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Cooperative Federalism and Hydraulic Fracturing: A Human Right to a Clean Environment

Elizabeth Burleson*

Abstract: United States natural gas production is likely to stunt the direction and intensity of renewable energy by up to two decades according to a MIT study. Gas will not provide a “‘bridge’ to a low-carbon future if it erodes efforts to prepare a landing at the other end of the bridge.”¹ Unconventional natural gas extraction need not become a “transition” to a new addiction. This article analyzes how cooperative federalism and inclusive decision-making can provide legitimacy and transparency when balancing property rights versus police powers to regulate natural gas production.

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I. Introduction

Transitioning from foreign fossil fuel reliance to domestic water insecurity, the energy debate continues to divide. As hydraulic fracturing intensifies so do calls for greater transparency

* Professor Elizabeth Burleson has a LL.M. from the London School of Economics, a J.D. from the University of Connecticut School of Law, and teaches property and energy law at Pace Law School. She would like to thank the participants of the Vermont and Albany Law School faculty workshops for their comments on an earlier version of this Article.

¹ Henry D. Jacoby, Francis M. O’Sullivan and Sergey Paltseva, *The Influence of Shale Gas on U.S. Energy and Environmental Policy*, 1 ECONOMICS OF ENERGY & ENVIRONMENTAL POLICY 1 (2012) available at http://globalchange.mit.edu/files/document/MITJPSPGC_Reprint_12-1.pdf.

and public participation to balance the three interdependent sustainable development pillars: environmental protection, social equity, and economic stability. Article I of the United States Constitution empowers Congress to promote innovation by protecting discoveries.² The federal government can also override patent protection to protect the public.³ Cooperative federalism and inclusive decision-making can provide legitimacy and transparency when balancing property rights versus police powers to regulate new natural gas mining innovations. Collaborative governance can best implement energy siting best practices and well integrity enforcement. Broad civil society participation can help resolve such questions as whether drinking water buffer zones should be over a mile or 150 feet. Protecting public health and environmental integrity depends upon greater regulation of hydraulic fracturing that is strictly enforced. United States Environmental Protection Agency (EPA) rulemaking on flaring and leakage of methane can begin the process of internalizing externalities. Regulatory commons issues are not new, yet hydraulic fracturing presents unique regulatory challenges in the wake of recent exemptions to federal environmental law. Filling the regulatory gaps governing unconventional natural gas can best be accomplished through collaborative governance that is genuinely adaptive and cooperative.

Collaborative federalism combined with procedural rights for inclusive decision-making should provide the requisite safeguards before further natural gas development advances. Part II of this Article discusses unconventional natural gas in the context of coordinating energy-water-climate governance. Part III evaluates current federal regulatory limitations while Part IV analyzes the New York suit against the federal government to conduct environmental impact

² Congress is empowered “[t]o promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries. Article I, Section 8, Clause 8 of the United States Constitution, known as the Copyright Clause.

³ 28 USC 1498, *see also* Elizabeth Burleson & Winslow Burleson, *Innovation Cooperation: Energy Biosciences and Law*, 2011 U. ILL. L. REV. 651 (2011).

review. In contrast, Part V assesses federal, local and civil society critique of the state of New York's revised environmental impact review. Part VI sets forth recommendations to strengthen energy-water-climate governance to respond to public health and environmental challenges of unconventional natural gas. This Article concludes that cooperative federalism and inclusive decision-making can facilitate both a human right to a clean environment and energy security.

II. Coordinating Energy-Water-Climate Collaborative Governance

Hydraulic fracturing provisions are strikingly fragmented – sparking a fierce debate on chemical disclosure, radioactive wastewater disposal, and greenhouse gas emissions. Flaring natural gas flies in the face of efforts to address climate change. The EPA Natural Gas STAR Program explains that natural gas extraction brings the greenhouse gas methane to the surface where it is twenty-one times more potent than carbon dioxide at trapping heat in the atmosphere over a 100-year period.⁴ A MIT study indicates that ramping up natural gas stunts renewable energy development by up to two decades.⁵ As the scope of carcinogenic, radioactive, and climate impacts of unconventional natural gas development become better known public safety must be addressed through health as well as environmental impact assessments.⁶ Public participation in early energy decision-making can avoid human rights violations that result when heavy industry is sited amidst residential communities and within drinking watersheds.

⁴ See Environmental Protection Agency, *Natural Gas STAR Program*, available at <http://www.epa.gov/gasstar/basic-information/index.html>.

⁵ Jacoby, O'Sullivan and Paltseva, *supra* note 1, at 1.

⁶ See Owen L. Anderson, *Subsurface "Trespass": A Man's Subsurface is Not His Castle*, 49 WASHBURN L.J. 247, 281-82 (2010); see also John W. Broomes, *Wrestling with a Downhole Dilemma: Subsurface Trespass, Correlative Rights, and the Need for Hydraulic Fracturing in Tight Reservoirs*, 53 ROCKY MTN. MIN. L. INST. 20-1, at 20-13 (2007).

Residents in Pennsylvania have learned that faulty well installation can compromise potable water sources.⁷ While conventional gas is extracted from permeable reservoirs, unconventional gas can be reached through fracturing rock formations. A combination of horizontal drilling and hydraulic fracturing has expanded access to unconventional gas found in a range of formations including shale, coalbeds, and sandstones. This article will focus on unconventional natural gas development rather than the narrower hydraulic fracturing step of injecting water, sand and chemicals underground to release natural gas from cracks in rocks.⁸ The media has focused on the term hydraulic fracturing, preferring the shorthand “fracking.”⁹ Yet, faulty cementing, wastewater, and a myriad of related concerns are as important to address as the specific industrial practice of opening cracks in shale using high pressure methods. In other words public debate has only recently expanded to encompass not only hydraulic fracturing but the entire unconventional natural gas extraction process and its substantial challenges to public health and environmental integrity.

⁷ See David Biello, *What the Frack? Natural Gas From Subterranean Shale Promises U.S. Energy Independence-With Environmental Costs*, Sci. Am. (Mar. 30, 2010), <http://www.scientificamerican.com/article.cfm?id=shale-gas-and-hydraulic-fracturing>.

⁸ The given hydrofracking ratio depends on specific well conditions, DRAFT PLAN TO STUDY THE POTENTIAL IMPACTS OF HYDRAULIC FRACTURING ON DRINKING WATER RESOURCES 6, United States Environmental Protection Agency Office of Research and Development, EPA/600/D-11/001 February 2011, *available at* [http://yosemite.epa.gov/ab/sabproduct.nsf/0/D3483AB445AE61418525775900603E79/\\$File/Draft+Plan+to+Study+the+Potential+Impacts+of+Hydraulic+Fracturing+on+Drinking+Water+Resources-February+2011-Report.pdf](http://yosemite.epa.gov/ab/sabproduct.nsf/0/D3483AB445AE61418525775900603E79/$File/Draft+Plan+to+Study+the+Potential+Impacts+of+Hydraulic+Fracturing+on+Drinking+Water+Resources-February+2011-Report.pdf) /s (noting that, “[h]ydraulic fracturing is often used to stimulate the production of oil and gas from unconventional oil and gas deposits, which include shales, coalbeds, and tight sands. Unconventional natural gas deposits generally contain a lower concentration of natural gas over broader areas that have a lower permeability than conventional gas reservoirs, which are typically porous and permeable and do not require additional stimulation for production.”) *Id.*

⁹ The term hydraulic fracturing has come to mean different things to different stakeholders. To natural gas operators it refers to a very specific part of the natural gas production process while the general public has a wider interpretation encompassing the lifecycle of natural gas extraction. The latter use of hydrofracking broadens the discussion to address negative impacts that result from steps before and subsequent to the actual hydraulic fracturing stage of opening fissures in a rock formation by blasting water, sand and chemicals.

Hydraulic fracturing involves injecting water, chemicals, and a proppant such as sand to hold fractures open and release trapped gas.¹⁰ Slickwater hydraulic fracking fluid often contains diesel, formaldehyde, and acids from the outset and picks up heavy concentrations of salts, minerals and radioactive materials from the rock formation.¹¹ The 2010 documentary *Gasland*, highlighted public concern over slickwater and gas migration into surface and groundwater supplies.¹² The Academy of Natural Sciences has found that drilling has impacted watershed indicator species.¹³

Drilling operators say that the thousands of feet between hydraulic fracturing operations and aquifers combined with casing regulations and the ratio of water to chemicals adequately protects the environment.¹⁴ At the same time, companies acknowledge that cement casing technology needs to be developed further¹⁵ and that Pennsylvania drillers have violated environmental regulations.¹⁶

Regulatory coordination is lacking with regard to unconventional natural gas extraction and its health/environmental impacts. The water intensity of hydraulic fracturing is particularly challenging. Both water availability and quality issues are coming to the fore as unconventional natural gas extraction expands. Unprecedented water withdrawals threaten aquatic habitat and overly rapid aquifer depletion. Generally flowback is treated (1) at publicly owned sewage treatment works (POTWs) raising radioactivity concerns, (2) injected into underground injection

¹⁰ See generally Ground Water Protec. Council, MODERN SHALE GAS DEVELOPMENT IN THE UNITED STATES: A PRIMER ES-4, U.S. Dept. Energy (Apr. 2009), www.netl.doe.gov/technologies/oil-gas/publications/EPreports/Shale_Gas_Primer_2009.pdf

¹¹ *Id.* at ES-4 to ES-5.

¹² *Gasland* (Intl. WOW Co. 2010) (motion picture), [http:// gaslandthemovie.com/about-the-film/synopsis](http://gaslandthemovie.com/about-the-film/synopsis).

¹³ Acad. Nat. Scis., Press Release, *Marcellus Shale Needs Scientific Study to Set Guidelines*, (Oct. 12, 2010), www.ansp.org/press/2010/release/Marcellus_Shale_environmental_impact_10-10.doc.pdf.

¹⁴ William S. Friedlander, *Poisoned Wells*, 47 MAR. TRIAL 16 (2011).

¹⁵ *Id.*

¹⁶ Pa. Dept. Env'tl. Protec., Press Release, *DEP Takes Aggressive Action against Cabot Oil and Gas Corp. to Enforce Environmental Laws, Protect Public in Susquehanna County* (Apr. 15, 2010).

wells raising seismicity concerns,¹⁷ and (3) stored in onsite and central industrial facilities raising leakage and long term feasibility concerns. Spills, leaks, runoff, and improper construction/drilling/disposal - all intensify pollution levels.

Water treatment plants have been ill prepared to treat flowback of hydraulic fracturing fluid, particularly given the added naturally occurring radium that flows back with the artificially added chemicals.¹⁸ Water treatment plants discharge into large rivers that in turn are relied upon for drinking water. Radioactive contamination presents a regional public health challenge.¹⁹ It also illustrates the complexity of pinpointing liability when hydrofracking operators do not deliberately add radioactive materials to hydraulic fracturing fluid. Environmental pollution governance generally suffers from the compromised ability to isolate harm caused by any given actor. A range of commercial and industrial facilities can adversely impact surface water and groundwater.²⁰ Industry use of intellectual property law has further complicated the process of tracing a given contaminant back to a given source. Generally, operators have contended that they do not have to disclose the ratio of chemicals added to hydrofracking fluids at any given site due to proprietary privileges under trade secret provisions.²¹ Well-resourced lobbying resulted in the dismantling of federal provisions that would have provided environmental and human health thresholds.

¹⁷ *Officials - 4.0 Magnitude Quake in Northeast Ohio Related to Wastewater Injection Well*, WASH. POST, Dec. 31, 2011, at 1, available at http://www.washingtonpost.com/business/40-magnitude-quake-strikes-in-northeast-ohio-the-latest-near-a-gas-drilling-injection-well/2011/12/31/gIQAhiRoSP_email.html (noting that, “Officials said Saturday they believe the latest earthquake activity in northeast Ohio is related to the injection of wastewater into the ground near a fault line, creating enough pressure to cause seismic activity.”) *Id.*

¹⁸ Mark A. Latham, *The BP Deepwater Horizon: a Cautionary Tale for Ccs, Hydrofracking, Geoengineering and Other Emerging Technologies With Environmental and Human Health Risks*, 36 WM. & MARY ENVTL. L. & POL’Y REV. 31, 56 (2011).

¹⁹ Ian Urbina, *Regulation Lax as Gas Wells’ Tainted Water Hits Rivers*, NY TIMES, Feb. 26, 2011, at A1.

²⁰ David H. Getches, *Groundwater Quality Protection: Setting a National Goal for State and Federal Programs*, 65 CHI.-KENT L. REV. 387, 410 (1989); see also Latham, *supra* note 18, at 56.

²¹ EPA, DRAFT STUDY PLAN, *supra* note 8, at 25.

Remaining federal regulatory capacity is fragmented. For instance, EPA's Mandatory Greenhouse Gas Reporting Program²² encompasses methane and carbon dioxide emissions reporting for distributors and facilities emitting over 25,000 metric tons of carbon dioxide annually.²³ Yet, EPA has yet to require greenhouse gas emissions reductions through this program.²⁴ This program and EPA's Tailoring Rule²⁵ together do not adequately incentivize greenhouse gas mitigation.

In the context of drinking water, when wells lack proper casing and cementing, stray gas can migrate from the wellbore into water supplies and residences. A Duke University study found drinking water methane concentrations 17 times higher in active drilling/extraction areas than non-active areas.²⁶ Few environmental or public health advocates at present have a comprehensive understanding of gas engineering and law, state-specific mineral leasing requirements, or intellectual and other property law dimensions. A profound lack of understanding of the capacity of unconventional natural gas extraction to threaten water supplies presents a level of scientific uncertainty justifying precaution.

A. United States Pioneering Collaborative Governance

Uma Outka has analyzed the environmental justice implications of National Environmental Policy Act (NEPA)²⁷ structural gaps.²⁸ Luke Cole, Robert Kuehn, Clifford

²² 40 C.F.R. Part 98.

²³ EPA, *Greenhouse Gas Reporting Program*, at 1, available at <http://www.epa.gov/climatechange/emissions/ghgrulemaking.html>.

²⁴ *Id.*

²⁵ The list includes carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. U.S. Environmental Protection Agency, *Final Rule: Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule*, available at <http://www.epa.gov/NSR/documents/20100413fs.pdf>.

