analysis favors shared federal-state regulation of potential impacts on underground drinking-water supplies and of hazardous waste management, and federal regulation of information disclosure, under the existing regimes created by our nation’s environmental laws”); Ellen Burford, *The Need for Federal Regulation of Hydraulic Fracturing*, 44 URB. LAW. 577, 586–87 (2012) (favoring federal imposition of minimum standards, including disclosure requirements); Burger, *supra* note 100, at 151–53 (responding to Spence’s arguments and contending “that fracking gives rise to interstate, and even national, problems that must be addressed accordingly”); Garmezzy, *supra* note 116, at 430–38 (arguing for federal baseline standards, combined with the ability of local governments to zone out hydraulic fracturing activity); Merrill & Schizer, *supra* note 81, at 257 (concluding that states should take the lead in regulating water contamination risks, but not necessarily other environmental risks of hydraulic fracturing); Joel Minor, *Local Government Fracking Regulations: A Colorado Case Study*, 33 STAN. ENVTL. L.J. 59, 113 (2013) (recommending local land use ordinances focus on regulating socioeconomic impacts); Stephanie Scott, Comment, *Who “Shale” Regulate the Fracking Industry?*, 24 VILL. ENVTL. L.J. 189, 222–23 (2013) (favoring state level regulation and contending that federal regulation will “impose costly regulatory hurdles”); Matt Willie, Comment, *Hydraulic Fracturing and “Spotty” Regulation: Why the Federal Government Should Let States Control Unconventional Onshore Drilling*, 2011 BYU L. REV. 1743, 1746 (2011) (urging that regulation of hydraulic fracturing is “best left to the states”).

¹³⁰ See Burford, *supra* note 129, at 585–86, 588 (explaining that federal governance would be able to regulate and create uniformity in the hydraulic fracturing industry better than states, and stressing the United States’ reliance on fossil fuel energy sources); Merrill & Schizer, *supra* note 81 at 253–55, 257 (explaining the matching principle, economies of scale, and various rationales for both federal and state environmental regulation); Spence, *supra* note 6, at 462–65 (discussing the various rationales for federal regulation including national interest, willingness to regulate, and uniform standards).

¹³¹ See Spence, *supra* note 6, at 462–65.

a. Environmental and Social Effects

Hydraulic fracturing has potential effects that are local, regional, national, and global, suggesting that under the matching principle, neither a purely federal approach nor a purely state approach is appropriate.

Many of hydraulic fracturing's direct impacts are primarily local in nature.¹³² Issues of water supply, groundwater contamination, and community character are typically of limited geographic scope and were traditionally within the purview of state or local governments.¹³³ Once the cumulative effects of multiple and rapidly proliferating hydraulic fracturing operations are considered, however, even seemingly local impacts on communities and the environment can assume a broader scale.¹³⁴ For example, the drilling of a single unconventional gas well may have purely local effects.¹³⁵ In the context of hundreds of wells across a landscape and an accompanying network of new roads and other infrastructure, however, such drilling activity collectively can fragment wildlife habitat and threaten the existence of protected species.¹³⁶ Similarly, "[t]he accumulation of water withdrawals from a limited water supply, the aggregation of spills into a given water body, and the combination of multiple injections into potentially seismically unstable rock formations all have the potential to increase the magnitude of adverse impacts."¹³⁷ Cumulative social effects have accrued as well, as the fracturing boom has dramatically raised the cost of living and demand for social services across entire regions.¹³⁸

Other impacts of hydraulic fracturing, moreover, are interstate in nature even when not considered cumulatively. Air pollution often extends beyond state boundaries, for example, and the disposal of immense quantities of hydraulic fracturing wastewater can pollute interstate surface waters or aquifers.¹³⁹ Conversely, hydraulic fracturing also can produce positive

¹³² Spence, *supra* note 6, at 478; see also David B. Spence, *Backyard Politics, National Policies: Understanding the Opportunity Costs of National Fracking Bans*, 30 YALE J. ON REG. ONLINE 30, 31 (2013), available at http://jreg.common.yale.edu/files/2013/03/Spence_FINAL_02_26_2013.pdf (noting that local communities may bear "disproportionate burdens of natural gas development" in terms of noise, odors, surface contamination, and heavy road traffic).

¹³³ See Merrill & Schizer, *supra* note 81, at 254; Spence, *supra* note 6, at 478–83, 492.

¹³⁴ See Burger, *supra* note 129, at 1500–01 ("[E]arlier analyses of fracking's federalism choice question have not fully accounted for the rapidly expanding industry's cumulative effects."); Burger, *supra* note 100, at 161 ("The more wells there are, the higher the risk of both direct interstate pollution and cumulative impacts that warrant federal response.") (footnote omitted).

¹³⁵ See Spence, *supra* note 6, at 581 (discussing the local effects of fracking).

¹³⁶ See Kalyani Robbins, *Awakening the Slumbering Giant: How Horizontal Drilling Technology Brought the Endangered Species Act to Bear on Hydraulic Fracturing*, 63 CASE W. RES. L. REV. 1143, 1153–58 (2013) (discussing the impacts that natural gas extraction can have on landscapes and consequently on species).

¹³⁷ Burger, *supra* note 129, at 1500–01.

¹³⁸ See Bret A. Weber et al., *Rural North Dakota's Oil Boom and Its Impact on Social Services*, 59 SOC. WORK 62, 62–63 (2014) (discussing the positive and negative impacts that the economic boom would bring to a region).

¹³⁹ See Spence, *supra* note 6, at 487–88, 492–93.

environmental impacts on a national level because using natural gas instead of coal to fuel power plants reduces emissions of sulfur dioxide and other pollutants of national concern.¹⁴⁰

Some spillover effects of hydraulic fracturing are even global, as in the case of climate change. Hydraulic fracturing generates fugitive emissions of methane, a powerful greenhouse gas (GHG). While hydraulic fracturing can reduce GHG emissions by enabling the substitution of natural gas for coal as a fuel source, methane leaks could undermine or even nullify this benefit, depending on the magnitude of those leaks.¹⁴¹ Even worse from a long-term perspective, the hydraulic fracturing boom has unleashed a generous supply of relatively inexpensive natural gas.¹⁴² This development has several potentially critical implications for climate change: perpetuating the U.S. economy's dependence on fossil fuels, discouraging the adoption of energy efficiency measures, and undermining the transition to renewable energy sources.¹⁴³ While the federal government has asserted that natural gas can serve as a "bridge fuel" to a low-carbon economy,¹⁴⁴ the premise underlying that assertion—that our reliance on natural gas will be short-lived—is a shaky one, particularly in the absence of a concrete pathway for achieving a low-carbon economy.¹⁴⁵ Energy systems are characterized by inertia, complexity, and costly and embedded infrastructure.¹⁴⁶ As a result of these characteristics, today's energy policy decisions often have unexpectedly long-lasting effects.¹⁴⁷ In the case of hydraulic fracturing, the current natural

¹⁴⁰ See Spence, *supra* note 132, at 36; Spence, *supra* note 6, at 501–03. Spence suggests that the health and environmental benefits of switching from coal to natural gas might even warrant federal support for hydraulic fracturing, though he finds such support currently unnecessary. See *id.* at 503–04.

¹⁴¹ See Robert H. Freilich & Neil M. Popowitz, *Oil and Gas Fracking: State and Federal Regulation Does Not Preempt Needed Local Government Regulation: Examining the Santa Fe County Oil and Gas Plan and Ordinance as a Model*, 44 URB. LAW. 533, 537–38 (2012).

¹⁴² See *id.* at 537; Merrill, *supra* note 47, at 992 ("Cheap gas . . . is poison for renewables."). But see EXEC. OFFICE OF THE PRESIDENT, THE ALL-OF-THE-ABOVE ENERGY STRATEGY AS A PATH TO SUSTAINABLE ECONOMIC GROWTH 35 (2014), available at http://www.whitehouse.gov/sites/default/files/docs/aota_energy_strategy_as_a_path_to_sustainable_economic_growth.pdf (arguing that the development of natural gas infrastructure can facilitate a transition to a "clean energy future" by making more natural gas available as a backup power supply to wind and solar power generation).