²⁶ Osborn, Vengosh, Warner, and Jackson, METHANE CONTAMINATION OF DRINKING WATER ACCOMPANYING GAS WELL DRILLING AND HYDRAULIC FRACTURING 2 (2011) Proceedings of the National Academy of Sciences, DOI: 10.1073/pnas.1100682108 available at <http://www.nicholas.duke.edu/cgc/pnas2011.pdf>.

²⁷ 42 U.S.C. § 4321 *et seq.*

²⁸ Uma Outka, *NEPA and Environmental Justice: Integration, Implementation, and Judicial Review*, 33 B.C. Env'tl. Aff. L. Rev. 601 (2006); see also Robert R. Kuehn, *A Taxonomy of Environmental Justice*, 30 ENVTL.

Rechtschaffen, and Mariá Ramirez Fisher have also analyzed the scope of environmental justice in the United States, while Svitlana Kravchenko did pioneering analysis in international human rights and the environment.²⁹ According to the EPA:

Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. EPA has this goal for all communities and persons across this Nation. It will be achieved when everyone enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work.³⁰

President Clinton's 1994 Executive Order on "Environmental Justice in Minority and Low-Income Populations" paved the way for federal agencies to identify and address health and environmental impacts on environmental justice.³¹ The Order did not set forth a private cause of action but did task federal agencies with the mission to integrate environmental justice into their

L. REP. 10,681, 10,681 (2000); Luke W. Cole & Sheila R. Foster, FROM THE GROUND UP: ENVIRONMENTAL RACISM AND THE RISE OF THE ENVIRONMENTAL JUSTICE MOVEMENT (New York University Press: 2001); *see also* Clifford Rechtschaffen, Advancing Environmental Justice Norms, 37 U.C. DAVIS L. REV. 95, 96 (2003); *see also* Mariá Ramirez Fisher, Book Note, On the Road from Environmental Racism to Environmental Justice, 4 VILL. ENVTL. L.J. 449, 449-52 (1994); *see also* Gerald Torres, Introduction: Understanding Environmental Racism, 63 U. COLO. L. REV. 839, 839-40 (1992).

²⁹ John E. Bonine and Svitlana Kravchenko, *Human Rights and the Environment: Cases, Law, and Policy*, 1st ed. (North Carolina: Carolina Academic Press 2008) at 261; *see also* Elizabeth Burleson, *Making Sand Castles as the Tide Comes In: Legal Aspects Of Climate Justice*, 2 JEEL & ELR 42 (2011); *see also* Elizabeth Burleson and Diana Pei Wu *Collaborative Community-based Natural Resource Management*, 21 FORDHAM ENVTL. L. REV. 201 (2010).

³⁰ EPA, Environmental Justice, at 1, *available at* <http://www.epa.gov/compliance/environmentaljustice/>.

³¹ FEDERAL ACTIONS TO ADDRESS ENVIRONMENTAL JUSTICE IN MINORITY POPULATIONS AND LOW-INCOME POPULATIONS, Exec. Order No. 12,898, 59 Fed. Reg. 7629 (Feb. 11, 1994), amended by Exec. Order No. 12,948, 60 Fed. Reg. 6381 (Jan. 30, 1995) (Mandating that each federal agency make "environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations"). *Id.* at 7629; *see also* Omar Saleem, Overcoming Environmental Discrimination: The Need for a Disparate Impact Test and Improved Notice Requirements in Facility Siting Decisions, 19 COLUM. J. ENVTL. L. 211, 213-22 (1994).

activities.³² Public Participation is a core aspect of environmental justice and has been required of federal agencies by NEPA.³³

NEPA requires federal agencies to write an environmental impact statement for “major federal actions significantly affecting the quality of the human environment”³⁴ including: issuing federal permits, establishing government policies/regulations, undertaking/authorizing federal projects, and activities potentially subject to federal control and responsibility.³⁵ Conducting environmental assessments³⁶ enables federal agencies to decide whether to go on to an entire environmental impact statement based on “‘a reasonably close causal relationship’ between the environmental effect and the alleged cause.”³⁷ Alternatively, federal agencies can declare a Finding of No Significant Impact (FONSI) and end environmental review.³⁸

A crucial provision in NEPA relates to timeframe. Federal agencies are to conduct their environmental review “at the earliest possible time” in a given planning process. This is core to awareness regarding adverse environmental impacts and potential alternatives genuinely informing decision-making.³⁹

³² FEDERAL ACTIONS TO ADDRESS ENVIRONMENTAL JUSTICE IN MINORITY POPULATIONS AND LOW-INCOME POPULATIONS, 59 Fed. Reg. at 7632-33.

³³ Id. §§ 4321, 4332. Council on Environmental Quality (CEQ) guidance of 1997 enhancing environmental justice under NEPA analyses 42 U.S.C. §§ 4321-4347 (2000); COUNCIL ON ENVTL. QUALITY, ENVIRONMENTAL JUSTICE: GUIDANCE UNDER THE NATIONAL ENVIRONMENTAL POLICY ACT 1 (1997), *available at* <http://ceq.hss.doe.gov/nepa/nepa25fn.pdf>; *see also* EPA, FINAL GUIDANCE FOR INCORPORATING ENVIRONMENTAL JUSTICE CONCERNS IN EPA'S NEPA COMPLIANCE ANALYSES § 1.0 (Apr. 1998), *available at* http://www.epa.gov/compliance/resources/policies/ej/ej_guidance_nepa_epa0498.pdf [hereinafter EPA GUIDANCE]; *see generally* <http://www.epa.gov/region4/ej/resources.html>.

³⁴ 42 U.S.C. § 4332(C) (2000).

³⁵ 40 C.F.R. § 1508.18 (2005).

³⁶ 40 C.F.R. § 1501.3.

³⁷ *Dep't of Transp. v. Pub. Citizen*, 541 U.S. 752, 767 (2004) (quoting *Metro. Edison Co. v. People Against Nuclear Energy*, 460 U.S. 766, 774 (1983)); *see* 40 C.F.R. § 1508.27.

³⁸ Id. § 1501.4.

³⁹ 40 C.F.R. § 1501.2.

The environmental impact statement process encompasses a reasonable alternatives analysis that includes seriously considering no action.⁴⁰ It also encompasses consideration of direct, indirect, and cumulative impacts that affect health, environmental, social, and economic resources.⁴¹

Once a draft environmental impact statement has been completed, NEPA requires the agency to solicit and respond in a specific and affirmative manner to potentially affected individuals as well as relevant federal, state, and local agencies.⁴² Furthermore NEPA facilitates inclusive decision-making by requiring the agency to involve the public. In doing so NEPA calls for public disclosure of comments and underlying documents, notification, and public meetings.⁴³ NEPA requires federal agencies to include their responses to public comments in their final environmental impact statement.⁴⁴ None of these requirements holds an agency to the most environmentally favorable option,⁴⁵ yet NEPA does set forth procedural measures to ensure informed decision-making. Environmental impacts may not prevent an action but actions should not commence without adequate understanding of environmental consequences.⁴⁶ Thus, NEPA places environmental analysis squarely on the agenda of federal decision-making as well as facilitating access to information and public participation.⁴⁷

⁴⁰ Id. § 1502.14.

⁴¹ Id. §§ 1508.25, 1508.14, 1508.8.

⁴² Id. § 1503.1.

⁴³ Id. § 1506.6.

⁴⁴ 40 C.F.R. §§ 1502.9, 1505.2.

⁴⁵ See id. § 1505.2.

⁴⁶ Id. § 1500.1(c)

⁴⁷ See 40 C.F.R. §§ 1500.1(c), 1506.6.

Council on Environmental Quality Guidance calls upon federal agencies to recognize factors that may amplify adverse environmental impacts for certain communities and strategize ways to surmount barriers to meaningful participation by a broad array of stakeholders.⁴⁸

A crucial environmental justice decision conducted by federal agencies involves determining whether to conduct a full environmental impact statement for a proposed action.⁴⁹ Generally, NEPA reviews are done via preliminary environmental assessments, not a full environmental impact statement.⁵⁰

It is important to note that NEPA regulations call on agencies to involve the public in preparing environmental assessments yet also be mindful of the reality that NEPA only requires public participation with regard to notice and comment provisions for a draft environmental impact statement.⁵¹ In other words, civil society participation in inclusive environmental decision-making rests on the determination of significant environmental impact.⁵² The federal agency has to be conscientious enough on its own to recognize substantial environmental impacts before NEPA requires the agency to engage with the general public to identify ramifications and alternatives.⁵³

B. Balancing Equity and Efficiency in Collaborative Governance

Sean Nolon has considered notions of equity, cultural perception of risk and attribution of cause in the context of energy siting. He explains that discounting civil society involvement as

⁴⁸ Council on Env'tl. Quality, *supra* note 33, at 8-9; "Express and judicially recognized exceptions to NEPA further limit NEPA's capacity to provide comprehensive procedural rights to access to information and public participation" Outka, *supra* note 49 at 612 *citing* Anchorage v. United States, 980 F.2d 1320, 1328 (9th Cir. 1992); Webb v. Gorsuch, 699 F.2d 157, 159-60 (4th Cir. 1983).

⁴⁹ See Cole and Foster, *supra* note 28, at 196-97.

⁵⁰ Stephen M. Johnson, NEPA and SEPA'S in the Quest for Environmental Justice, 30 LOY. L.A. L. REV. 565, 575 (1997).

⁵¹ See 40 C.F.R. § 1506.6(a) (2005).

⁵² EPA GUIDANCE, *supra* note 33, at § 4.1.

⁵³ Cole and Foster, *supra* note 28, at 196.

costly and time consuming misses the following important points of governance. Siting decisions often “impose significant, uncompensated burdens on communities”⁵⁴ and collaborative governance⁵⁵ can enhance sustainable development. Process can profoundly impact outcome. Nelson Mandela’s inviting a powerful Afrikaans resistance group leader into his home enhanced reconciliation and capacity for cooperative South African governance. In the context of environmental justice, such trust building is important. Calling for people to care, openly and for the long-term, Elisabeth Radow explains that:

Public participation processes in which the dialogue manifests in open communication, collaborative interaction and transformed individual perspectives results in a greater likelihood of reasoned outcomes, which ultimately account for the common and varied interests of all involved parties.⁵⁶

In the vacuum of regulation, civil society has organized, sharing information via the Internet and public forums. Good governance involves inclusive decision-making at the outset when public participation can inform a precautionary approach⁵⁷ to energy policy rather than after-the-fact dispute resolution.

From Tunisia⁵⁸, to Egypt,⁵⁹ to US,⁶⁰ to Russia – ordinary individuals gathered to express collective desperation. High cost of living, corruption, and unemployment drive resistance.⁶¹

⁵⁴ Sean Nolon, *Negotiating the Wind: a Framework to Engage Citizens in Siting Wind Turbines*, 12 CARDOZO J. CONFLICT RESOL. 327, 331 (2011) (noting that, “successful citizen involvement is more than a statement of principle – it must be implemented following the best practices of consensus building and collaboration.”) *Id.*

⁵⁵ Jody Freeman, *Collaborative Governance in the Administrative State*, 45 UCLA L. Rev. 1, 13 (2007).

⁵⁶ Elisabeth N. Radow, *Citizen David Tames Gas Goliaths on the Marcellus Shale Stage: Citizen Action as a Form of Dispute Prevention in the Internet Age*, 12 Cardozo J. Conflict Resol. 373 (2011) (noting that “[t]he decision-making process occurs over time in an evolving international landscape regarding the boom or bust economic forecast of the drilling investment itself, growing numbers of incidents of environmental and human catastrophes, states and private parties in growing need of revenue and the resulting politics.”) *Id.*

⁵⁷ Daniel Bodansky, *Scientific Uncertainty and the Precautionary Principle*, 33 Env’t 4, 4 (1991).

⁵⁸ *My Son Set Himself on Fire for Dignity*, Mannoubia Bouazizi cited in Kurt Andersen, *The Protester*, Dec. 14, 2011, at 1, available at http://www.time.com/time/specials/packages/article/0,28804,2101745_2102132_2102373,00.html (“Majdi Calboussi, a middle-class 29-year-old software developer and antiregime blogger, was there recording the protests and the police with his BlackBerry. “People started to say, ‘Ben Ali, dégage’ ” (“Get out, Ben Ali”). He uploaded his video to Twitter, and it got half a million views in a day. Hours later, President Zine el Abidine Ben Ali flew to exile

Kurt Andersen argues, “Democracy is difficult and sometimes a little scary. Because deciding what you don't want is a lot easier than deciding and implementing what you do want, and once everybody has a say, everybody has a say.”⁶² This is an unpredictable process. Inclusive decision-making provides a best practice that can avert social unrest and balance sustainable development.

Informed, inclusive decision-making may find sensible places to extract natural gas that do not compromise public health and environmental integrity. Some communities are in a position to determine whether gas production should occur, while many communities find themselves already contending with natural gas production and seek inclusive decision-making forums to identify best practices.⁶³

While the ingredients of good governance are well known, implementing transparency and inclusive decision-making in the context of energy siting remains challenging. EPA explains that:

Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Achieving environmental justice is an Agency-wide priority (USEPA, 2010d), and is therefore considered in this study plan. There are concerns that hydraulic fracturing may adversely affect some communities that may be more likely to be exposed to harmful chemical contaminants as a result of fracturing activities, particularly through contaminated drinking water resources. Stakeholders have raised concerns about the environmental justice implications of

in Saudi Arabia. After just four weeks, the protesters had won. . . "This was like a user's manual in how to topple a regime peacefully," says Wael Nawara, 50, a Web entrepreneur and longtime opposition political activist. In January, Tunisians "sent us a lot of information," says Ahmed Maher, a Cairo civil engineer and one of Egypt's most prominent activists, "like use vinegar and onion" — near one's face, for the tear gas.") *Id.*

⁵⁹ *Id.* regime changing protests were sparked by fraudulent elections. At least 4.5 million Egyptians protested.

⁶⁰ *Id.* (noting that, “[i]n the U.S., three acute and overlapping money crises — tanked economy, systemic financial recklessness, gigantic public debt — along with ongoing revelations of double dealing by banks, new state laws making certain public-employee-union demands illegal and the refusal of Congress to consider even slightly higher taxes on the very highest incomes mobilized Occupy Wall Street and its millions of supporters.