¹⁴³ See Naomi Oreskes, *The Centerpiece of Obama's Energy Policy Will Actually Make Climate Change Worse*, THE NATION, July 28, 2014, available at <http://www.thenation.com/article/180791/centerpiece-obamas-energy-policy-will-actually-make-climate-change-worse#>; Albert C. Lin, *A Sustainability Critique of the Obama "All-of-the-Above" Approach*, GEO. WASH. J. ENERGY & ENVTL. L., Winter 2014, at 21.

¹⁴⁴ See, e.g., President Barack Obama, State of the Union Address (Jan. 28, 2014), transcript available at <http://www.whitehouse.gov/the-press-office/2014/01/28/president-barack-obamas-state-union-address>. For an analysis suggesting that a natural gas bridge may be "of limited direct emission-reducing value," see Michael Levi, *Climate Consequences of Natural Gas as a Bridge Fuel*, 118 CLIMATIC CHANGE 609, 609 (2013).

¹⁴⁵ See Lin, *supra* note 143, at 21–22 (explaining slow progress and barriers to transitioning the United States from fossil fuels to renewable energy sources).

¹⁴⁶ See Albert C. Lin, *Lessons From the Past for Assessing Energy Technologies for the Future*, 61 UCLA L. REV. 1814, 1820–22 (2014).

¹⁴⁷ See *id.* at 1820.

gas boom further entrenches energy supply and distribution networks, transportation systems, and economies built on a foundation of fossil fuels, making the necessary transition to low-carbon systems that much more difficult. Under a matching approach, these global concerns do not readily map onto either federal or state responsibility.

b. National Interests

In addition to the environmental and social effects just considered, hydraulic fracturing also implicates other interests of national significance. Perhaps the most prominent of these interests is energy security.¹⁴⁸ Heavy reliance on foreign energy sources can undermine national defense and leave the military and economy vulnerable to supply disruptions.¹⁴⁹ Like other public goods, energy security may be underprovided in the absence of government intervention.¹⁵⁰ Federal involvement in hydraulic fracturing policy premised on energy security could involve direct financial support, such as subsidies. Indeed, federal support already appears in other forms: hydraulic fracturing enjoys various tax advantages common to domestic oil and gas production in addition to the previously discussed exemptions from environmental regulation.¹⁵¹

Whether hydraulic fracturing actually enhances energy security, however, depends on whether it displaces foreign, less stable energy sources. The United States has derived limited energy security benefits from the production of unconventional natural gas as this resource has largely displaced other domestic energy sources, most commonly coal.¹⁵² By contrast, unconventional oil production has improved U.S. energy security by reducing oil imports.¹⁵³

More generally, domestic oil and gas production can provide significant benefits to the national economy. Unconventional oil and gas production has

¹⁴⁸ See MOLLY F. SHERLOCK, CONG. RESEARCH SERV., R43206, ENERGY TAX POLICY: ISSUES IN THE 113TH CONGRESS 4 (2013).

¹⁴⁹ *Id.* at 4–5.

¹⁵⁰ *Cf.* Adler, *supra* note 123, at 143–45 (discussing public goods rationale for federal action). Indeed, the federal government touts unconventional oil and natural gas production as critical to increasing U.S. energy security. See EXEC. OFFICE OF THE PRESIDENT, *supra* note 142, at 6, 30.

¹⁵¹ See SHERLOCK, *supra* note 147, at 8, 14 (discussing tax incentives for energy production from the oil and gas sector).

¹⁵² See Spence, *supra* note 6, at 500–01. *But see* EXEC. OFFICE OF THE PRESIDENT, *supra* note 142, at 6 (“[T]he diversification of energy sources through the growth of natural gas and renewables has softened the link between world oil prices and domestic energy prices.”). Widespread use of natural gas as a motor vehicle fuel would displace foreign oil and thereby offer increased energy security, but would require substantial changes in energy infrastructure. See Spence, *supra* note 84, at 501.

¹⁵³ EXEC. OFFICE OF THE PRESIDENT, *supra* note 142, at 11–12 (noting that net petroleum imports dropped from a peak of over 12 million barrels per day in 2005 to 6.2 million barrels per day in 2013, with approximately one-third of this drop attributable to increased domestic production). Spain could reap similar energy security benefits from hydraulic fracturing, as domestic production of oil or natural gas would reduce the country’s near total dependence on hydrocarbon imports.

boosted gross domestic product and generated thousands of jobs in the United States.¹⁵⁴ Lower natural gas prices have benefited consumers and manufacturers alike.¹⁵⁵ Because of its implications for climate change, energy security, and overall economic activity, hydraulic fracturing represents an important aspect of national energy policy. These policy concerns ultimately lead to conflicting policy prescriptions. On the one hand, energy security and economic concerns may favor increased hydraulic fracturing and federal support for it. On the other hand, climate concerns may warrant tighter environmental controls on fracturing activity as well as federal policies to promote greater reliance on renewables instead of fossil fuels. Either way, application of the matching principle to these concerns suggests a significant federal role.

c. Relative Incentives to Regulate

In debates over federal versus state regulation, an oft-cited concern is the relative ability and willingness of the federal and state governments to regulate in the public interest.¹⁵⁶ Some scholars contend that states engage in a regulatory “race to the bottom” to attract economic activity.¹⁵⁷ To the extent that this is the case, federal intervention—in the form of regulatory floors, for example—may be warranted to prevent states from adopting suboptimal policies as a result of such competition.¹⁵⁸ Others argue against such intervention, however, countering that states engage in an economically efficient “race to the top” by offering different combinations of taxes, environmental protection, and other regulatory initiatives.¹⁵⁹

The ongoing debate regarding the effects of competition between states on their incentives to regulate industry¹⁶⁰ may be somewhat muted with respect to hydraulic fracturing. On the one hand, hydrocarbon resources are fairly immobile, and “[i]nvestment in [unconventional oil and gas] production in one state does not preclude simultaneous investment in

¹⁵⁴ See *id.* at 15–17 (noting economic benefits of increased domestic hydrocarbon production).

¹⁵⁵ See VIPIN ARORA & JOZEF LIESKOVSKY, NATURAL GAS AND U.S. ECONOMIC ACTIVITY 3 (2013), available at http://mpr.a.ub.uni-muenchen.de/50197/8/MPRA_paper_50197.pdf.

¹⁵⁶ See, e.g., Kirsten H. Engel, *State Environmental Standard-Setting: Is There a “Race” and Is It “To the Bottom”?*, 48 HASTINGS L.J. 271, 274–76 (1997) (explaining the debate in environmental policy about whether federal standards or state competition better serve the public welfare).

¹⁵⁷ See *id.* at 283 (“It is generally acknowledged that competition from other states for the location of industry causes states to relax their environmental standards.”).

¹⁵⁸ See *id.* at 274, 276.

¹⁵⁹ See generally Richard L. Revesz, *Rehabilitating Interstate Competition: Rethinking the “Race-to-the-Bottom” Rationale for Federal Environmental Regulation*, 67 N.Y.U. L. REV. 1210, 1236–44 (1992).

¹⁶⁰ See Merrill & Schizer, *supra* note 81, at 253–54 (recognizing there may be no simple answer to the question of whether states will engage in a regulatory race to the bottom, because the interest group influence that might foster it will vary by context, and in the end the question is mainly an empirical one); Adler, *supra* note 123, at 153–54; Ann E. Carlson, *Iterative Federalism and Climate Change*, 103 NW. U. L. REV. 1097, 1106–07 (2009).

another.”¹⁶¹ On the other hand, industry may focus its operations on states having fewer and less costly regulations.¹⁶² As between the federal government and the states, moreover, states generally have a greater incentive than the federal government to underregulate economic activity because they are more dependent on economic activity for tax revenue.¹⁶³ As Professor Richard Revesz explains, “[s]tates get the employment and fiscal benefits when they allow fracking, but the negative consequences from fugitive methane are mostly felt elsewhere.”¹⁶⁴ Ultimately, the economic incentives for states to underregulate leave the federal government better situated to act in the public interest with respect to at least some aspects of hydraulic fracturing oversight.

d. Uniformity, Variety, and Experimentation

A final set of concerns in the debate over hydraulic fracturing regulation involves general rationales for centralized or decentralized regulation. Centralized regulation can be uniform: a national regulatory regime that preempts local standards “would relieve producers from having to worry about multiple state regulatory regimes” while safeguarding against insufficiently protective state standards.¹⁶⁵ Uniform standards also offer economies of scale in developing and setting standards, which may be especially valuable in dealing with complex issues.¹⁶⁶

Although hydraulic fracturing is technically complex, the varying physical conditions under which it occurs suggest that uniform nationwide standards may not be ideal. State regulators may better understand local conditions and how to take them into account when considering hydraulic fracturing’s benefits and risks.¹⁶⁷ State regulations also may adapt more readily to new information or changed circumstances than federal regulation.¹⁶⁸

¹⁶¹ Spence, *supra* note 6, at 495 (adding that states need not “chas[e] limited investment capital”).

¹⁶² Joshua P. Dennis, *The Emergence of Natural Gas and the Need for Cooperative Federalism to Address a Big “Fracking” Problem*, 4 SAN DIEGO J. CLIMATE & ENERGY L. 253, 271 (2013).

¹⁶³ See William W. Buzbee, *Contextual Environmental Federalism*, 14 N.Y.U. ENVTL. L.J. 108, 121 (2005).

¹⁶⁴ Richard Revesz, *Fracking and Methane: Regulators Must Look Upstream*, THE HILL, (July 29, 2014, 10:00 AM), <https://thehill.com/blogs/pundits-blog/213362-fracking-and-methane-regulators-must-look-upstream> (last visited Nov. 22, 2014).

¹⁶⁵ Spence, *supra* note 6, at 507.

¹⁶⁶ See Merrill & Schizer, *supra* note 81, at 255.

¹⁶⁷ See David S. Steele et al., *Environmental and Social Implications of Hydraulic Fracturing and Gas Drilling in the United States: An Integrative Workshop for the Evaluation of the State of Science and Policy*, 22 DUKE ENVTL. L. & POL’Y F. 245, 253 (2012) (demonstrating state regulators may be able to understand local conditions and take them into account in regulating hydraulic fracturing).

¹⁶⁸ See Richard J. Pierce, Jr., *Rulemaking Ossification Is Real: A Response to Testing the Ossification Thesis*, 80 GEO. WASH. L. REV. 1493, 1493 (2012) (asserting that federal regulations have suffered especially from regulatory ossification); Albert C. Lin, *Power to the People:*

Decentralized regulation offers a further potential benefit of allowing states to serve as laboratories of regulatory experimentation.¹⁶⁹ The existence of differing regulatory regimes for oil and gas production, as well as the emergence of differing approaches to hydraulic fracturing regulation, offers opportunities for comparisons and learning.¹⁷⁰ Whether useful comparisons can be drawn and whether such learning will occur, however, are open to debate. Varying physical conditions, legal regimes, and historical contexts may hamper cross-jurisdictional comparisons. Moreover, sharing information among state regulators may be difficult and require federal facilitation.¹⁷¹

Decentralized regulation ultimately need not preclude federal involvement, however. The federal government can establish standards that prescribe desired results while allowing states and private parties flexibility in determining how to achieve those results. Cooperative federalism offers just such an approach: states can tailor specific requirements to local conditions and experiment with different approaches so long as federal goals or standards are met.¹⁷²

e. A Summary of Matching Principle Arguments

To summarize, the matching principle does not offer a clear case for either wholly federal or state regulation. Hydraulic fracturing has both widespread and localized impacts. Many of its pollution and social spillovers are local when considered in isolation, yet cumulatively expansive. Hydraulic fracturing's ramifications for climate change and energy security are national, if not global, and significant. Other frequently cited rationales for federal oversight, however, are weaker here than in other areas of environmental policy. Thanks to the immobility of the resources at issue and the varying conditions in which hydraulic fracturing activity occurs, uniformity, race-to-the-bottom dynamics, and economies of scale are of modest relevance.

Restoring the Public Voice in Environmental Law, 46 AKRON L. REV. 1017, 1018–19 (2013) (same).

¹⁶⁹ See *New State Ice Co. v. Liebmann*, 285 U.S. 262, 311 (1932) (Brandeis, J., dissenting) (“[A] single courageous State may, if its citizens choose, serve as a laboratory; and try novel social and economic experiments without risk to the rest of the country.”).

¹⁷⁰ See Merrill & Schizer, *supra* note 81, at 256.

¹⁷¹ See Hannah Wiseman, *Regulatory Islands*, 89 N.Y.U. L. REV. (forthcoming 2014) (contending that the federal government is best situated to produce and synthesize regulatory information generated by state policy experimentation). For differing views regarding whether information sharing is likely among state hydraulic fracturing regulators, compare Merrill & Schizer, *supra* note 81, at 256 (noting institutional mechanisms for promoting such sharing) with Burger, *supra* note 100, at 160 (contending that states are doing little to share the information gained through their regulatory experiments).

¹⁷² See Burger, *supra* note 100, at 159–60 (asserting that cooperative federalism allows locally tailored approaches that meet federal standards).

B. Beyond the Matching Principle

The matching principle falls short of offering a clear answer on its own terms. Moreover, its shortcomings suggest the need to contemplate alternative or complementary approaches to allocating regulatory authority. As explained below, dynamic federalism offers one such approach.

1. Shortcomings of the Matching Approach

The matching principle helps identify important factors to consider in determining regulatory jurisdiction. The approach, however, comes at the risk of oversimplification. Natural systems are complex, frequently involving effects at different geographic and temporal scales.¹⁷³ Human activity compounds this natural complexity by altering, destroying, or creating ecological relationships.¹⁷⁴ The matching principle nonetheless “assumes away much of the inherent complexity of environmental problems” and “ignores the constantly shifting landscape in which environmental policy is set.”¹⁷⁵ A perfect governmental match often will not exist for a particular environmental problem or even for one aspect of that problem. Harms may be both localized and dispersed, and they may arise from actions or actors outside of any regulator’s jurisdiction.¹⁷⁶

The environmental concerns associated with hydraulic fracturing illustrate the difficulty of seeking a simple jurisdictional match. Hydraulic fracturing generates land use conflicts, traditionally a local concern; groundwater pollution risks, often deemed a matter for the states; and GHG emissions, which constitute a global threat. One possible approach consistent with the matching principle might have local authorities address land use, state authorities groundwater pollution, and national authorities GHG emissions.¹⁷⁷ Such an approach would tend to give insufficient weight, however, to cumulative land use effects, regional groundwater concerns, and global implications of GHG emissions. Furthermore, a compartmentalized approach—in which one level of government addresses some aspects of an activity and other levels of government address other aspects—can yield conflicting policies and fail to account for the interrelated elements of environmental problems.¹⁷⁸ For example, a local

¹⁷³ See David E. Adelman & Kirsten H. Engel, *Adaptive Federalism: The Case Against Reallocating Environmental Regulatory Authority*, 92 MINN. L. REV. 1796, 1814–15 (2008).

¹⁷⁴ *Id.* at 1815–16 (discussing how human actions add to the complexity of ecological systems).

¹⁷⁵ *Id.* at 1799.

¹⁷⁶ See William W. Buzbee, *Recognizing the Regulatory Commons: A Theory of Regulatory Gaps*, 89 IOWA L. REV. 1, 22–27 (2003) (discussing problem of “jurisdictional mismatch”).