⁶¹ Andersen, *supra* note 58 at 1.

⁶² *Id.*

⁶³ Radow, *supra* note 56, at FN 148.

gas drilling operations, noting that people with a lower socioeconomic status may be more likely to consent to drilling arrangements because they may not have the resources to engage with policymakers and agencies to affect alternatives. Additionally, drilling agreements are between landowners and well operators, implying that tenants and neighbors may have little or no input in the decision-making process.⁶⁴

It is difficult to reach the environmental justice elements of rights to access to information and public participation when federal agencies issue a FONSI without involving civil society.⁶⁵

When and if a federal agency decides to prepare an environmental impact statement, Council on Environmental Quality regulations call for notice of intent to be published in the Federal Register.⁶⁶ Public participation measures kick in at this stage as agencies affirmatively request responses to a draft environmental impact statement.⁶⁷ Unfortunately, such public participation is solicited well into the decision-making process and only if an environmental impact statement is conducted.⁶⁸ Furthermore, institutional momentum tends to propel federal agencies toward completing the federal action rather than putting on the brakes and calling for no-action. Thus, the earliest stages of decision-making are a far more sensible stage at which to genuinely involve impacted stakeholders and seriously consider no action as a viable option.

Enhancing US federal environmental law's access to information, public participation, and access to justice provisions can overcome the substantial barriers to environmental justice encountered given NEPA's limited structure and timing of public participation measures.⁶⁹ Making initial outreach more robust at the earliest preliminary environmental assessment stage

⁶⁴ EPA, DRAFT STUDY PLAN, *supra* note 8.

⁶⁵ See Cole and Foster, *supra* note 28, at 196.

⁶⁶ 40 C.F.R. § 1501.7 (2005).

⁶⁷ Id. § 1503.1(a)(4).

⁶⁸ EPA GUIDANCE, *supra* note, at § 4.1; Cole and Foster, *supra* note 28, at 196.

⁶⁹ See Cole and Foster, *supra* note 28, at 196-97.

can avert the perception of civil society being “appeased rather than an actual part of the decision-making process.”⁷⁰

Actions pursuant to the Clean Air Act⁷¹ may not be required to implement NEPA's full public participation measures, leaving access to information and public participation less predictable.⁷² Cooperative federalism has led to curtailed NEPA scope when states administer the Clean Air Act, Clean Water Act,⁷³ and the Resource Conservation and Recovery Act (RCRA).⁷⁴ State action under these statutes may not be federal action pursuant to NEPA.⁷⁵ EPA review may not trigger NEPA either.⁷⁶ Yet, many states have little NEPAs, or SEPAs that include environmental justice provisions. Actions that neither trigger NEPA nor SEPA requirements for inclusive decision-making continue to result in unsustainable development.⁷⁷

Procedural rights to inclusive decision-making should not be set aside under “functional equivalent” provisions on the grounds that other statutes are more specialized and thus NEPA review would be redundant.⁷⁸ Stephen Johnson argues that NEPA functionally equivalent measures should be enhanced to require substantially equivalent public participation and other environmental justice factors.⁷⁹

While NEPA does not include a citizen suit provision, private enforcement of NEPA provisions may be pursued under the Administrative Procedures Act (APA)⁸⁰ general private

⁷⁰ Outka *supra* note 28, at 610.

⁷¹ 42 U.S.C. §§ 7401-7671q (2000).

⁷² See EPA GUIDANCE, *supra* note 33, at § 1.2.1.

⁷³ 33 U.S.C. § 1251 *et seq.* (2011); see also Elizabeth Burleson, *Tribal, State, and Federal Cooperation to Achieve Good Governance*, 40 AKRON LAW REVIEW 207 (2007) (analyzing federal, state, and tribal cooperative good governance pursuant to the Clean Water Act).

⁷⁴ 42 U.S.C. §§ 6901-6992k (2000).

⁷⁵ Johnson, *supra* note 50, at 595 n.126.

⁷⁶ *Id.*

⁷⁷ See Johnson, *supra* note 50, at 568-69.

⁷⁸ See *Env'tl. Def. Fund, Inc. v. EPA*, 489 F.2d 1247, 1256 (D.C. Cir. 1973).

⁷⁹ See Johnson, *supra* note 50, at 596.

⁸⁰ 5 U.S.C. §§ 702, 704 (2000).

right of action for judicial review of final agency actions.⁸¹ Such APA review can include agency action that is: unreasonably delayed, arbitrary, capricious, or an abuse of discretion.⁸² Reviewing courts will defer to agency actions, given the agency's area of discretion,⁸³ if the agency “has considered the relevant factors and articulated a rational connection between the facts found and the choice made.”⁸⁴

The US pioneered inclusive federal legislation that could enhance informed decision-making. The National Environmental Policy Act, the Freedom of Information Act, the Administrative Procedure Act, and the Toxic Release Inventory provide a framework for transparent, inclusive governance.⁸⁵ This US approach remains nascent and this article offers a comparative legal analysis with which to optimize inclusive environmental decision-making.

III. EPA Study on Hydraulic Fracturing and Water

Congress has directed EPA to examine the relationship between hydraulic fracturing and drinking water resources.⁸⁶ Congress approved \$1.9 million for EPA to re-open its 2004 hydraulic fracturing study, using independent sources of information, best available science, and

⁸¹ *Id.*

⁸² *Id.* at § 706.

⁸³ See *Dep't of Transp. v. Pub. Citizen*, 541 U.S. 752, 763 (2004); *Balt. Gas & Elec. Co. v. Natural Res. Def. Council, Inc.*, 462 U.S. 87, 105 (1983); *Kleppe v. Sierra Club*, 427 U.S. 390, 410 n.21 (1976).

⁸⁴ *Balt. Gas*, 462 U.S. at 105 (citations omitted).

⁸⁵ Sean Nolon, *supra* note 54, at 355. Lisa Blomgren Bingham, *Collaborative Governance: Emerging Practices and the Incomplete Legal Framework for Citizen and Stakeholder Voice*, 2009 J. Disp. Resol. 269, 273-77 (2009). (discussing the scope of Freeman's term Collaborative Governance, ranging from negotiated rulemaking to broader collaborative: participatory planning, negotiation and mediation.)

⁸⁶ EPA, DRAFT STUDY PLAN, *supra* note 8; see also U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA), SCIENCE IN ACTION BUILDING A SCIENTIFIC FOUNDATION FOR SOUND ENVIRONMENTAL DECISIONS: HYDRAULIC FRACTURING RESEARCH STUDY 1-2 (2010), at 1, available at <http://www.epa.gov/safewater/uic/pdfs/hfresearchstudyfs.pdf> (“Potential risks to surface and underground sources of drinking water might occur at various points in the hydraulic fracturing process. The likelihood of those risks causing drinking water contamination will be evaluated during the EPA hydraulic fracturing study. Contaminants of concern to drinking water include fracturing fluid chemicals and degradation products and naturally occurring materials in the geologic formation (e.g. metals, radionuclides) that are mobilized and brought to the surface during the hydraulic fracturing process.”) *Id.* at 2.

a transparent peer-reviewed process.⁸⁷ EPA is researching all stages of the hydraulic fracturing water lifecycle, based on case studies and generalized scenario evaluations.⁸⁸ EPA anticipates releasing an interim report in 2012 and a final report in 2014.

A. EPA Efforts to Enhance Public Participation

To its credit EPA has committed to involving stakeholders and working with independent experts. Federal, state, and tribal partner consultations have focused on the study's scope, gaps in information and ways to share data and conduct joint studies.⁸⁹ EPA also held a series of sector-specific webinar online, real-time, interactive forums that allow participants to ask questions.⁹⁰ These forums have brought EPA together with representatives from industry and non-governmental organizations to work on effective public engagement and information sharing.⁹¹

Hydrofracking impacts on drinking water have galvanized strong responses by the general public to date. Thousands of people are participating in informational meetings where EPA has solicited answers to fill EPA information gaps and set priorities.⁹²

While its transdisciplinary process to integrate analysis from inside and outside the EPA has taken a narrow slice of the unconventional natural gas picture, EPA is seeking to address environmental justice.⁹³ EPA notes that:

⁸⁷ HR 2996, *Conference Report for the Department of the Interior, Environment, and Related Agencies Appropriations Act*, 2010, 111th Congress (2009) (Report 111-316), available at http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=111_cong_reports&docid=f:hr316.111.pdf.

⁸⁸ EPA, DRAFT STUDY PLAN, *supra* note 8, at 50.

⁸⁹ EPA, DRAFT STUDY PLAN, *supra* note 8, at 3 (“The federal partners included the Bureau of Land Management, the U.S. Geological Survey (USGS), the U.S. Fish and Wildlife Service, the U.S. Forest Service, the U.S. Department of Energy (DOE), the U.S. Army Corps of Engineers (USACE), the National Park Service (NPS), and the Agency for Toxic Substances and Disease Registry.”) *Id.*

⁹⁰ EPA, *What's a Webinar?*, available at <http://www.epa.gov/webtraining/whatsawebinar.html>

⁹¹ EPA, DRAFT STUDY PLAN, *supra* note 8, at 3 (“Public information meetings were held between July and September, 2010, in Fort Worth, Texas; Denver, Colorado; Canonsburg, Pennsylvania; and Binghamton, New York.”) *Id.*

⁹² EPA, DRAFT STUDY PLAN, *supra* note 8, at 3-4.

⁹³ *Id.* at 15.

[t]here are concerns that hydraulic fracturing may adversely affect some communities that may be more likely to be exposed to harmful chemical contaminants as a result of fracturing activities, particularly through contaminated drinking water resources. Stakeholders have raised concerns about the environmental justice implications of gas drilling operations, noting that people with a lower socioeconomic status may be more likely to consent to drilling arrangements because they may not have the resources to engage with policymakers and agencies to affect alternatives. Additionally, drilling agreements are between landowners and well operators, implying that tenants and neighbors may have little or no input in the decision-making process. To address these concerns, EPA will combine the data collected on the location of well sites within the United States with demographic information (e.g., income and race) to screen whether hydraulic fracturing disproportionately impacts some citizens and to identify areas for further study.⁹⁴

While studying health/environmental impacts should not take the place of effectively enforcing strict regulations, the EPA is providing a collaborative governance best practice by involving civil society in its evaluation of hydrofracking impacts on drinking water. This is being done by strengthening core environmental justice components (1) access to information and (2) public participation.⁹⁵

B. Substantive Limitations of Federal Natural Gas Oversight

In 2010, EPA published a list of publicly known chemicals used in hydrofracking. EPA requested voluntary disclosures, yet EPA admits that its list is incomplete with regard to the full list of chemicals as well as the concentrations and frequency of chemical use. EPA favors the term “release” which it uses to refer to a leak, spill, or release. In early 2011, Congressman Waxman brought to light that diesel and thus benzene had been used in hydrofracking operations

⁹⁴ *Id.* at 49 (“Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies”) *Id.*

⁹⁵ Garrick B. Pursley and Hannah J. Wiseman, *Local Energy*, 60 EMORY L.J. 877, 931-932 (2011); citing William W. Buzbee, *Asymmetrical Regulation: Risk, Preemption, and the Floor/Ceiling Distinction*, 82 N.Y.U. L. Rev. 1547, 1565-66 (2007); see also Ann E. Carlson, *Iterative Federalism and Climate Change*, 103 Nw. U. L. Rev. 1097, 1102-03 (2009); see also Kirsten Engel, *State and Local Climate Change Initiatives: What Is Motivating State and Local Governments to Address a Global Problem and What Does This Say About Federalism and Environmental Law?*, 38 URB. LAW. 1015, 1021 (2006).

in 19 states from 2005-09 – heightening public outcry over the identity and toxicity of hydrofracking chemicals.⁹⁶ Chairman of the Subcommittee on Energy and Environment Henry Waxman and Subcommittee Chairman Edward Markey requested information on fracturing chemicals from eight natural gas companies.⁹⁷ The companies were not forthright in responding to these congressional requests.⁹⁸

Given the following EPA identified risks associated with hydrofracking, the scope and timeframe of the EPA study warrant serious criticism:

[L]arge hydraulic fracturing operations require extensive quantities of supplies, equipment, water, and vehicles, which could create risks of accidental releases, such as spills or leaks. Surface spills or releases can occur as a result of tank ruptures, equipment or surface impoundment failures, overfills, vandalism, accidents, ground fires, or improper operations. Released fluids might flow into a nearby surface water body or infiltrate into the soil and near-surface ground water, potentially reaching drinking water aquifers.⁹⁹

The year 2014 is too distant a timeframe for EPA to determine the “toxic and human health effects associated with hydraulic fracturing fluid chemical additives.” Further, depending on voluntary disclosures from hydraulic fracturing companies and scientific literature reviews of surface chemical spills does not strike this author as sensible given the option to require toxic disclosures and enforce robust environmental laws.

The EPA study does not focus on air pollution from unconventional natural gas extraction forgoing the opportunity to better understand the greenhouse gas emissions and other air quality impacts of ramping up drilling. Yet, EPA recognizes that one of the most substantial

⁹⁶ EPA, DRAFT STUDY PLAN, *supra* note 8, at 25.

⁹⁷ Press Release, *Comm. on Energy and Commerce, Energy & Commerce Committee Investigates Potential Impacts of Hydraulic Fracturing* (Feb. 18, 2010) at 12, available at http://energycommerce.house.gov/index.php?option=com_content&view=article&id=1896:energy-a-commerce-committee-investigates-potential-impacts-of-hydraulic-fracturing&catid=122:media-advisories&Itemid=55; *see also* Letter from Rep. Henry A. Waxman, Chairman, Comm. on Energy and Commerce, to 10 Oil and Gas Companies (July 19, 2010), available at <http://energycommerce.house.gov/documents/20100719/Letters.Hydraulic.Fracturing.07.19.2010.pdf>.

⁹⁸ Letter from Waxman *supra* note 97.

⁹⁹ EPA, DRAFT STUDY PLAN, *supra* note 8, at 25.

pollution concerns with regard to hydrofracking is “off- gassing of methane from flowback before a well is put into production. New York estimates that 10,200 mcf of methane is off gassed per well.”¹⁰⁰ Furthermore, EPA highlights known reduced emissions completion methods that can prevent 90 percent of the methane from being released into the atmosphere and further destabilizing the climate. At a local level such methane concentrations can and do cause explosions. On a daily basis, volatile organic compounds (VOCs) emitted from unconventional natural gas extraction include benzene and other carcinogens. Information is lacking on air pollution factors as straightforward as transport exhaust from heavy-duty diesel trucks. The National Park Service projects that truck traffic throughout the Marcellus Shale will substantially elevate nitrogen oxides levels.¹⁰¹ The scope and timeframe of the EPA study does not appear to be in keeping with the precautionary principle given the continued use of the drinking water supplies in question by the general public in the meantime.¹⁰² The public sector appears to be taking civil society through an experiment with the hopes that natural gas revenue will offset adverse health and environmental integrity. It strikes this author as an inadequate scope to focus narrowly on hydraulic fracturing and drinking water rather than the broader array of adverse impacts that result from natural gas development.

Hydrofracking became economic by carving out responsibility for such negative externalities as water pollution. Other factors include rising fossil fuel prices as well as technological advances in drilling horizontally using high pressure hydraulic fracturing. The oil

¹⁰⁰ *Id.* at 55.

¹⁰¹ *Id.* at 55.

¹⁰² See Elisabeth Rosenthal, *I Disclose ... Nothing*, NY TIMES, Jan. 22, 2012, at SR1, available at <http://www.nytimes.com/2012/01/22/sunday-review/hard-truths-about-disclosure.html?scp=1&sq=elizabeth%20rosenthal&st=cse> (noting that, “[i]f recent history serves as a guide, disclosure laws — meant to elucidate — do not necessarily lead to greater transparency or prevent the things they were meant to deter. Every holder of a subprime mortgage that is now underwater once signed an elaborate disclosure statement required by the Truth in Lending Act describing precisely the risky terms of their loan. Likewise, “super PACs” in the presidential campaign are technically compliant with financial disclosure laws, but have so far proved successful at hiding many of the sources of their money.”) *Id.*

and gas industry successfully lobbied for exemptions for hydrofracking from several major federal environmental laws, many of which went into effect with the enactment of the Energy Policy Act of 2005 (EPAAct).¹⁰³ EPAAct exempted many activities associated with hydraulic fracturing from existing federal governance. In particular, industry lobbying succeeded in removing hydraulic fracturing from federal drinking water measures.¹⁰⁴ This has come to be known as the EPAAct “Halliburton Loophole” to the Safe Drinking Water Act (SDWA).¹⁰⁵ Oil and gas drilling activities are generally exempt from the Clean Air Act (CAA);¹⁰⁶ Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA; commonly known as “Superfund”);¹⁰⁷ and Resource Conservation and Recovery Act.¹⁰⁸ These statutes may still cover aspects of oil/gas processing.¹⁰⁹ Hannah Wiseman has discussed the manner in which Congress has exempted many hydraulic fracturing activities from federal provisions.¹¹⁰ Fragmented federal provisions still address limited unconventional natural gas

¹⁰³ Energy Policy Act of 2005, Pub. L. No. 109-58, 119 Stat. 594, 694 (2005) (codified as amended in scattered sections throughout the U.S. Code).

¹⁰⁴ *Id.*

¹⁰⁵ 42 U.S.C. § 300(f) *et seq.*

¹⁰⁶ 42 U.S.C. § 7401 *et seq.*

¹⁰⁷ 42 U.S.C. § 103 *et seq.*

¹⁰⁸ RCRA *supra* note 74.

¹⁰⁹ EPA, *National Pollutant Discharge Elimination System (NPDES), Regulation of Oil and Gas Construction Activities* (Mar. 9, 2009), <http://cfpub.epa.gov/npdes/stormwater/oilgas.cfm>.

¹¹⁰ 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, 117 (2009) (noting that, “Congress’ exemption of fracing from the Safe Drinking Water Act involved two types of regulatory failure.”), *see also* Hannah Wiseman, *Regulatory Adaptation in Fractured Appalachia*, 21 VILL. ENVTL. L.J. 229, 251 n.125 (2010) (listing and explaining exceptions). *See also* Emily C. Powers, *Fracking and Federalism: Support for an Adaptive Approach that Avoids the Tragedy of the Regulatory Commons*, 19 J.L. & Pol’y 913 (2011) citing Energy Policy Act of 2005, Pub. L. No. 109-58, 119 Stat. 594, 694 (2005) (codified as amended in scattered sections throughout the U.S. Code) (exempting hydraulic fracturing processes from the Safe Drinking Water Act, 42 U.S.C.A.) 300(h)(d) (West 2010)). The Energy Policy Act also altered how portions of the following Acts are applied to hydrofracking, resulting in de facto exemption: Comprehensive Environmental Response Compensation Liability Act (CERCLA), Pub. L. No. 96-510, 94 Stat. 2767 (1980) (codified at 42 U.S.C.A.) 9601-75 (West 2010)); Clean Water Act, ch. 758, 62 Stat. 1155 (1948) (codified in scattered sections throughout 33 U.S.C.); National Environmental Policy Act (NEPA), Pub. L. No. 91-190, 83 Stat. 852 (1969) (codified at 42 U.S.C.A.) 4321-4347 (West 2010)); Resource Conservation and Recovery Act (RCRA), Pub. L. No. 94-580, 90 Stat. 2795 (1976) (codified at 42 U.S.C.A.) 6901 *et seq.* (West 2010)); Clean Air Act (CAA), ch. 360, 69 Stat. 322 (1955) (codified at 42 U.S.C.A.) 7401-7671 (West 2010)); Emergency Planning and Community Right-to-Know Act (EPCRA), Pub. L. No. 99-499, 100 Stat. 1728 (codified in scattered sections throughout 42 U.S.C.); 40 C.F.R.) 372.22(b), 373.23(b). *See also* Hannah Wiseman, *Untested*

development under such statutes as the CWA, SDWA, NEPA, Endangered Species Act (ESA),¹¹¹ Clean Air Act, Emergency Planning and Community Right to Know Act (EPCRA),¹¹² and CERCLA.

In the vacuum of federal governance, jurisdictions and stakeholders have brought suits against one another to act or refrain from acting to regulate unconventional natural gas extraction. Hydraulic fracturing bans passed by local communities are being challenged by states on preemption grounds.¹¹³ The New York Attorney General has sued the federal government including the EPA¹¹⁴ to conduct an environmental impact assessment pursuant to NEPA.¹¹⁵ At the same time EPA has challenged the environmental impact statement issued by the New York Department of Conservation as wholly inadequate. As federal-state responsibilities remain in limbo subject to the manner in which arguments play out in the judicial system, ordinary citizens have organized protests that have resulted in delaying a decision on whether to hydraulically fracture in the Delaware River Basin. The fate of the drinking water for nine million people in

Waters: The Rise of Hydraulic Fracturing in Oil and Gas Production and the Need to Revisit Regulation, 20 Fordham Env'tl. L. Rev. 115, 116 (2009).

¹¹¹ 16 U.S.C. § 1531 *et seq.*

¹¹² 42 U.S.C. 116 *et seq.*

¹¹³ *Northeast Natural Energy, LLC v. The City of Morgantown*, WL 3584376 (2011) (the Monongalia County Circuit Court rejected Morgantown, WV City Council's home rule argument for passing an ordinance banning hydraulic fracturing, stating "[t]he doctrine of preemption is applicable law when the State has assumed control of a particular subject of regulation, and a local government has enacted an ordinance in the same field.") *Id.*, see also Pittsburgh City Council based its ban hydraulic fracturing on "health, safety and welfare of residents and neighborhoods within the city," Marie C. Baca, *Pittsburgh Bans Natural Gas Drilling*, PROPUBLICA, Nov. 16, 2010, at 1, available at <http://www.propublica.org/article/pittsburgh-bans-natural-gas-drilling>, Patrick Duprey, *City Bans Hydraulic Fracturing*, THE ITHACAN (Nov. 3, 2011), <http://theithacan.org/17555/>, (noting Dryden, Ithaca and Syracuse hydraulic fracturing bans.) John Smith, *The Prodigal Son Returns: Oil and Gas Drillers Return to Pennsylvania with a Vengeance are Municipalities Prepared?* 49 Duq. L. Rev. 1. 33 (2011) citing to 53 Pa. Stat. Ann. § 10105 (West 2010) (police powers) and 58 Pa. Stat. Ann. § 601.101 (West 2010) (oversight) (Observing that Pennsylvania has better oversight of swimming pool fencing than hydraulic fracturing fluid fencing and noting "so long as Pennsylvania state law continues to underserve its citizens by employing inadequate setbacks and oversight, municipalities may have little choice but to restrict zoning districts in order to protect schools, residential areas or other districts essential to public health and safety. Accordingly, the courts should find that this effort is a valid exercise of the police powers conferred to local municipalities.") *Id.*

¹¹⁴ Defendants are listed as: US Army Corps of Engineers, US Fish and Wildlife Service, US National Park Service, US Department of the Interior, and the US Environmental Protection Agency. Complaint at 1, *New York v. U.S. Army Corps of Engineers et al.*, No. 1:2011cv02599 (New York Eastern District Court May 31, 2011).

¹¹⁵ 42 U.S.C. 4321 *et seq.*

New York City remains up in the air in the face of regulatory indecision among civil society, local governments, states, the federal government, courts, and a transboundary water commission.

New York Attorney General Schneiderman's commitment to federal environmental impact assessment under NEPA prior to Delaware River Basin natural gas permitting is starkly at odds with the New York Department of Environmental Conservation Revised Draft Supplemental Generic Environmental Impact Statement (RDSGEIS) which in turn takes a strikingly different tone than the EPA Region 2 comments providing over 25 pages of substantive recommendations for strengthening New York's environmental impact assessment. This is an intriguing legal dynamic in which New York is providing a check and balance role within the Delaware River Basin Commission (DRBC) by insisting on NEPA review and a full environmental impact statement for the DRBC while the EPA, a named defendant in the New York suit, is in turn greatly enhancing access to information and transparency by submitting deeply critical comments of New York's RDSGEIS. On the one hand, this may well be federalism at its most effective. Litigation certainly brings otherwise unavailable information into the public domain. On the other hand, it is not cooperative federalism. Yet, collaborative governance is occurring quietly here and there. This author has presented at conferences in which EPA officials and their state counterparts have shared ideas in good faith and together with other experts and members of the audience, analyzed solutions. Michael Gerard's hosting of a Region 2 EPA meeting at Columbia Law School, Cornell Law Student's hosting of an interdisciplinary three-day conference on natural gas, and James Van Nostrand's inaugural West Virginia Climate and Energy Center's hydrofracking forum – all represent the non-litigious approach to cooperative governance. Universities have host forums from Brooklyn to Buffalo and beyond.

The stakes could not be much higher and sentiments are running in the high-octane range. Yet, many sensible recommendations are emerging and middle ground is being forged. Non-state actors have been a driving force in this process. In addition to academia, non-governmental organizations ranging from the Natural Resources Defense Council (NRDC) to Riverkeeper have successfully brought detailed technical information into the public domain through independent research and exercising rights to justice through citizen suits that have brought disclosures into the public record. These efforts have enhanced the accuracy of information available to the general public. The tripartite system of checks and balances is slowly unfolding. A more effective approach however would be genuine cooperative federalism and inclusive decision-making. Informed, inclusive decision-making on natural gas extraction is well within the capacity of New York, the DRBC, federal government and general public.

IV. The Delaware River Basin Commission: Regional Energy-Water-Climate Decision-Making

Exxon Mobil's exploration application to the Delaware River Basin Commission remains pending as the judiciary determines whether the DRBC is required to conduct a NEPA environmental impact assessment before issuing hydraulic fracturing permits.¹¹⁶ Fifteen million people depend upon DRBC water, as does the 13,539 square-mile Delaware River Basin ecosystem.¹¹⁷ New York has sued the federal government¹¹⁸ to compel NEPA environmental impact assessment and public review before the Delaware River Basin

¹¹⁶ Tiffany Kary, *U.S. Can Try to End New York Fracking Lawsuit, Judge Rules*, BLOOMBERG, Aug. 10, 2011, available at <http://www.businessweek.com/news/2011-08-10/u-s-can-try-to-end-new-york-fracking-lawsuit-judge-rules.html>.

¹¹⁷ *DRBC Postpones November 21 Special Meeting: New Meeting Date Still to be Determined*, DRBC, at 1, available at http://www.state.nj.us/drbc/newsrel_naturalgas111811.htm.

¹¹⁸ Defendants are listed as: US Army Corps of Engineers, US Fish and Wildlife Service, US National Park Service, US Department of the Interior, and the US Environmental Protection Agency. Complaint at 1, *New York v. U.S. Army Corps of Engineers et al.*, No. 1:2011cv02599 (New York Eastern District Court May 31, 2011).

Commission's proposed regulations for hydraulic fracturing can go into effect.¹¹⁹ Delaware Riverkeeper brought a similar case.¹²⁰

New York argues that hydraulic fracturing poses “an unacceptable threat to the unfiltered, fresh water supply of nine million New Yorkers.”¹²¹ The Fish and Wildlife Service and National Park Service, two of the ten federal agencies sued by New York support the New York position and encourage the federal government to conduct an environmental impact assessment of hydraulic fracturing.¹²²

It remains to be seen whether the New York suit against the federal government will withstand the federal argument that it has sovereign immunity and may not be sued unless it has waived its immunity or consents to the suit.¹²³ That said, it is worth setting the stage.

In 1961, Delaware, New Jersey, New York, Pennsylvania, and a representative from the federal government entered into the Delaware River Basin Compact¹²⁴ to regionally protect and manage the Delaware River Basin. They established the Delaware River Basin Commission¹²⁵ to coordinate regional management of the basin. The DRBC is a federal-interstate compact government agency.¹²⁶ This regional legal entity came into being in 1961 when President Kennedy and the governors of Delaware, New Jersey, Pennsylvania, and New York signed concurrent compact legislation.¹²⁷ Meetings gather four state commissioners and the North Atlantic Division Engineer of the U.S. Army Corps of Engineers as the federal representative.

¹¹⁹ 42 U.S.C. 4321 et seq.

¹²⁰ The filed complaint can be found at:
<http://www.delawareriverkeeper.org/resources/Comments/FrackingComplaint.pdf>

¹²¹ *New York Complaint*, *supra* note 118 at 3.