¹⁷⁷ See, e.g., Merrill & Schizer, *supra* note 81, at 257 (recommending that states take the lead in regulating risk of water contamination from hydraulic fracturing, but not necessarily in regulating air pollution or other risks); see also Daniel C. Esty, *Toward Optimal Environmental Governance*, 74 N.Y.U. L. REV. 1495, 1554–56 (1999) (suggesting that some dimensions of an environmental problem are best addressed locally, whereas others are best addressed nationally).

¹⁷⁸ See Adelman & Engel, *supra* note 173, at 1816–17.

mandate to minimize surface disturbance could lead to increased horizontal drilling activity and thereby magnify the regional or national risks associated with such activity.

Applying the matching principle presents the further danger of disregarding the historical and policy contexts in which an activity occurs.¹⁷⁹ A history of oversight can argue for or against continued regulation. On the one hand, prior regulation provides some support for continued oversight by the same body, based on its “expertise, [its] relationships with important interest groups, and . . . natural inclination to protect [its] turf.”¹⁸⁰ This reasoning would tend to support state oversight of hydraulic fracturing, since states have historically regulated oil and gas exploration and production.¹⁸¹ “[O]il and gas production involves difficult issues of property law, including allocating oil and gas reserves among different landowners, as well as regulating the common pool problem and the incentives for waste created by the rule of capture.”¹⁸² Arguably, states are better positioned to address these issues.¹⁸³ On the other hand, the existence of established relationships between regulators and industry can undermine the ability of agencies to perform their regulatory responsibilities with sufficient vigor.¹⁸⁴ This danger seems particularly great for state oil and gas regulators, who historically focused on maximizing production rather than on addressing environmental harms.¹⁸⁵ Regulation by a different agency or a different level of government may be necessary to mitigate this danger.

Application of a simple matching approach may also lead to the neglect of broader or interrelated policy concerns. For instance, because energy production often requires large quantities of water, energy and water resources must be managed together.¹⁸⁶ This is especially true in the case of hydraulic fracturing, which consumes large quantities of water and produces large quantities of wastewater.¹⁸⁷ Although states’ authority over water

¹⁷⁹ See Buzbee, *supra* note 163, at 112 (contending that generic arguments regarding environmental federalism involve “at most, regulatory propensities and incentives”).

¹⁸⁰ Merrill & Schizer, *supra* note 81, at 251.

¹⁸¹ Spence, *supra* note 6, at 447. If the federal government were to assert regulatory authority over hydraulic fracturing, the agency most likely to be involved in such oversight—EPA—has relatively little experience with oil and gas production, but does possess expertise in dealing with the environmental effects of that production. Merrill & Schizer, *supra* note 81, at 255.

¹⁸² Merrill & Schizer, *supra* note 81, at 251.

¹⁸³ See *id.* (“In the face of pervasive uncertainty, the existing alignment of authority is a sensible place to start.”).

¹⁸⁴ See generally David Freeman Engstrom, *Corralling Capture*, 36 HARV. J.L. & PUB. POL’Y 31 (2013) (discussing some ways that interest groups may control regulatory agencies).

¹⁸⁵ Merrill, *supra* note 47, at 978–79.

¹⁸⁶ Robin Kundis Craig, *Hydraulic Fracturing (Fracking), Federalism, and the Water-Energy Nexus*, 49 IDAHO L. REV. 241, 255 (2013).

¹⁸⁷ See *id.* at 244–45 (asserting that fracking requires a considerable amount of water that becomes so polluted through the process that it cannot be returned to streams). *But see* Monika Ehrman, *The Next Great Compromise: A Comprehensive Response to Opposition Against Shale Gas Development Using Hydraulic Fracturing in the United States*, 46 TEX. TECH L. REV. 423, 448–51 (2014) (suggesting that water consumption by hydraulic fracturing activities is comparable to that associated with other forms of energy production).

allocation offers an additional factor in favor of state jurisdiction over fracturing, it would be a mistake to treat fracturing as merely a governance problem of water allocation or local pollution for the states to handle alone.¹⁸⁸ Such an approach can undermine needed efforts to integrate environmental, energy, and water policy.¹⁸⁹

2. *An Alternative to Matching: Dynamic Federalism*

The matching principle ultimately cannot achieve the goal of optimally efficient regulation because there is no way to ensure that a regulator internalizes all costs and benefits.¹⁹⁰ Furthermore, the matching principle rests on a static model that fails to account for interactions between states and the federal government.¹⁹¹ Indeed, notwithstanding its simplicity, the matching principle bears little resemblance to existing allocations of responsibility in U.S. environmental law.¹⁹² As a descriptive matter, the rival approach of dynamic federalism, which recognizes that “federal and state governments function as alternative centers of power,” better reflects present institutional arrangements.¹⁹³ And as a normative matter, dynamic federalism’s presumptive view that both levels of government should have authority over a policy area addresses various shortcomings encountered under the matching principle.¹⁹⁴

At first glance, a system of overlapping federal and state jurisdiction may appear clumsy in contrast to the neat divisions suggested by the matching principle. Regulation in a system of dynamic federalism may be redundant, burdensome, or even conflicting. Not surprisingly, critics contend that overlapping jurisdiction is detrimental to the interests of efficiency, uniformity, accountability, and finality.¹⁹⁵

Overlapping jurisdiction nonetheless offers a number of advantages over a system that allocates authority according to the best match. Overlapping jurisdiction enables an intergovernmental dialogue that

¹⁸⁸ See Craig, *supra* note 186, at 259–60 (asserting that hydraulic fracturing is not primarily an issue of state regulation because fracking operations are never individualized operations with purely local environmental impacts).

¹⁸⁹ *Id.* at 263–64.

¹⁹⁰ See Adelman & Engel, *supra* note 173, at 1817 (“[N]o systematic way exists to bound most environmental problems.”).

¹⁹¹ See Carlson, *supra* note 160, at 1106–07 (contending that classic environmental federalism debates are largely theoretical and “pay less attention to the actual operation of federal and state environmental statutes”); Kirsten H. Engel, *Harnessing the Benefits of Dynamic Federalism in Environmental Law*, 56 EMORY L.J. 159, 163 (2006) (concluding that the matching principle, as part of the debate about environmental federalism, is dominated by references to static economic models).

¹⁹² See Engel, *supra* note 191, at 166 (reporting that the norm in regulating environmental issues is a substantial overlap between federal and state regulators).

¹⁹³ *Id.* at 176.

¹⁹⁴ See *id.* at 176–77 (describing dynamic federalism’s benefits as the expression of important values, encouragement of policy innovation, and resistance to monopolization, among others).

¹⁹⁵ Adelman & Engel, *supra* note 173, at 1828; see also Buzbee, *supra* note 162, at 126 (noting potential for creating regulatory confusion).

promotes learning, regulatory action, and policy innovation.¹⁹⁶ Governments can learn from each other's experiences, and regulation at one government level can inspire regulation at another.¹⁹⁷ In addition, the redundancy inherent in overlapping jurisdiction provides alternative avenues for policy action when one regulator is unable to act because of policy gridlock or other reasons.¹⁹⁸ Because interest groups that might block action in one regulatory forum may not be equally dominant in other fora, jurisdictional overlap can provide a regulatory "safety net" against excessive interest group influence.¹⁹⁹

The cooperative federalism approach incorporated into much of U.S. environmental risk regulation reflects many aspects of dynamic federalism. In cooperative federalism schemes, the federal government sets minimum regulatory standards, which may be implemented by either the states or the federal government, and states retain the ability to adopt more stringent standards.²⁰⁰ The federal and state governments thus have overlapping authority, though state authority is constrained by federal limits and preempted if in conflict with federal law. In theory, cooperative federalism schemes allow states to engage in a dialogue with the federal government regarding how to regulate and whether to regulate more vigorously. As a practical matter, however, federal standards can sometimes be so comprehensive as to leave the states with little room to engage in any such dialogue.²⁰¹

C. Federalism and Energy Facility Regulation

Whereas cooperative federalism represents the primary approach to environmental regulation in the United States, the matching principle is predominant in the regulation of energy facilities and production.²⁰² In some areas, the federal government wields exclusive authority, as in the licensing of hydroelectric facilities, nuclear power plants, and offshore oil and gas production.²⁰³ The preemption of state and local regulation in these areas suggests a judgment not only that the development of these facilities and resources is in the national interest and requires federal intervention, but

¹⁹⁶ See Adelman & Engel, *supra* note 173, at 1809 (discussing the opportunity for implementing aggressive environmental regulations); Buzbee, *supra* note 162, at 122 (discussing the learning benefits of regulatory overlap); Carlson, *supra* note 160, at 1099–1100 (discussing virtues of "iterative federalism," in which certain states engage in an ongoing regulatory dialogue with the federal government, which leads to policy innovation).