¹²² Kary, *supra* note 116.

¹²³ *See Gray v. Bell*, 712 F.2d 490, 507 (D.C. Cir. 1983).

¹²⁴ Delaware River Basin Compact, Pub. L. No. 87-328, 75 Stat. 688 (1961). *See also* DELAWARE RIVER BASIN COMMISSION, DELAWARE RIVER BASIN COMPACT 1 (1961), *available at* <http://www.state.nj.us/drbc/regs/compa.pdf>.

¹²⁵ *Id.* at 6.

¹²⁶ Natural Gas Drilling in the Delaware River Basin, at 1, *available at* <http://www.state.nj.us/drbc/naturalgas.htm>.

¹²⁷ *DRBC Overview*, at 1, *available at* <http://www.state.nj.us/drbc/over.htm>.

Before the DRBC, coordination was difficult among over 75 federal, interstate, state, agencies with mandates covering disparate and overlapping aspects of watershed management along the 330 miles of the Delaware River.¹²⁸ Now, each DRBC commissioner holds a vote of equal sway and a majority vote resolves most decisions. Budget and drought declarations require unanimous votes.¹²⁹

Business meetings/hearings and advisory committees are open to the public.¹³⁰ This public participation combined with regional management provides a model for good governance.

The DRBC basin-wide comprehensive water management plan combined with the its water resources program that coordinates quality and quantity needs among basin stakeholders¹³¹ makes the DRBC flexible enough to carry out adaptive management in the face of evolving scientific water-energy-climate understanding.¹³² Importantly, the DRBC can both allocate water as well as condition such allocation upon environmental conditions. It can also conduct, sponsor and share research to enhance its adaptive governance capacity.¹³³

Each Compact Signatory State has committed to promulgating adequate water governance legislation. Yet, unconventional natural gas extraction challenges water conservation and ecosystem integrity commitments. The Compact does not allow projects that “substantially

¹²⁸ Delaware River headwaters are located near Hancock, New York and flows into the Delaware Bay.

¹²⁹ *DRBC Overview*, at 1, available at <http://www.state.nj.us/drbc/over.htm>, (“Commission programs include water quality protection, water supply allocation, regulatory review (permitting), water conservation initiatives, watershed planning, drought management, flood loss reduction, and recreation. The DRBC is funded by the signatory parties, project review fees, water use charges, and fines, as well as federal, state, and private grants.”)

¹³⁰ *DRBC Overview*, at 1, available at <http://www.state.nj.us/drbc/over.htm>.

¹³¹ Delaware River Basin Compact, art. III.

¹³² William W. Buzbee, *Contextual Environmental Federalism*, 14 N.Y.U. ENVTL. L.J. 108 (2005) (discussing environmental federalism and overlapping regulatory capacity); see also David E. Adelman & Kirsten H. Engel, *Adaptive Federalism: The Case Against Reallocating Environmental Regulatory Authority*, 92 MINN. L. REV. 1796 (2008).

¹³³ Delaware River Basin Compact, art. III, cl. 3.6. Noah D. Hall, *Interstate Water Compacts and Climate Change Adaptation*, 5 Env'tl & Energy L. & Pol'y J. 237 (2010) (“Approximately 5% of the United States' population (almost fifteen million people) relies on the river for domestic and industrial use.”) *Id.* at 288.

impair or conflict with the comprehensive plan.”¹³⁴ Furthermore, the Compact provides for Commission water governance that ensures “public health, stream quality control, economic development, improvement of fisheries, recreation, dilution and abatement of pollution, [and] the prevention of undue salinity.”¹³⁵ The Delaware River basin encompasses special protection waters, further enhancing watershed protection.¹³⁶

Noah Hall has called the Delaware River Basin Compact: in many ways a model compact for adapting to the risks and uncertainties of climate change. It provides comprehensive planning and enforcement, rigorous water conservation, and an ecosystem protection regime. Most importantly, the Delaware River Basin Commission has the legal authority and resources to address new circumstances and stresses without severely disrupting water uses and rights.¹³⁷

The Commission can control surface and groundwater withdrawals¹³⁸ and bring legal action against any entity in violation of the Compact's provisions pursuant to the Compact.¹³⁹ Yet in the context of unconventional natural gas extraction, the single state of New York has been the litigant against the actions of the Commission rather than the other way around.

Over thirty percent of the Delaware River Basin lies over the Marcellus Shale formation.¹⁴⁰ This is an area inhabited by 5 million people.¹⁴¹ New York City Mayor Michael Bloomberg explains that, “[b]ecause full-scale development of natural gas exploitation in the

¹³⁴ Delaware River Basin Compact, art. III, cl. 3.8.

¹³⁵ Delaware River Basin Compact, art. IV, cl. 4.2(a); *see also* Hall, *supra* note 133, at 289-290, “The Commission can also sponsor any soil conservation, forestry, or fish and wildlife project that is related to the water resources of the basin”; *see also* Delaware River Basin Compact, art. VII.

¹³⁶ Kevin J. Garber, Jean M. Mosites, and Steven Baicker-McKee, *Water Sourcing and Wastewater Disposal: Two of the Least Worrisome Aspects of Marcellus Shale Development in Pennsylvania*, 13 Duq. Bus. L.J. 169 (2011).

¹³⁷ Hall, *supra* note 133, at 290.

¹³⁸ Delaware River Basin Compact, art. X.

¹³⁹ Delaware River Basin Compact, art. V, cl. 5.4.

¹⁴⁰ *Natural Gas Drilling in the Delaware River Basin*, at 1, available at <http://www.state.nj.us/drbc/naturalgas.htm>.

¹⁴¹ Brigid Landy & Michael Reese, *Getting to “Yes”: a Proposal for a Statutory Approach to Compulsory Pooling in Pennsylvania*, 41 Env'tl. L. Rep. News & Analysis 11044 (2011) (noting that, “as rock oil began to replace whale oil as the dominant source of fuel for illumination, supply often exceeded demand.”) *Id.* *See also* U.S. ENERGY INFORMATION ADMINISTRATION, ANNUAL ENERGY OUTLOOK 2011 WITH PROJECTIONS TO 2035 EARLY RELEASE REPORT 1 (2010), available at <http://www.eia.gov/oiaf/aeo/gas.html>.

watershed could degrade water quality, a rush to regulate and drill risks the long-term viability of one of the most important drinking water sources in the United States.”¹⁴² As a tight geologic formation, Marcellus Shale natural gas deposits have not been seen as recoverable until recent technological advances in hydraulic fracturing, increased costs of extracting conventional energy, and exemptions to federal environmental laws.¹⁴³

In 2009, the DRBC prohibited the commencement of any natural gas extraction within the basin's Special Protection Waters without DRBC approval given the significant impact that unconventional natural gas production can have on the basin's surface and groundwater quality and quantity.¹⁴⁴ The DRBC found that:

water withdrawals, wastewater disposal, and other activities, natural gas extraction projects in shale formations may individually or cumulatively affect the water quality of Special Protection Waters by altering their physical, biological, chemical or hydrological characteristics.¹⁴⁵

The DRBC further clarified that this finding covered all natural gas extraction drilling pad, related activities/facilities, and all water withdrawals used.¹⁴⁶

In 2010 the DRBC issued draft regulations for hydraulic fracturing and was to gather for a final vote in November of 2011. A large civil society demonstration was planned for the November 21st meeting to express the broad view that the draft rules do not adequately protect

¹⁴² Governor Markell, “*Fracking*” *Proposal Currently Lacks Sufficient Health and Safety Protections Delaware will vote “No” at Monday meeting of the Delaware River Basin Commission*, Nov. 17, 2011, at 1, available at http://news.delaware.gov/2011/11/17/drbc_fracking/ (Describing the needed “close coordination of multiple regulatory regimes: the state and local governments of Pennsylvania and New York; coupled with the Federal Environmental Protection Agency and this Commission. Some of these regulatory schemes have (1) yet to be finalized; (2) have just been finalized but not fully evaluated; or (3) are final but inadequate.”) *Id.*

¹⁴³ Natural Gas Drilling in the Delaware River Basin, *supra* note 140.

¹⁴⁴ DRBC Executive Director issued a determination under 18 C.F.R. § 401.35(a). DRBC review is to remain consistent with the Delaware River Basin Comprehensive Plan, largely found in the DRBC Water Code, available at www.state.nj.us/drbc/regula.htm; see also Garber, Mosites, and Baicker-McKee, *supra* note 136 (noting that, “in December 2010, the DRBC proposed a new Article 7 of its Water Quality Regulation to protect water resources of the basin during construction and operation of natural gas development projects. Proposed Article 7 applies to water withdrawal, well pad infrastructure, and wastewaters.”) *Id.*

¹⁴⁵ Natural Gas Drilling in the Delaware River Basin, *supra* note 140.

¹⁴⁶ *Id.*

drinking water supplies.¹⁴⁷ New York and Delaware appeared to favor waiting while Pennsylvania and New Jersey appeared to approve the draft regulations, leaving the federal government with the deciding vote before the DRBC delayed the decision.¹⁴⁸ The DRBC postponed its November 21, 2011 meeting in which it was to decide upon its draft natural gas development regulations, leaving “additional time for review by the five commission members.”¹⁴⁹ DRBC members are deeply divided over permitting unconventional natural gas extraction within the basin. It appears that Delaware Governor Jack Markell’s announcement that he would vote against such permitting was crucial to the delayed vote.

While expressing appreciation for fellow member states interest in hydraulic fracturing jobs and tax revenue, Delaware Governor Markell explained that,

as a downstream state that could be adversely affected by poorly crafted and/or executed regulations, Delaware is focused on protecting the water quality throughout the Delaware River Basin. While this watershed only covers a small portion of the Marcellus Shale, it serves as the primary water supply source for at least two-thirds of Delaware’s citizens.¹⁵⁰

The governor expressed “significant concerns” that the proposed extraction regulations would not protect the regions water supply.¹⁵¹ He also explained that while the DRBC has reviewed over 68,000 public comments,¹⁵² reflecting the profound importance of the DRBC decision, the public needs to be able to review and comment upon significant revisions to the draft regulations.

¹⁴⁷ *Delaware River Basin Commission: Battleground for Gas Drilling*, NPR, at 1, available at <http://stateimpact.npr.org/pennsylvania/tag/drbc/> (noting that, “[t]he DRBC is funded by the states, the federal government, permit fees, fines, as well as public and private grants. The Delaware River is the longest free-flowing river east of the Mississippi with its headwaters located in Hancock, N.Y. It stretches 330 miles and empties into the Delaware Bay. The Delaware River provides drinking water to about 15 million people in New York, New Jersey, Pennsylvania and Delaware. In 1968 the Delaware River was declared a “Wild and Scenic River” by President Lyndon Johnson, which affords it special protection. Parts of the river have also received the designation of “special protection waters.”) *Id.*

¹⁴⁸ *Id.*

¹⁴⁹ *DRBC Postpones November 21 Special Meeting*, *supra* note 117.

¹⁵⁰ Governor Markell, “*Fracking*” *supra* note 150.

¹⁵¹ *Id.*

¹⁵² Accessing the Public Comments, at 1, available at <http://www.state.nj.us/drbc/NGC/index.htm>.

November 8 to 21 is not an adequate window for public participation, nor is it acceptable to make changes on November 16 and make such a major decision on November 21¹⁵³

There are two separate discussions underway. One involves the decision to extract or not to extract natural gas while the second discussion regards mitigating measures of such extraction. With so little information in the public domain, it has not been at all clear whether the second discussion warrants any discussion. At best it would provide threshold best practices for “water withdrawal, siting and setback requirements, drilling and construction standards, ongoing operational protections, and clean up protocols and financial assurances should a release occur.”¹⁵⁴

Unconventional natural gas drillers rapidly ramped up operations in rural Pennsylvania, drilling 3,000 wells in a little over three years. Rather than conducting a thorough environmental assessment before commencing significant industrial activity in communities, it has taken roughly four years for a Marcellus Shale Advisory Commission of scientists and nongovernmental stakeholders to draft extraction recommendations. “Irresponsible hydrofracturing” continues to occur in Pennsylvania, impacting public health and environmental integrity.¹⁵⁵

Pennsylvania’s legislative debate regarding scientific understanding of sound well construction and operation continues, as does New York’s review of cementing and well construction. As a result, the DRBC is not in a position to find state standards adequately protective of water supplies when state requirements are still a moving target or have yet to be promulgated.

¹⁵³ Governor Markell, “*Fracking*” *supra* note 150.

¹⁵⁴ *Id.*

¹⁵⁵ *Id.*

V. New York Environmental Impact Assessment of Hydraulic Fracturing

New York public officials are conducting a high profile hydraulic fracturing review of economic benefits *vis a vis* adverse impacts to public health and environmental integrity. Public health and natural resource regulation have long been recognized as within state police power authority. Based upon this police power, New York has set forth unconventional natural gas regulations.¹⁵⁶ Yet, New York's approach has a long way to go before representing analytical environmental impact assessment.

This article has sketched the regulatory chaos regarding unconventional natural gas development and analyzed the environmental justice implications of public sector gridlock. This section considers the communication that is occurring among federal, state, industry, health and environmental stakeholders. Each have distinct constituents and therefore prefer different but overlapping regulations for unconventional natural gas extraction. This author seeks to take this communication, that is largely in the form of comments submitted to New York during its State Environmental Quality Review Act (SEQRA) required review,¹⁵⁷ and conduct a legal analysis with which coordinated collaborative governance can emerge.

¹⁵⁶ N.Y. ENVTL. CONSERVATION LAW 23-0301 (McKinney 2010). New York Environmental Conservation Law Article 23 grants DEC Division of Mineral Resources jurisdiction over oil and gas. Department of Transportation and Public Service Commission regulate transport and siting of gas lines respectively without falling under the public participation provisions of New York's counterpart to NEPA, namely the State Environmental Quality Review Act (SEQRA). N.Y. COMP. CODES R. & REGS. tit. 6) 617.5(c)(35) (2010); *see also* SGEIS, *supra* note 29, at 5-129. *See also* Marcellus Shale, N.Y. ST. DEP'T OF ENVTL. CONSERVATION, <http://www.dec.ny.gov/energy/46288.html> (offering an overview of hydrofracking and New York's regulatory Plan).

¹⁵⁷ 6 N.Y.C.R.R. § 617.9(b)(5)(v).

A. EPA Substantive Recommendations to New York

EPA advised New York to strengthen its environmental impact analysis of radioactive flowback water before commencing hydraulic fracturing¹⁵⁸ and remove language that minimized radioactivity concerns. New York should enhance regulation language that adequately responds to elevated levels of radioactivity generally and concentrated exposure to naturally occurring radioactive materials (NORM) by water treatment plant workers in particular.¹⁵⁹ New York should explain how proper handling of elevated concentrations of naturally-occurring materials will occur when concentrations for technologically-enhanced naturally-occurring radioactive materials (TENORM) result from pipe scale or water treatment waste.¹⁶⁰ Radioactive water should not be sent to wastewater treatment plants that do not have the capacity to treat such water. Similarly, New York should regulate disposal of radioactive drill cuttings that pose an endangerment to human health and the environment at a permitted offsite facility.¹⁶¹

EPA states “NYSDEC must ensure that updated flooding conditions are used for evaluating floodplain distances”¹⁶² and requested that floodplain prohibitions be considered for not only well pads but all natural gas infrastructure including pipes, transfer stations, and containment tanks.¹⁶³ New York should require close loop storage rather than surface impoundments and ensure adequate liability and regulatory funding for well, water, and related testing.¹⁶⁴ New York should assess adverse impacts of oil and gas infrastructure and related

¹⁵⁸ EPA COMMENTS ON REVISED DRAFT NYSDEC REVISED dSGEIS FOR HORIZONTAL DRILLING AND HIGH-VOLUME HYDRAULIC FRACTURING TO DEVELOP THE MARCELLUS SHALE AND OTHER LOW-PERMEABILITY GAS RESERVOIRS 3, January 11, 2012, *available at* <http://www.epa.gov/region2/newsevents/pdf/EPA%20R2%20Comments%20Revised%20dSGEIS%20Enclosure.pdf>.

¹⁵⁹ *Id.* at 4.

¹⁶⁰ *Id.* at 14.

¹⁶¹ *Id.* at 2.

¹⁶² *Id.* at 18; *see also Elizabeth Burleson*, “Energy Revolution and Disaster Response in the Face of Climate Change,” 22 VILLANOVA ENVIRON. LAW J. 169 (2011).

¹⁶³ EPA COMMENTS ON REVISED DRAFT NYSDEC at 2.

¹⁶⁴ *Id.* at 1.

activities beyond narrowly focusing on hydraulic fracturing. EPA advised broad regulation beyond narrow categories of slickwater or high volume hydraulic fracturing.¹⁶⁵ EPA advised recognizing the New York State Public Service Commission as a cooperating agency given its regulatory authority over natural gas gathering lines.¹⁶⁶ With regard to water availability, New York should require permits to include reporting of proposed water sources.¹⁶⁷ EPA advised using the New York State Department of Health Source Water Assessment Program Plan buffer zone of one-mile radius around community and non-transient non-community wells.¹⁶⁸ Furthermore, this should be considered as a buffer radius with regard to any natural gas impact, not just well pad siting. EPA advised New York to reference recent seismic risk zone studies and to regulate comprehensively to prevent seismic damage.¹⁶⁹ New York should map naturally occurring methane¹⁷⁰ and require cement bond logging or equivalent tests of shallow gas zones as well as areas impacting drinking water supplies.¹⁷¹

New York should include all six principal greenhouse gas emissions, the relative lifespans of each greenhouse gas, and their global warming potential.¹⁷² Further, New York should clarify direct versus indirect emissions and specify greenhouse gas emissions that result from unconventional natural gas development beyond the listed: vented, combustion, and fugitive emissions.¹⁷³ Within vented emissions special mention of “incomplete flare combustion” needs analysis given its substantial adverse contribution to climate change. Other greenhouse gas

¹⁶⁵ *Id.* at 2.

¹⁶⁶ *Id.* at 2.

¹⁶⁷ *Id.* at 2.

¹⁶⁸ *Id.* at 2.

¹⁶⁹ *Id.* at 2.

¹⁷⁰ *Id.* at 2.

¹⁷¹ *Id.* at 16.

¹⁷² *Id.* at 12.

¹⁷³ *Id.* at 12.

emissions that need to be further analyzed include transport, storage, and distribution, and downstream use greenhouse gas emissions.¹⁷⁴

EPA advised New York to prohibit production brine road spreading,¹⁷⁵ noting that road spreading of all natural gas related wastewater would need to meet Clean Air Act provisions.¹⁷⁶ New York should designate responsible regulatory authority for wastewater disposal as well as enhance baseline / post development air and water monitoring.¹⁷⁷ EPA called for New York to quantify all volatile organic compounds released to the atmosphere and use state of the art vapor recovery systems.¹⁷⁸ EPA notes that the federal government has broader authority than described by the RDSGEIS:

despite some of the restrictions legislated through the Energy Policy Act of 2005, EPA retains responsibilities for industry oversight under several federal statutes, including the Clean Water Act, Clean Air Act, Safe Drinking Water Act, Comprehensive Environmental Response, Compensation, and Liability Act, Resource Conservation Recovery Act, Emergency Planning Community Right-to-Know Act and the National Environmental Policy Act. For example, EPA Region 2 has regulatory authorities concerning publicly-owned treatment works (POTWs) disposal of flowback and produced water.¹⁷⁹

Finally, EPA recommended that New York update regulations rather just permitting provisions and that New York require disclosure of chemical concentrations as well as chemical names.¹⁸⁰

¹⁷⁴ *Id.* at 12.

¹⁷⁵ *Id.* at 23; *see also* Elizabeth Burleson, *Emerging Law Addressing Climate Change and Water*, 5 ENVIRONMENTAL AND ENERGY LAW AND POLICY JOURNAL 489 (2010) (noting the complexities of disposing of brine in the desalination context).

¹⁷⁶ EPA COMMENTS ON REVISED DRAFT NYSDEC at 5-6.

¹⁷⁷ *Id.* at 9 (noting that, “[o]n Aug. 23, 2011, the EPA published in the Federal Register the proposed rule, “Oil and Natural Gas Sector: New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants Review.” This rule is scheduled to be promulgated in March 2012 and may broaden the scope of operations and emission points covered by existing rules.”) *Id.*

¹⁷⁸ *Id.* at 10.

¹⁷⁹ *Id.* at 21 (noting further that, “underground injection control permit under the Safe Drinking Water Act is required if diesel is used in the high-volume hydraulic fracturing fluid.”) *Id.*

¹⁸⁰ *Id.* at 23.

B. Joint Legal Memorandum by Environmental Non Profits

The RDSGEIS foresees roughly 1,400 to 2,200 horizontal wells developed annually. This would have substantial impacts across New York and warrants the SEQRA required full analysis that a range of reasonable and feasible alternatives to the proposed action be considered.¹⁸¹ Adding piecemeal permit conditions over outdated regulations invites compliance problems. The non-discretionary nature of regulations combined with formal public review makes regulations a far more transparent means of governance.¹⁸² Straightforward oil and gas regulations should be codified in the New York Codes, Rules and Regulations (NYCRR). New York should greatly expand upon its analysis of alternatives beyond its cryptic (1) No-Action Alternative, (2) Phased Permitting Approach, and (3) Green Categories. New York has failed to meet its statutory requirement to consider alternatives, given its paltry coverage in an over 1,500 plus page document.¹⁸³ Each of these should be meaningfully analyzed. New York should additionally consider the options of (3) waiting until the New York Department of Environmental Conservation has regulatory capacity,¹⁸⁴ (4) waiting until EPA 2014 study results present feasible alternatives, (5) giving deference to local zoning, (6) designating environmental hazard

¹⁸¹ 6 N.Y.C.R.R. § 617.9(b)(5)(v).

¹⁸² COMMENTS OF CATSKILL MOUNTAINKEEPER, DELAWARE RIVERKEEPER NETWORK, EARTHJUSTICE, THE NATURAL RESOURCES DEFENSE COUNCIL AND RIVERKEEPER ON THE REVISED DRAFT SUPPLEMENTAL GENERIC ENVIRONMENTAL IMPACT STATEMENT ON THE OIL, GAS AND SOLUTION MINING REGULATORY PROGRAM, WELL PERMIT ISSUANCE FOR HORIZONTAL DRILLING AND HIGH-VOLUME HYDRAULIC FRACTURING TO DEVELOP THE MARCELLUS SHALE AND OTHER LOW-PERMEABILITY RESERVOIRS 3, January 11, 2012 [hereinafter JOINT COMMENTS].

¹⁸³ JOINT LEGAL MEMORANDUM ON THE REVISED DRAFT SUPPLEMENTAL GENERIC ENVIRONMENTAL IMPACT STATEMENT ON THE OIL, GAS AND SOLUTION MINING REGULATORY PROGRAM AND PROPOSED REGULATIONS FOR HORIZONTAL DRILLING AND HIGH VOLUME HYDRAULIC FRACTURING IN THE MARCELLUS SHALE AND OTHER LOW-PERMEABILITY RESERVOIRS PREPARED BY CATSKILL MOUNTAINKEEPER, DELAWARE RIVERKEEPER NETWORK, EARTHJUSTICE, THE NATURAL RESOURCES DEFENSE COUNCIL, RIVERKEEPER, AND THE SIERRA CLUB 21, Jan. 11, 2012 citing Webster Assocs. v. Town of Webster, 59 N.Y.2d 220, 228 (1983) [hereinafter JOINT LEGAL MEMORANDUM] (noting that, "the omission of a required item from a draft EIS cannot be cured simply by including the item in the final EIS.").

¹⁸⁴ *Id.* at 25, NYSDEC is unlikely to have the staffing capacity to respond to unconventional natural gas extraction at the earliest in 2014 if at all.

areas off-limits to drilling and (7) allowing unconventional natural gas only at the demonstration project scale until further environmental impact analysis can be conducted.¹⁸⁵

New York's RDSGEIS neither references a plan for treatment of billions of gallons of toxic/radioactive wastewater nor adequately provides an environmental impact analysis of shipping/storing/treating/waste.¹⁸⁶ Similarly lacking is an analysis expanding pipeline infrastructure,¹⁸⁷ a quantification of negative socioeconomic, and community impacts.¹⁸⁸ The RDSGEIS highlights potential economic benefits of extracting natural gas without analysis of likely costs ranging from emergency response to monitoring nor does it speak to the adverse impacts of a sudden influx of transient population followed by a steep fall in economic prospects for long-term residents.¹⁸⁹

Taking the oil spill fund approach, the following measures should be enacted before any drilling takes place: strict liability, NYSDEC capacity to order immediate owner/operator cleanup or take over clean up, fund a Natural Gas Damage Recovery Fund through surcharges on natural gas permits, and require owner/operator surety bonds adequate to remediation costs.¹⁹⁰

New York should require "bonding and insurance that addresses the costs and risks of long-term monitoring; publicly incurred response and cleanup operations; site remediation and well abandonment; and adequate compensation to the public for adverse impacts."¹⁹¹ Given the one in four chance of flooding in a 30-year project life for wells in 100-year floodplains,

¹⁸⁵ *Id.* at 21.

¹⁸⁶ *Id.* at 6.

¹⁸⁷ *Id.*

¹⁸⁸ *Id.* (noting that, "socioeconomic and environmental justice analysis requires examination of reasonably foreseeable impacts on noise; historic resources; aesthetic resources; traffic; short- and long-term population concentration, distribution, or growth; and community character, all of which are specifically protected by SEQRA.") *Id.* at 8.

¹⁸⁹ *Id.* at 6.

¹⁹⁰ *Id.* at 9.

¹⁹¹ JOINT COMMENTS *supra* note 182 at 172.

setbacks should be substantially increased.¹⁹² New York does not explain why a public water supply should have a 2,000 foot setback when private water wells only receive 500 foot setbacks.¹⁹³ It would be sensible for local zoning authorities to have authority to determine threshold setbacks beyond the state minimum to meet the needs of community characteristics and site-specific issues.¹⁹⁴

New York should require state inspections of all well cementing and keep permanent records. “DEC has at least partial records on 40,000 wells, but estimates that over 75,000 oil and gas wells have been drilled in the State since the 1820s. Most of the wells date from before New York established a regulatory program. Many of these old wells were never properly plugged.”¹⁹⁵ Such wells provide a vertical pollutant pathway.¹⁹⁶ NRDC et. al. argue “[b]uffer zone size should increase with geologic and technical uncertainty. Buffer zone size may decrease as industry gains experience and data quality/quantity improves.”¹⁹⁷ Buffer zones around water supplies should be permanent and apply to all drinking water supplies.¹⁹⁸ NRDC et. al. explains that:

[i]n order to ensure that the uniquely unfiltered New York City and Syracuse watersheds remain unscathed, NYSDEC should increase its proposed 4,000-foot buffer to preclude any horizontal drilling under these watersheds sufficient to account for the length of current or future horizontal well bores. Moreover, it appears that vertical drilling and low-volume hydraulic fracturing would still be permitted in these areas, even though they present the same kinds of risks.

¹⁹² *Id.* at 137.

¹⁹³ *Id.* at 132.

¹⁹⁴ *Id.* at 136.

¹⁹⁵ *Id.* at 50 (noting that, “Permanent Abandonment. A well that, is no longer needed to produce hydrocarbons should be plugged (e.g. cement barriers installed, failed casing removed, mechanical plugs set), surface equipment removed (e.g. wellhead and piping), and permanently abandoned.”) *Id.*

¹⁹⁶ *Id.* at 51 (noting that, “6 NYCRR § 555.5 requires only 15’ cement plugs, as compared to Texas, Alaska, and Pennsylvania regulations that require a series of 50’-200’ cement plugs at various locations within the wellbore.”) *Id.* at 53.

¹⁹⁷ *Id.* at 67.

¹⁹⁸ JOINT LEGAL MEMORANDUM *supra* note 183 at 11.