¹⁹⁷ See Engel, *supra* note 110, at 170 (discussing examples of such interaction, like the enactment of federal legislation following California's pioneering efforts to establish emission standards).

¹⁹⁸ See Adelman & Engel, *supra* note 173, at 1809–10 (explaining that policy stalled at one level of government might be ripe for action at a different level of government with a more favorable political climate).

¹⁹⁹ *Id.* at 1832–33; Engel, *supra* note 191, at 179.

²⁰⁰ Adelman & Engel, *supra* note 173, at 1811–12; Spence, *supra* note 6, at 470–71.

²⁰¹ See Adelman & Engel, *supra* note 173, at 1813.

²⁰² See Spence, *supra* note 6, at 471–76.

²⁰³ See *id.* at 471–72.

also that co-management by the states could interfere with federal policies.²⁰⁴ In other areas of energy regulation, states are in charge, as in the oversight of hydraulic fracturing operations and the licensing of electric power plants and onshore renewable energy facilities.²⁰⁵ With respect to these facilities, the federal role is largely limited to the co-regulation (with the states) of environmental, health, and safety risks.²⁰⁶

Under regimes of exclusive federal authority, states can neither block nor compel federal action. These regimes generally do offer states an opportunity to raise concerns, however.²⁰⁷ In considering possible approaches to fracturing regulation, one such regime, the Outer Continental Shelf Lands Act (OCSLA),²⁰⁸ especially merits attention because it likewise governs oil and gas extraction. The analogy between the offshore resources governed by OCSLA, which are wholly owned by the federal government, and the onshore resources subject to hydraulic fracturing, which are largely private, is hardly perfect. Nonetheless, OCSLA's detailed provisions for state input could provide an instructive model, as they reflect an elaborate effort to account for state interests within an exclusive federal program. These state interests are largely two-fold: obtaining a fair share of the revenues derived from offshore leasing, and addressing the environmental burdens generated by leasing activity—burdens that are borne disproportionately by coastal states.²⁰⁹

OCSLA authorizes the federal government, through the Department of the Interior, to lease ocean oil and gas resources located beyond state jurisdiction.²¹⁰ The federal government's responsibilities include not only the grant of individual leases, but also the preparation of a five-year leasing program describing the size, timing, and location of proposed lease sales.²¹¹ During the preparation of a leasing program, the federal government "shall invite and consider suggestions" from affected state and local governments.²¹² Prior to publication, the federal government also must submit its proposed program to affected state and local governments, which may request modifications to the proposal.²¹³ Individual lease sales and development and production plans are also subject to state and local input. Specifically, state and local governments may submit recommendations "regarding the size, timing, or location, of a proposed lease sale or with respect to a proposed development and production plan."²¹⁴ In deciding

²⁰⁴ See *id.* at 471.

²⁰⁵ See *id.* at 474–76.

²⁰⁶ See *id.*

²⁰⁷ See *id.* at 473–74.

²⁰⁸ Outer Continental Shelf Lands Act, 43 U.S.C. §§ 1331–1356a (2012).

²⁰⁹ See Amy McIntire, *Oil and Gas Development on the Outer Continental Shelf: The Uphill Battle for State Input into Federal Policy*, 9 TEX. J. OIL GAS & ENERGY L. 37, 47–52 (2014).

²¹⁰ 43 U.S.C. §§ 1331(a), 1337. State jurisdiction over submerged lands is generally limited to the 3-mile zone closest to the coastline. *Id.* § 1312.

²¹¹ *Id.* §§ 1337, 1344.

²¹² *Id.* § 1344(c)(1).

²¹³ *Id.* § 1344(c)(2).

²¹⁴ *Id.* § 1345(a).

whether to accept or reject such recommendations, the federal government is to “provide for a reasonable balance between the national interest and the well-being of the citizens of the affected State.”²¹⁵

OCSLA’s detailed provisions offer one model for accommodating federal and state interests. In practice, however, federal interests have tended to dominate, and state concerns have received little weight. Courts review the federal government’s acceptance or rejection of state and local input under a lenient “arbitrary or capricious” standard and have been highly deferential to federal decisions.²¹⁶ Moreover, courts have interpreted OCSLA’s provisions regarding state and local input as procedural in nature and thus have required only that the federal government respond to such input.²¹⁷ These provisions have had virtually no substantive effect, leaving one commentator to conclude that the statute provides no more than “a toothless and nontransparent balancing test in which states . . . have no greater opportunity to affect policy than any other party in notice-and-comment rulemaking.”²¹⁸ Reflecting upon how OCSLA’s flaws might be addressed, however, can help design more effective mechanisms for accounting for national and regional interests, as Part V explains.

V. MOVING FORWARD

The foregoing discussion suggests that there may be no ideal arrangement for allocating regulatory authority over activities that have

²¹⁵ *Id.* § 1345(c). In addition to the OCSLA provisions discussed above, the Coastal Zone Management Act’s consistency review process provides another avenue for states to express their concerns. *See* 16 U.S.C. § 1456(c) (2012). Consistency review requires applicants for offshore oil and gas exploration, development, or production affecting the coastal zone of a state to certify that the proposed activity is consistent with the state’s coastal zone management program. *See id.* § 1456(c)(3)(B). The federal government may not allow the proposed activity to go forward unless the state concurs with the certification or the federal government finds the activity to be consistent with the objectives of the Coastal Zone Management Act or is “otherwise necessary in the interest of national security.” *Id.* § 1456(c)(3)(B)(iii).

²¹⁶ 43 U.S.C. § 1345(d) (2012); *see* Sierra B. Weaver, Note, *Local Management of Natural Resources: Should Local Governments Be Able to Keep Oil Out?*, 26 HARV. ENVTL. L. REV. 231, 239–40 (2002).

²¹⁷ *See* *Natural Res. Def. Council v. Hodel*, 865 F.2d 288, 305 (D.C. Cir. 1988) (explaining that the OCSLA requirements that the Secretary of Interior consider suggestions from affected states and reply to state requests for modifications constitute a duty only “to identify his legal or factual basis and to explain why he acted as he did”); *Cal. ex rel. Brown v. Watt*, 668 F.2d 1290, 1321–22 (D.C. Cir. 1981) (characterizing OCSLA requirements regarding state input as “a procedural framework for participation” that “merely require[s] the Secretary to state his reasons for accepting or rejecting state recommendations”); *California v. Watt*, 683 F.2d 1253, 1269 (9th Cir. 1982), *rev’d on other grounds*, 464 U.S. 312 (1984) (rebuffing the contention that the Secretary of Interior failed to provide for a reasonable balance in rejecting state recommendations, where the Secretary “gave some consideration to the relevant factors”); Weaver, *supra* note 216, at 239–41.

²¹⁸ Weaver, *supra* note 216, at 240. In response, many cities and counties have adopted local ordinances restricting the establishment of onshore support facilities for offshore oil and gas development—a strategy that may be vulnerable to legal challenges as inconsistent with federal law. *See id.* at 242–46; John K. Van de Kamp & John A. Saurenman, *Outer Continental Shelf Oil and Gas Leasing: What Role for the States?*, 14 HARV. ENVTL. L. REV. 73, 118–21 (1990).

local, regional, and national implications. Clearly, hydraulic fracturing should not be a matter for wholly local determination. Hydraulic fracturing has important implications for energy security at a national level and generates environmental and social effects that extend well beyond local boundaries. At the same time, many effects of hydraulic fracturing are indeed geographically concentrated. The matching principle does not provide an adequate solution for matching jurisdiction over fracturing activity with its effects because those effects are dynamic and overlapping. The presence of significant national, regional, and local interests calls for a governance system that takes into account these varied interests and allows for input by different levels of government. Furthermore, the presence of supranational concerns—most importantly, climate change—suggests that governments must also look beyond hydraulic fracturing's immediate benefits and risks.

The hydraulic fracturing controversies in Spain and the United States reveal the presence of similar concerns regarding energy security, job creation, revenue sharing, environmental impacts, and societal change. The two countries possess differing governmental structures and resource ownership regimes, however, making unlikely an identical approach to allocating regulatory authority. This Part considers first the situation in Spain and then the situation in the United States.

A. Spain

Not surprisingly, support for or opposition to hydraulic fracturing at various levels of government in Spain reflects the distribution of expected costs and benefits. The national government owns the country's subsurface resources and would reap a direct financial gain—in the form of royalties as well as increased tax revenues—from their extraction. In addition, the benefits of improved energy security and lower energy prices would rebound to the nation as a whole rather than to particular regions. Hydraulic fracturing's benefits would be largely national, and support is strongest at the national level.

Autonomous communities where hydraulic fracturing occurs would gain a disproportionate share of some benefits, such as job growth and economic activity. But in contrast to U.S. states, Spain's autonomous communities primarily rely on transfers from the national government rather than on tax revenues to sustain their budgets. Consequently, the economic benefits of fracturing activity to the autonomous communities would be somewhat muted in comparison to the benefits reaped by U.S. states. Meanwhile, the environmental and social costs of such activity would be concentrated regionally and locally. The staunch regional and local opposition is unsurprising in light of these costs.

Is Spain's policy-making process suited to account for regional and local concerns? The answer is yet to be determined, but there are grounds for skepticism. The national government has a near monopoly over the process, and the autonomous communities are guaranteed no effective

voice. Such a situation may not be tenable in a polity facing constant and substantial pressure for greater decentralization.²¹⁹ Hydraulic fracturing policy in Spain is nonetheless at an early stage of development, and there is room to reevaluate institutional arrangements in advance of significant resource extraction.

First, consider existing institutional arrangements for making hydraulic fracturing policy. Spain's government not only owns all subsurface resources but also controls the key processes relating to their management. Under the constitution, the national government possesses general authority over mining and energy matters. The Hydrocarbons Act and subsequent enactments firmly give the national government exclusive authority over unconventional oil and gas concessions as well as the environmental assessments for those concessions. Management of intercommunity water resources—which will be critical if significant hydraulic fracturing activity occurs—is within the national government's exclusive authority as well.²²⁰

In light of the national government's authority over key decisions and decision-making processes, the autonomous communities are unlikely to wield much influence in hydraulic fracturing policy. Several mechanisms exist for autonomous communities to express their concerns, but none promises to be effective. First, bans have not survived legal challenges, and less onerous restrictions may fare no better.²²¹ Second, measures to protect public health and environmental resources, which could attempt to shape any fracturing activity, may be vulnerable as well. Such measures will be preempted should they interfere with the national administration of the mineral concession laws and may be at risk if they even overlap with the national regulatory regime.²²² Similarly, regional taxes on hydraulic fracturing activity will likely encounter legal challenges. Such taxes face better prospects for surviving a challenge if they merely internalize hydraulic fracturing's environmental costs, rather than seek to discourage the activity itself.²²³ Third, when the national government proposes to grant concessions, the autonomous communities may express their concerns through reports or less formal channels. Although the national government cannot completely disregard those concerns, it remains to be seen if their consideration will be more than a formality. Indeed, the national government's response may

²¹⁹ See *supra* Part II.A (highlighting Spain's decentralization and sharing of power with subnational units).

²²⁰ CONSTITUCIÓN ESPAÑOLA [C.E.], B.O.E. n. 311, Dec. 29, 1978, art. 149, para. 1 (Spain), translated at <http://www.boe.es/legislacion/documentos/ConstitucionINGLES.pdf>. However, as conflicts over scarce water resources have intensified, some autonomous communities have asserted authority over such resources by statute. See Alberto Garrido & M. Ramon Llamas, *Water Management in Spain: An Example of Changing Paradigms*, in POLICY AND STRATEGIC BEHAVIOUR IN WATER RESOURCE MANAGEMENT 125, 127 (Ariel Dinar & Jose Albiac eds., 2009). These developments have led one pair of commentators to conclude that in Spain, “[w]ater policy is increasingly a regional policy.” *Id.* at 133.

²²¹ See *supra* Part II.C (describing regional bans that were challenged and invalidated by the Spanish government).

²²² See *supra* text accompanying notes 70–73.

²²³ See *supra* Part II.B (discussing the ability of autonomous communities to impose environmental taxes).

resemble the response of Spain's Industry Minister to a 2013 letter expressing various municipalities' concerns about hydraulic fracturing. In that instance, the minister simply affirmed the government's support for fracturing and noted that operators would be required to obtain liability insurance.²²⁴ Finally, relief through a region's representatives in the Spanish parliament is unlikely. That body just enacted laws to make way for hydraulic fracturing, and the adverse effects of any fracturing activity are likely to be concentrated in the country's relatively sparsely populated north.²²⁵

As matching principle adherents might put it, hydraulic fracturing in Spain presents "geographically mismatched costs and benefits."²²⁶ This mismatch suggests on the one hand that the allocation of control over fracturing decisions to the national government presents a serious risk of underregulation. On the other hand, transferring control to the autonomous communities not only is politically implausible, but also risks overregulation. Regional or local domination of fracturing decisions could lead to the disregard of national interests in energy security and the undermining of national energy policy. The dynamic federalism literature points to alternative arrangements that may better account for the varied interests at stake.

One possibility would involve revenue sharing: parceling a greater share of fracturing's economic benefits to affected autonomous communities would provide a measure of compensation and enable mitigation of some of fracturing's negative consequences.²²⁷ Such an arrangement could be patterned after the benefit-sharing provisions of OCSLA, under which affected coastal states receive a percentage of federal offshore oil and gas revenues "for the mitigation of adverse economic and environmental effects related to the development of [offshore] resources."²²⁸ Ensuring that shared revenues are sufficient to mitigate or compensate for tangible losses is no easy matter, however. Such losses may be sizable, and the uncertainties surrounding the adverse effects of hydraulic fracturing will make them difficult to measure.²²⁹ Furthermore, revenue sharing simply may not be

²²⁴ See Sevillano, *supra* note 42.

²²⁵ The autonomous communities with the most promising shale gas prospects—Cantabria, La Rioja, the Basque Country, and Navarra—together contain less than 10% of Spain's total population. See INSTITUTO NACIONAL DE ESTADÍSTICA, POPULATION FIGURES AT 1 JANUARY 2014, MIGRATION STATISTICS 2013, PROVISIONAL DATA 5 (2014), available at http://www.ine.es/en/prensa/np854_en.pdf (showing that the current combined population of these communities is 3,705,328, which is approximately 8% of Spain's total population of 46,507,760).

²²⁶ Spence, *supra* note 6, at 497.

²²⁷ See BBC.COM, *UK Looks to Boost Fracking with New Land Access Rules*, BBC NEWS, May 23, 2014, <http://www.bbc.com/news/business-27529175> (last visited Nov. 22, 2014) (discussing various proposals in the United Kingdom to compensate local communities and those living directly above fracturing sites).