NYSDEC should address these issues and clearly prohibit any activities related to natural gas development in and under these watersheds and buffer areas.¹⁹⁹

Furthermore, the seismicity activities associated with unconventional natural gas development and wastewater disposal threatens the stability of aging and vulnerable water infrastructure.²⁰⁰

Public participation has been core to keeping open the legal option to establish “permanent, protective buffer areas in and around all watersheds” upon which drinking supplies depend.²⁰¹

Mandatory prior disclosure of chemical threats presented by all aspects of unconventional natural gas development should predate drilling given the importance of baseline information with which to prove harm in legal proceedings. The RDSGEIS proposed prior disclosure of chemical additive products by product name and purpose/type, and proposed percent ratio follows the sensible mandatory prior disclosure best practice modeled by Wyoming²⁰² but should be expanded to all chemical threats posed by unconventional natural gas development.²⁰³

New York should disclose individual chemicals, identified by Chemicals Abstracts Service number in addition to available material data safety sheet (MSDS) and a statement of the amount of the chemical used. This legal advice builds upon emerging best practice models in Texas, Colorado, and Wyoming.²⁰⁴ New York’s final environmental impact analysis should reference these experienced energy producing state’s decisions to use their police powers to

¹⁹⁹ *Id.* at 11.

²⁰⁰ *Id.* at 11 (noting that, “[a]llowing unsafe drilling activities to occur near aging and vulnerable water supply infrastructure poses an unreasonable risk to public health and emergency preparedness.”) *Id.*

²⁰¹ *Id.* at 11.

²⁰² Wyo. Admin. Code Oil Gen. Ch. 3 § 45.

²⁰³ See JOINT LEGAL MEMORANDUM at 17 (noting that, “[b]ecause drilling mud uses similar chemicals as hydraulic fracturing fluid, it poses many of the same hazards to the environment and human health as hydraulic fracturing fluid, and should be subject to the same disclosure requirements.”) *Id.*

²⁰⁴ *Id.* at 15, citing 16 Tex. Admin. Code § 3.29(c)(1). The Colorado Oil and Gas Conservation Commission released a final draft for updated rules on December 13, 2011. Draft 2 Cob. Code Regs. § 404-1 :205A(B)(2)(A)(IX)-(XII) requires disclosure of individual chemical constituents in addition to disclosure of additives. Wyoming’s rules also require disclosure of additives as well as the Chemical Abstracts Number for individual chemicals *see* Wyo. Admin. Code Oil Gen. Ch. 3 § 45(d). Draft 2 Cob. Code Regs. § 404-1 :205A(B)(2)(A)(XII); *see also* 16 Tex. Admin. Code § 3.29(c)(2)(ix).

regulate dangerous chemicals to protect public health and environmental integrity. Colorado responded to industry concern that competitors might reverse engineer hydraulic fracturing additives by clarifying that Colorado disclosure of all additives and all chemicals does not require specific lists of chemical ingredients.²⁰⁵

Mandating use of the safest chemical additives and unconventional natural gas development methods is as equally important as reporting of chemicals. This broader analysis belongs in any New York environmental impact assessment. SEQRA is designed to provide an opportunity for state decision-making to be informed, incorporating a genuine understanding of public health and environmental externalities resulting from permitting decisions.²⁰⁶

While re-establishing federal safeguards requires cooperation in congress, New York is in a position to implement federal Emergency Planning and Community Right to Know Act (EPCRA) standards²⁰⁷ rather than the general trade secret provisions of 6 NYCRR § 616.7. Doing so would fold New York's unconventional natural gas extraction into a trade secret approach designed to weigh intellectual property rights with public health. In particular, retaining the public right to information would balance the influence of industry on public decision-making with informed analysis on public health. EPCRA mandates public release of adverse health effects associated with each secret chemical.²⁰⁸

Flaring/venting methane while drilling and completion cause substantial greenhouse gas emissions.²⁰⁹ Reduced Emission Completions (RECs) that capture greenhouse gas emissions²¹⁰

²⁰⁵ *Id.* at 16 citing Draft 2 Cob. Code Regs. § 404-1 :205A(B)(2XA)(IX)-(XII). 102 *See* Colorado Dept. of Natural Resources, Oil and Gas Cons. Comm'n, Amendments to 100 Series Definitions, 200 Series General Rules, 300 Series Drilling, Development, Production, and Abandonment Rules and 500 Series Practice and Procedure Rules, Statement of Basis, Specific Statutory Authority, and Purpose, 3-4.

²⁰⁶ *Id.* at 18.

²⁰⁷ The relevant EPCRA regulations can be found at 40 C.F.R. Pt. 350.

²⁰⁸ 40 C.F.R. § 350.21.

²⁰⁹ JOINT COMMENTS *supra* note 182 at 113.

²¹⁰ *Id.* at 116.

should be required for wells drilled prior to construction of gathering lines.²¹¹ “[C]aptured gas can be used for fuel, offsetting operating costs, or re-injected to improve well performance. Industry has demonstrated that RECs are both an environmental best practice and profitable.”²¹² New York ambient air quality monitoring “needs further definition, a funding commitment, and a formal industry compliance obligation.”²¹³ New York should require measureable, enforceable greenhouse gas mitigation plans for all natural gas operations, requiring Natural Gas STAR Program best management technologies and practices.²¹⁴

C. Local Governments

Layered on top of corporate instincts to preserve competitive advantage and maximize profits are public sector instincts to preserve sovereignty.²¹⁵ In the absence of comprehensive federal and state regulation, local governments are hard pressed to respond to unconventional natural gas extraction, particularly given New York prohibition on local government direct regulatory authority over hydrofracking processes.

Given the cursory analysis of the no-action option, the RDSGEIS should be substantially revised. Doing so would provide room for a discussion of cooperative and inclusive decision-making rather than jumping straight to ECL §23-0303(2) language stating that Oil, Gas and Solution Mining Law supersedes local governance beyond local roads and real property tax

²¹¹ *Id.* at 116.

²¹² *Id.* at 117.

²¹³ *Id.* at 110 (noting that, “[t]he modeling analysis assumed that there will be no emissions of criteria pollutants from venting. However, the RDSGEIS proposes to allow gas venting of up to 5 MMscf during any consecutive 12-month period, including sour gas, as long as it is vented at least 30 feet in the air. This allowance undermines the assumption that no criteria pollutants would be emitted during venting. The modeling analysis assumes only three days of gas flaring per well. However, the RDSGEIS states that flaring can occur for up to a month in some cases. 212 Therefore, the modeling understates the potential emissions from flaring.”) *Id.* at 108.

²¹⁴ *Id.* at 113.

²¹⁵ Joseph A. Dammel, *Notes From Underground: Hydraulic Fracturing In The Marcellus Shale*, 12 Minn. J.L. Sci. & Tech. 773 (2011). (different layers of government do not always seek opportunities to work together.).

collection.²¹⁶ Villages are hard pressed to distinguish between road use by heavy agricultural vehicles and heavy industrial trucks on sheer design of vehicle and weight on rural dirt roads. Energy siting and environmentally sound energy-water development can best be sustained through coordination among layers of government, recognition of the need to prioritize health and ecosystem services, and stakeholder participation that does not favor well resourced industrial representatives.

Access to information and public participation should not be limited solely to issuance of drilling permits in state parks, within 2,000 feet of public water supply wells, and disturbance of more than 2.5 acres in agricultural districts pursuant to New York's SEQRA participation provisions.²¹⁷ Whether focusing on the NEPA inclusive review procedures or state corollaries such as SEQRA, the objective should be broadly sharing information to better understand adverse impacts and avert harmful activity before widespread damage occurs.

New York's RDSGEIS recommends additional public input on: issuance of a permit to drill when high-volume hydraulic fracturing is proposed shallower than 2,000 feet along the proposed wellbore; where the top of the target fracture zone of the wellbore is less than 1,000 feet below a known fresh water supply; and within 500 feet of a principal aquifer.²¹⁸ Yet the report qualifies that re-evaluation of this latter provision occur in 2 years.²¹⁹ Other activities deemed worthy of public input by New York include: water withdrawals and drilling well pads distances within 150 feet of a perennial or intermittent stream, storm drain, lake or pond or ground water withdrawal within 500 feet of a private well or wetland that pump test data shows

²¹⁶ NYSDEC, REVISED DRAFT SUPPLEMENTAL GENERIC ENVIRONMENTAL IMPACT STATEMENT ON THE OIL, GAS AND SOLUTION MINING REGULATORY PROGRAM 1003 updated August 2011, *available at* <http://www.dec.ny.gov/data/dmn/rdsgeisfull0911.pdf> [hereinafter NEW YORK RDSGEIS].

²¹⁷ *Id.* at 1004.

²¹⁸ *Id.*

²¹⁹ *Id.*

would have an influence on the wetland.²²⁰ Yet, fragmented well pad by well pad public review is unlikely to result in adequate enforcement of health and environmental protections when compared with comprehensive prohibitions on negatively impacting water supplies.

Similarly, local government notification based upon the following statement is unlikely to lead to cooperative governance needed to prevent natural gas extraction from resulting in substantial adverse impacts. Passing mention in the NY RDSGEIS of urging Road-Use Agreements between drillers and municipalities does not go far enough to address the need to involve local governments in siting, safety, disposal, etc. decisions going forward. First and foremost, elected local officials are well positioned to be part of the decision-making process regarding no-action approaches to natural gas extraction as well as the scope of operations if permits are to be issued. Stating in a draft environmental impact statement that state exclusive authority to issue well permits supersedes local government authority over well siting and that permits will be issued irrespective of conflicting local land use laws/regulations/comprehensive plans/policies²²¹ does not indicate a willingness to coordinate effective regulation of unconventional natural gas regulation. Requiring applicants to list conflicting local law and stating that substantial adverse impacts will be considered does not go far enough to committing to cooperative inclusive decision-making.

The NY RDSGEIS reads as a warning to other layers of government to back off from DEC jurisdictional turf to issue permits. Beyond stating that permits will be issued in keeping with departmental capacity, insufficient discussion of how county health departments are to effectively respond to drinking water contamination remains to be developed by the state of New York. Regulations ranging from updated well casing requirements to emergency response plans

²²⁰ *Id.* at 1003.

²²¹ *Id.*

should apply to all natural gas development in New York. Furthermore, indirect and cumulative impacts should be part of New York's environmental impact assessment.

IV. Recommendations: Adaptive Federalism and the Regulatory Commons

A. Collaborative Governance

A useful framework for inclusive decision-making involves: gathering stakeholders and information, then brainstorming and analyzing options before implementing any given approach. Polarized communities may benefit from skilled facilitator expertise grounded in mediation approaches that can enhance collaborative governance. Enhancing public participation at the outset (in pre-application and pre-environmental assessment contexts) can help optimize genuine sustainable development.

This can include 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 that need to be addressed before industrial production should be authorized. Gathering expertise from such a broad forum can begin the process of identifying best practices to minimize negative impacts not only at the local level but comprehensively evaluate externalities and conscientiously internalize them. Model ordinances, leases,²²² and public-private bodies that can facilitate lifecycle analysis and inclusive decision-making can sustain healthy communities both economically and with regard to public health and environmental integrity. This process can

²²² See *Drillers Fail to Share Fracking Risks With Landowners* – EWG, Dec. 12, 2011, at 1, available at <http://www.eenews.net/Greenwire/rss/2011/12/12/11> (noting that, “[n]atural gas companies that employ hydraulic fracturing are disclosing drilling risks to shareholders but not to landowners.”) *Id.*

provide a base upon which to make the range of decisions from whether/where to site to adequate bonding arrangements for eventual decommission or possible problems with operation.

If natural gas is to receive special support as a “transition fuel” then firm renewable targets for renewable energy production and efficiency should be legally mandated as an integral part of any efforts to publically support unconventional natural gas extraction.²²³

Participatory planning can go beyond deliberative polling and can occur well before the process has reached a mitigation discussion.²²⁴ Doing so may change the dynamic described by Sean Nolon in which success tends to depend upon siting negotiation in which “(1) each party must possess something to trade; (2) “deals” must be possible that are better than “no deal”; (3) each party must trust that the other will honor its promises; and (4) each party must believe the above is true.”²²⁵

Societal agreement to transition away from oil and coal may not equate to local siting coordination on given energy projects. What appears to be a clear police power to some looks more like a governmental taking of private property to others. Jurisdictions do not have free reign to require setbacks and other mitigating measures in light of existing exaction jurisprudence.

To this author best practices involve participatory planning to build consensus regarding optimal energy production that does not unacceptably compromise environmental and public health. Such collaborative decision-making requires the public sector to adequately support inclusive processes with technical and advisory support. This might look like a public-private

²²³ See generally Elizabeth Burleson, *Wind Power, National Security, and Sound Energy Policy*, 17 PENN STATE ENVIRONMENTAL LAW REVIEW 137 (2009).

²²⁴ Negotiated Rulemaking Act, 5 U.S.C. §§ 563-568 (2006) (inclusive decision-making can begin well before this rulemaking stage in which a representative group of stakeholders tend to focus on consensus building with regard to mitigating measures rather than whether to conduct the activity at all.).

²²⁵ Sean Nolon, *supra* note 54, at 369 citing to O'Hare et al., *Facility Siting and Public Opposition* 85-90 (1983) at 90.

body comparable to a transboundary water commission but resilient in the face of regulatory capture.

B. Environmental and Health Impact Assessments

The federal government should conduct a national environmental impact analysis of unconventional natural gas extraction to ensure that any development is done as safely as possible. This can best be accomplished through broad access to information, public participation, and access to justice. This process can lead to innovations that optimize safe and environmentally sound technologies and procedures.²²⁶

Health Impact Assessments (HIAs) should also be conducted before any unconventional natural gas development commences. HIAs have been carried out for Bureau of Land Management oil and gas extraction plans for Alaska's North Slope²²⁷ as well as for natural gas development in Garfield County, Colorado.²²⁸

C. No Action Option

France has said no to hydrofracking.²²⁹ Before any discussion of buffer zones, flowback provisions and other ways to mitigate unconventional natural gas extraction there should be a full and inclusive process of decision-making as to whether unconventional natural gas extraction should be authorized.

²²⁶ see generally, Elizabeth Burleson, *Energy Policy, Intellectual Property and Technology Transfer to Address Climate Change*, 18 UNIVERSITY OF IOWA TRANSNATIONAL LAW AND CONTEMPORARY PROBLEMS 69 (2009).

²²⁷ Alaska Intertribal Council et al., National Petroleum Reserve – Alaska Oil Development Plan, Alaska, United States (September 2008).