²²⁸ 43 U.S.C. § 1332(4)(B) (2012); see *id.* § 1337(g)(2) (specifying revenue sharing arrangement).

²²⁹ See SEC'Y OF ENERGY ADVISORY BD., U.S. DEP'T OF ENERGY, SHALE GAS PRODUCTION SUBCOMMITTEE 90-DAY REPORT 33 (2011), available at http://www.shalegas.energy.gov/resources/081811_90_day_report_final.pdf (noting the need to clarify uncertainty about hydraulic

viewed as an acceptable balm for some types of losses, such as a lost way of life, the destruction of certain environmental amenities, and the psychic tensions associated with oil and gas development's rapid and uncertain changes.²³⁰ Because it is these latter types of losses that are largely at stake in Spain,²³¹ revenue sharing alone may not suffice.

OCSLA's provisions for state input suggest another avenue to account for local concerns. OCSLA addresses a situation analogous to that presented by hydraulic fracturing in Spain: the national government owns and controls sizable oil and gas resources, the development of which will have adverse regional or local impacts. Although OCSLA's efforts to incorporate state concerns into federal decisions have not been very effective in practice,²³² they afford a useful starting point in designing channels for regional input. The most pertinent lesson from the OCSLA experience is that procedural solutions are necessary but not sufficient. Providing states and other parties an opportunity to comment identifies their concerns, but without more, those concerns are readily disregarded. Demanding that decision makers offer specific written responses to submitted comments—as OCSLA does—ensures some engagement with those comments and would go beyond current requirements of Spanish law. Nonetheless, under OCSLA the states too often have experienced their comments to have no substantive effect.

Relatively modest modifications to Spanish law could bolster the weight given to the autonomous communities' views. Specifically, the law could be amended to require deference to the autonomous communities' recommendations unless the national government finds those recommendations to be unreasonable.²³³ A presumption of reasonability would apply once an autonomous community has identified significant environmental, social, or cultural resources at risk from proposed fracturing activity. Alternatively, the law could require the national government to identify overriding considerations in order to overcome regional objections

fracturing's risks). *Cf.* Weaver, *supra* note 216, at 263 (noting that OCSLA revenue sharing may not even fully compensate “for the more tangible injuries of loss to tourism or increased strain on the public purse caused by an expanding population and a shifting economic base”).

²³⁰ See Weaver, *supra* note 216, at 263 (suggesting that OCSLA revenue sharing does not make up for intangible losses).

²³¹ See Elola, *supra* note 47 (describing farmers' and other local residents' fears of land expropriation); Mercado et al., *supra* note 43, at 56 (noting that the hydraulic fracturing debate in Spain “is more focused on the social, environmental and health aspects, rather than on the scientific and technical aspects”).

²³² See *supra* Part IV.C.

²³³ See Van de Kamp & Saurenman, *supra* note 218, at 132 (noting that incorporating such an approach into OCSLA “gives coastal governors a much greater voice in the leasing decision while still allowing the Department of the Interior leeway to reject unreasonable recommendations”); Sam Kalen, *Cruise Control and Speed Bumps: Energy Policy and Limits for Outer Continental Shelf Leasing*, 7 ENVTL. & ENERGY L. & POL'Y J. 155, 173 (2012) (contending that, contrary to judicial interpretations, OCSLA's consultation requirements are substantive, “requir[ing] that the Secretary accept a governor's recommendations if those recommendations provide for a reasonable balance between the nation's interests and the interests of the state, with the presumption favoring the State not the converse”).

to a proposed concession.²³⁴ Under either approach, the national government would retain control over the development of energy resources, but would no longer have unfettered leeway to disregard regional concerns.

In addition, establishment of an upfront planning process for hydrocarbon development, involving national, regional, and local authorities from the outset, could help establish priorities for both development and environmental protection. At present, prospecting and exploration permits and concessions to extract hydrocarbons are issued on a case-by-case basis. Although Spain's Hydrocarbons Act does establish general planning requirements, it focuses on forecasting overall supply and demand and on ensuring adequate transportation and storage facilities.²³⁵ Not surprisingly, those requirements make no explicit mention of domestic hydrocarbon production, which has been minimal to date.²³⁶ Incorporating domestic hydrocarbon activity into the planning process would increase the transparency of that activity and generate information about its overall effects.²³⁷ Ideally, the planning process would include input from scientists, other experts, and the public, regarding natural resources and environmental concerns as well as the social and cultural resources at stake.²³⁸ The identification of areas of significant social, cultural, or environmental value could serve as the basis for discouraging or even excluding fracturing activity in those areas.²³⁹ Participation by autonomous communities and other stakeholders in the planning process would allow their concerns to be taken into account before economic investments and site-specific commitments are made.²⁴⁰

These sorts of modifications to existing law could even establish a system of overlapping authority in which each level of government effectively wields a veto. Veto authority could be exercised through a programmatic planning process, as suggested above, or on a case-by-case

²³⁴ Cf. CAL. PUB. RES. CODE § 21081 (West 2014) (requiring a public agency to find overriding considerations to approve or carry out a proposed project having significant environmental effects).

²³⁵ See Hydrocarbons Act, *supra* note 47, art. 1.

²³⁶ See *id.*; see also MILIEU, *supra* note 38, at 7 (noting that planning requirements have “not been used to justify a Strategic Environmental Assessment of unconventional gas activities”).

²³⁷ See Robert B. Wiygul, *The Structure of Environmental Regulation on the Outer Continental Shelf: Sources, Problems, and the Opportunity for Change*, 12 J. ENERGY, NAT. RESOURCES & ENVTL. L. 75, 90–91, 125 (1992).

²³⁸ Cf. Elizabeth Burleson, *Cooperative Federalism and Hydraulic Fracturing: A Human Right to a Clean Environment*, 22 CORNELL J.L. & PUB. POL'Y 289, 327 (2012) (recommending “broad stakeholder discussion to identify appropriate locations for unconventional natural gas extraction given reliance on shared water resources, bioaccumulation of contaminants, ecosystem fragility, density of human settlements, and other important factors”).

²³⁹ See Lynn S. Sletto, *Piecemeal Legislative Proposals: An Inappropriate Approach to Managing Offshore Oil Drilling*, 33 GOLDEN GATE U. L. REV. 557, 583 (2003) (discussing an analogous “environmental baseline” approach that “would establish a line of demarcation, indicating where drilling would be prohibited, in areas determined to be environmentally sensitive using a nationally accepted process”).

²⁴⁰ Cf. Wiygul, *supra* note 237, at 170 (criticizing the OCSLA process for “leav[ing] real state input to the end of the process . . . [when] it can upset [a] company's and the federal government's economic projections the most”).

basis. Dynamic federalism theory indicates that requiring assent from multiple regulators may help counter interest group influence and address regulatory gaps.²⁴¹ To assuage concerns that such an approach may be too cumbersome, the veto authority could be limited; for example, it might be invoked only with respect to the most ecologically sensitive areas or in other limited circumstances.

Notwithstanding its differing governmental structure and subsurface ownership regime, Spain can benefit from the United States' experience in managing hydrocarbon development. For purposes of accounting for national, regional, and local interests, it turns out that the most fitting U.S. analogue to Spain's onshore unconventional oil and gas resources are the offshore oil and gas resources managed by the U.S. government. Inspired by OCSLA, yet also recognizing its shortcomings, the suggested changes offer a pathway to resolving conflict between Spain and its autonomous communities.

B. United States

Even though the United States has nearly a decade's worth of hydraulic fracturing experience that Spain lacks, it features similarly polarized views on the subject and has yet to satisfactorily resolve questions regarding suitable government oversight. With state authority over resource extraction deeply rooted in tradition and practice, a complete federal takeover of U.S. fracturing policy is as improbable as would be a complete transfer of fracturing decision making to Spain's autonomous communities. The federal role, though presently limited, does provide potential avenues to address some spillover effects and to guard against state tendencies to underregulate economic activity. The Clean Air Act and the Clean Water Act enable the EPA to respectively regulate air emissions and wastewater discharges to surface waters.²⁴² Other federal environmental laws could be amended to eliminate exemptions applicable to hydraulic fracturing activity.²⁴³ Such amendments would represent important initial steps toward accounting more fully for the hazards of hydraulic fracturing.

Federal regulation of these hazards need not—and should not—preempt state regulation. States are more familiar with local conditions and fracturing practices, and they already have in place some oversight structure.²⁴⁴ Rather, through a cooperative federalism approach, the federal government can establish baseline performance standards for chemical disclosure, wastewater storage, and the like, while leaving the states flexibility on how to meet those standards.²⁴⁵ Joint federal and state

²⁴¹ See *supra* Part IV.B.

²⁴² See *supra* Part III.B.

²⁴³ See *supra* Part III.B.

²⁴⁴ Gianna Cricco-Lizza, Comment, *Hydraulic Fracturing and Cooperative Federalism: Injecting Reality into Policy Formation*, 42 SETON HALL L. REV. 703, 736–37 (2012).

²⁴⁵ See Jody Freeman, Op-Ed., *The Wise Way to Regulate Gas Drilling*, N.Y. TIMES, July 6, 2012, at A23 (contending that a cooperative federalism approach to hydraulic fracturing

regulation ultimately promises more complete and integrated attention to fracturing's environmental hazards.

Even with these suggested changes, however, the application of federal environmental laws would not account for the full range of interstate or national interests implicated by hydraulic fracturing. Of particular concern—and often forgotten in proposals regarding hydraulic fracturing regulation—is the effect of inexpensive and abundant natural gas supplies on efforts to transition to an economic system powered by renewable energy rather than fossil fuels.²⁴⁶ States, which are focused on reaping fracturing's economic benefits and on ameliorating its immediate hazards, are likely to pay scant attention to such concerns.²⁴⁷ In comparison, the federal government is better positioned to set a policy direction that articulates hydraulic fracturing's role in long-term national energy policy.²⁴⁸ Nonetheless, the federal government has done no more than states to ensure that natural gas remains only a temporary bridge rather than a long-term addiction. Federal tax breaks and regulatory exemptions that promote hydraulic fracturing activity at best would be temporary but instead are of indefinite duration. Moreover, the limited federal regulatory efforts to date have concentrated on direct emissions of pollutants rather than on systematic implications for climate change. Indeed, because climate change's effects are global, long-term, and cumulative, national governments are inherently disinclined to give sufficient attention to them.²⁴⁹ The actions of federal and state regulators are likely to focus on improving the environmental quality of hydraulic fracturing operations rather than on limiting the quantity of fossil fuels being produced.

Neither the matching principle nor dynamic federalism offers an easy answer to this problem. But they do offer noteworthy insights. The matching principle is typically cited in debates regarding whether states or the federal government should regulate a subject. The reasoning behind the principle is not limited to the domestic context, however, and supports international regulation of externalities that extend beyond national boundaries. Yet

regulation “can strike the right balance, simultaneously realizing hydraulic fracturing's energy promise and minimizing the risks while respecting state authority”).

²⁴⁶ See *supra* Part IV.A.2.a.

²⁴⁷ For example, California directly addressed hydraulic fracturing and related techniques for the first time in 2013 with the passage of Senate Bill 4, which established a permitting system, disclosure requirements, and a study of potential hazards. See CAL. ENVTL. LAW & POLICY CTR., *supra* note 1, at 4–5, 39. Critics of the bill suggested that in creating a permitting process “California is backing away from its stated commitment to transition to a ‘clean energy economy.’” *Id.* at 10.

²⁴⁸ Energy security is another interest that states have relatively little incentive to consider, and that federal regulations do not directly account for. The energy security argument for an enhanced federal role in fracturing policy is relatively weak, however, as current conditions apparently provide ample incentives for unconventional oil and gas development. See Spence, *supra* note 6, at 504 (contending that pollution reductions from use of shale gas do not warrant federal promotion of shale gas development in light of vigorous shale gas activity).

²⁴⁹ See generally STEPHEN M. GARDINER, A PERFECT MORAL STORM: THE ETHICAL TRAGEDY OF CLIMATE CHANGE (2011) (discussing long-term global climate issues and the inefficacy of attempts by national governments to fix these issues).

international regulation of hydraulic fracturing is implausible: the international response to the general problem of climate change has been anemic, and any future climate regime is highly unlikely to impose specific mandates regarding a nation's extraction of resources within its boundaries. In the absence of plausible international regulatory options, are there institutions or other actors that can serve the essential function of heeding fracturing's ramifications for climate change?

An independent energy task force presents one possible mechanism for articulating—from a macroscopic perspective—an energy policy that takes into account long-term and short-term concerns. As discussed elsewhere in further detail, such a task force could hold broad public discussions regarding energy policy, propose a national energy policy, and offer recommendations for legislative and executive action.²⁵⁰ It could explore alternative means to foster energy security that create fewer climate impacts, including promoting alternative energy sources and decreasing energy demand. Further, the task force could consider specific issues regarding the role of hydraulic fracturing, the use of natural gas as a bridge fuel, and potential pathways for transitioning to renewables. A task force would have no lawmaking authority but ideally would possess persuasive power through its expertise and the integrity of its procedures.

Just as the matching principle helps to identify gaps left by state and federal regulation, dynamic federalism highlights the value of having multiple levels of government engaged in the policy-making process. Although the matching principle indicates that states have relatively weak incentives to enact measures to combat climate change, many states and local governments have done so nonetheless.²⁵¹ These initiatives serve as important means for engaging in national energy policy matters—including the role of hydraulic fracturing. In particular, the adoption of renewable portfolio standards, which require utilities to deliver a certain percentage of electricity from renewable energy sources, simultaneously reduces the demand for fossil fuels while creating a market for renewable energy.²⁵² Energy codes and other energy efficiency measures likewise have reduced fossil fuel demand. The effect of such measures on hydraulic fracturing activity is admittedly indirect, and of course the Commerce Clause restricts states' ability to influence interstate economic activity.²⁵³ Nonetheless, this analysis provides an important reminder that states do sometimes express and act upon global concerns. Vigorous participation by both states and the federal government in hydraulic fracturing policy is desirable not only from

²⁵⁰ See Lin, *supra* note 146, at 1842.

²⁵¹ See Engel, *supra* note 191, at 168; see also Ctr. for Climate and Energy Solutions, *Climate Action: U.S. States & Regions*, <http://www.c2es.org/us-states-regions> (last visited Nov. 22, 2014) (listing climate policies adopted by states and regions).

²⁵² See Barry Rabe, *Race to the Top: The Expanding Role of U.S. State Renewable Portfolio Standards*, 7 SUSTAINABLE DEV. L. & POL'Y 10, 10 (2007).

²⁵³ See generally Steven Ferrey, *Carbon Outlasts the Law: States Walk the Constitutional Line*, 41 B.C. ENVTL. AFF. L. REV. 309 (2014) (providing an extensive discussion of constitutionally based challenges to state measures aimed at reducing carbon emissions).

the standpoint of representative government, but also because it promises better substantive outcomes.

VI. CONCLUSION

Hydraulic fracturing presents complexities and challenges for oversight because its various effects occur at different scales and implicate distinct policy concerns. The uneven distribution of fracturing's benefits and burdens means that national, regional, and local views regarding fracturing's desirability are likely to diverge. To account for these views, the involvement of different levels of government is essential in policy decisions regarding whether to allow fracturing and to what extent, as well as in decisions regarding individual projects. As the comparative analysis in this Article suggests, such involvement can be achieved through legal and institutional arrangements that are tailored to the political system of a particular country. The suggestions offered here will not reconcile conflicting views, but outline promising means of airing and attempting to accommodate underlying concerns.