²²⁸ Roxanna Witter, MD et al., *Health Impact Assessment for Battlement Mesa*, Garfield County Colorado, Denver, Colorado (September 2010).

²²⁹ 34 INER 643, 7/6/ 11.

The no-action alternative, a prohibition on development of the Marcellus and Utica Shale²³⁰ plays in New York, was not considered beyond stating that while none of the adverse impacts would occur none of the economic benefits would occur either. For an environmental impact statement this is notably cryptic. The organizational decision-making in designing the RDSGEIS is also striking. The economic benefits are described at length up front while the no-action alternative is given little more than 4 paragraphs from page 1071 to 1073 and is quickly followed by a phased permitting approach.²³¹ Beginning an environmental impact analysis with lengthy narrative on potential drilling jobs and followed by paltry text on sustaining a moratorium does not appear to meet the statutory requirements of environmental impact analysis. It is inadequate to make a reference to the public interest language in Article 23-0301 of the ECL²³² without balancing the public's need for energy with (1) the public interest in investing in renewable energy (2) the public interest in substantially lowering such greenhouse gasses as methane (natural gas) (3) and the public interest to protect the drinking water of 9 million people in New York City. As a revised draft environmental impact statement, the lack of discussion of the full impact on the environment by natural gas extraction is striking.

It is certainly in the public interest for home heating prices to be affordable. That is not the same thing as saying it is in the public interest to ramp up natural gas production to ensure very cheap methane production and consumption. The discussion of environmental safeguards

²³⁰ JOINT COMMENTS *supra* note 182 at 3 (noting that, “[w]hile the RDSGEIS mentions baseline geologic aspects of the Utica shale, the lack of environmental impact assessment on depths other than the Marcellus shale makes it important for this analysis to occur; require Utica Shale or other unnamed low-permeability gas reservoir development have site-specific supplemental environmental impact statement review; or issue future SGEIS beyond the Marcellus shale.”) *Id.*

²³¹ NEW YORK RDSGEIS *supra* note 216 at 1071.

²³² Oil, Gas and Solution Mining Law Declaration of Policy - ECL Article 23: “It is hereby declared to be in the public interest to regulate the development, production and utilization of natural resources of oil and gas in this state in such a manner as will prevent waste; to authorize and to provide for the operation and development of oil and gas properties in such a manner that a greater ultimate recovery of oil and gas may be had, and that the correlative rights of all owners and the rights of all persons including landowners and the general public may be fully protected, and to provide in similar fashion for the underground storage of gas, the solution mining of salt and geothermal, stratigraphic and brine disposal wells.” *Id.* available at <http://www.dec.ny.gov/energy/26498.html>.

genuinely protective of water supplies and habitats is a nascent one that has yet to bring informed stakeholders to the table to broaden the public/private understanding of scope and depth of adverse impacts from natural gas extraction. It is not clear that natural gas is an adequate “bridging fuel” to renewable energy. MIT has found that natural gas production appears to be stunting renewable energy.²³³ Environmentally sound energy use is in the public interest, as is enhancing efficiency, conservation, wind, solar, and the array of energy sources that optimize environmentally sound sustainable development.

It is not enough to say that increasing the supply of unconventional natural gas will lower prices of natural gas in an environmental impact statement and then move quickly to job production. Renewable energy also creates jobs. Pitting job creation against environmentally sound energy use is not an analytical exercise and should not be the only discussion occurring in an environmental impact statement. The no-action section of the RDSGEIS is not the appropriate location to continue an already extensive discussion elsewhere in the document regarding drilling jobs, private mineral royalties and subsequent state taxes. This author finds the following statement lacking for a no-action analysis in an environmental impact statement (draft or otherwise):

The no-action alternative is also not favored because most of the potential significant adverse impacts identified in this Supplement can be fully mitigated by the measures outlined in Chapter 7. Other significant adverse impacts can be partially mitigated, or are temporary in nature. A prohibition would also deny owners of mineral interests an opportunity to realize the benefit of mineral rights ownership. Accordingly, it is not a recommended alternative to the rational and controlled development proposed in this Supplement.²³⁴

New York’s phased permitting approach raises but does not adequately address the need to protect New York’s drinking water sheds. Simply waiting several years before permitting

²³³ Jacoby, O’Sullivan and Paltseva, *supra* note 1, at 1.

²³⁴ NEW YORK RDSGEIS *supra* note 216 at 1073.

drilling over aquifers²³⁵ is not a viable approach to public safety, a paramount public interest and one that permits states to utilize police powers to protect the public.

This author's definition of energy security does not include jeopardizing public water supplies.

Temporarily delaying permitting in NYC and Syracuse watersheds does not adequately address sustaining public water supply protective measures. The following recommendation by the

RDSGEIS should be strengthened to protect public safety:

Well pads for high-volume hydraulic fracturing would not be permitted within 2,000 feet of public water supply wells, river or stream intakes or reservoirs until at least 3 years after issuance of the first permit for high-volume hydraulic fracturing. Reconsideration of this prohibition at that time would be based on actual experience and impacts associated with permit issuance outside these buffer zones. This approach functions as a partial "phased" permitting approach because it prohibits and limits activities in areas deemed to be especially sensitive where a phased and cautious approach is merited.²³⁶

A cautious approach is merited everywhere, as is serious consideration of a genuine buffer zone that does not allow industrial activity under or near drinking water supplies. Genuinely independent experts and individuals whose drinking water is at stake should be brought into the decision-making process in a meaningful way that enhances both understanding and insight for sustaining public health and environmental integrity. Is placing a drill pad 2,000 feet from the edge of a public water well a sufficient distance to permit drilling when horizontal drilling can extend a mile from the drill pad under the water supply? Is delaying only high-volume hydraulic fracturing within 500 feet from a primary aquifer for 2 years an adequate scope, distance, and timeframe? Should independent non-industry scientists be determining these safety thresholds before drilling commences rather than on a piecemeal level over the next several years in isolated case studies? Should 2-3 years rather than the long term be considered a sufficient precautionary window with which to refrain from drilling over public water supplies? What

²³⁵ NEW YORK RDSGEIS *supra* note 216 at 1076.

²³⁶ *Id.*

about private wells and the individual's drinking water from these wells over the next several years whose health may be at stake while studies progress slowly? If site specific SEQRA determinations are as deferential to drilling jobs, lowering natural gas prices, and tax revenues over actual environmental impacts, then do individualized reviews of this time adequately protect water supplies? It will be difficult for each local water supply impact to outweigh the generalized projections of economic advantages advanced to promote unconventional natural gas extraction. Should fragmented site-specific studies be relied upon with regard to protecting drinking water when blanket prohibitions to drilling in the vicinity of drinking water supplies could be both more economically efficient and environmentally protective? Asking such questions could result in different recommendations than those released by New York in its RDSGEIS.

Budgetary constraints are an unpredictable proxy for health/environmental enforcement. On page 1077 the RDSGEIS "proposes to limit the number of permits it issues to match the Department resources that are made available to review and approve permit applications and to adequately inspect well pads and enforce permit conditions and regulations."²³⁷ This statement hangs at the end of the discussion on protecting drinking supplies presumably as a means of soothing public concern yet is lacking sufficient detail to do so.

Given the placement of the discussion of non-chemical fracturing technologies and additives within the alternatives section of the RDSGEIS, it is inadequate to end the discussion with "further study is warranted."²³⁸ The report acknowledges, "recognition of potential hazards has motivated investigation into environmentally-friendly alternatives for hydraulic fracturing

²³⁷ *Id.* at 1077.

²³⁸ *Id.*

technologies and chemical additives.”²³⁹ The report also recognizes that greener technologies to date reduce without eliminating toxicity in unconventional natural gas extraction. The reports recommendation of full lifecycle analysis of chemical impacts should be greatly expanded to the entire range of adverse impacts resulting from unconventional natural gas extraction rather than solely the development of less toxic hydraulic fracturing fluids.

Stabilizing short-term domestic energy needs is a valid argument in its own right. Yet, an analytically robust lifecycle analysis of energy sources and efficiency measures is long overdue and should be conducted by the public sector before jeopardizing drinking water supplies on the grounds that energy security depends upon compromising water security.

D. Enhancing Federal Law Covering Natural Gas Extraction

Congress should reestablish federal thresholds that can protect public health and the environment from unconventional natural gas operations. Enacting the FRAC Act to close the Halliburton Loophole²⁴⁰ would be a sensible first step. In 2009 companion bills H.R. 2766 and S. 1215 were introduced in Congress to amend the SDWA to once again cover hydraulic fracturing.²⁴¹ The FRAC Act was reintroduced in 2011 but has yet to build political steam to amend the SDWA definition of “underground injection” to include injection in the context of hydraulic fracturing.²⁴² The FRAC Act would also mandate public disclosure of chemicals used

²³⁹ *Id.*

²⁴⁰ On June 9, 2009, Sen. Bob Casey Jr. (D-Pa.) introduced into the 111th Congress Senate Bill 1215--the Fracturing Responsibility and Awareness of Chemicals (FRAC) Act.

²⁴¹ Fracturing Responsibility and Awareness of Chemicals Act of 2009, S. Con. Res. 1215, 111th Cong. (2009); Fracturing Responsibility and Awareness of Chemicals (FRAC) Act, H.R. Con. Res. 2766, 111th Cong. (2009).

²⁴² S. 1215 § 2(a); H.R. 2766 § 2(a).

in unconventional natural gas production while retaining industry proprietary control over chemical formulas.²⁴³

This analysis is mindful of the interest of industry to minimize external oversight and maximize secrecy of operations. Yet, property law in the US is an ongoing balancing act among protecting the general public, preserving the public trust, and recognizing individual property rights. Police powers are indeed powerful and can be used to require development to adhere to sustainability criteria. In the context of natural gas extraction in residential communities, *Hadacheck v. Sebastian*²⁴⁴ brick production looks benign. Intellectual property rights are not more sacred than other property rights or than public health.

Reestablishing comprehensive federal thresholds for drinking water that encompass natural gas extraction, would bring mandatory disclosure back to the comparatively better resourced federal level. A federal floor and data collection process would provide vital information with which to adapt both technology and regulation to sustainable water-energy-climate policy.

The unconventional natural gas industry is comparable to numerous other economic sectors, both in the energy field and beyond, that are subject to federal regulation. Hannah Wiseman has analyzed the similarities between unconventional natural gas extraction and coal mining, both of which vary from one location to another without impeding EPA capacity to regulate impoundments and related activities.²⁴⁵ Numerous scholars have conducted environmental federalism analyses with respect to a wide range of economic activities with

²⁴³ S. 587, 112th Cong. (2011); H.R. 1084, 112th Cong. (2011). Fracturing Responsibility and Awareness of Chemicals Act of 2011; Susan L. Sakmar, *The Global Shale Gas Initiative: Will the United States be the Role Model for the Development of Shale Gas Around the World?* 33 Hous. J. Int'l L. 369 (2011); see also <http://www.govtrack.us/congress/bill.xpd?bill=h112-1084>

²⁴⁴ *Hadacheck v. Sebastian*, 239 U.S. 394, 410-11 (1915) (recognizing broad police power).

²⁴⁵ Wiseman, *Regulatory Adaptation supra* note 110 at 289.

negative externalities on individuals and the environment. The United States is witnessing an unprecedented regulatory drafting race to the bottom in the context of unconventional natural gas extraction. Proposed state and DRBC regulations read like internal industry reports rather than comprehensive rules capable of internalizing the range of public health and environmental impacts that result from unconventional natural gas development.

Given the regulatory gaps in climate-energy-water governance, transboundary coordination should focus on enhancing existing legislation and drafting acceptable new provisions that balance public health with energy dependence and ecosystem sustainability. Inclusive decision-making can result in unconventional natural gas regulations that are as effective as federal Emergency Planning and Community Right to Know Act coverage.

1. Disclosures, Environmentally Sound Innovation, and Adaptive Management

Intellectual property rights and safety standards are not mutually exclusive. Disclosure would incentivize internalizing adverse impacts of gas extraction and help decision-makers identify best practices. Disclosure data can inform decision-making by making available empirical data with which to determine minimally environmentally damaging extraction methods. This process could be strengthened by collaborative analysis by jurisdictions, publically funded university researchers, and the private sector to evaluate a database of disclosure information.

Regulation can be technology forcing by ruling out chemicals with unacceptable impacts on environment and human health. Pooling all current information regarding the adverse impacts of unconventional natural gas extraction can not only facilitate lifecycle analysis across energy options but enable any natural gas production to precede using effective methods that minimize adverse impacts to environmental and human health.

Adaptive management of unconventional natural gas extraction can involve banning unacceptably harmful chemicals and methods as soon as best practices are identified and proven effective. While geology and water availability varies across drilling locations, public-private research capacity is robust enough to identify best practices for a wide array of factors given current coding, mapping, and analytical expertise. Interdisciplinary and transboundary cooperation can replace random industry experimentation at the expense of public health and environmental integrity.

Incentivizing innovation through intellectual property right protection is a well-established public good but one to be weighed against other public goods including public health. Trade secrets and the corporate revenue stream protected by such secrets do not outweigh legal requirements to sustain safe drinking water.²⁴⁶

Police power to protect public health need not impede innovation in energy diversification. Intellectual property law protects companies through trade secret, patent, copyright, and trademark. This field of law has long balanced the property rights of innovators with the public interest in broadly available goods.²⁴⁷ For this reason property rights expire after a reasonable timeframe and the given innovation becomes part of the public domain. As long as a trade secret remains a secret owners can sustain revenue streams well beyond the common patent timeframes. Trade secret law has protected the Coca Cola formula for over a century. Yet, trade secret law is not immune from the balancing of public health and property rights. Ultimately, the public sector has the police power to place the public safety before monetary gain by a given industry.

²⁴⁶ See Burleson and Burleson, *supra* note 3.

²⁴⁷ AIDS drug availability in Africa presents another context in which public health and proprietary property rights have been weighed, leading to broader AIDS drug availability.

Groundwater protections and recycling requirements can provide technology-forcing incentives to adequately address the water pollution associated with natural gas production. Maximizing the recycling of flowback water is an area in need of greater innovation if natural gas development is to proceed. To date the cost of wastewater recycling far exceeds that of injecting contaminated water into underground formations.²⁴⁸ Yet, seismic instability appears to present serious challenges to the practice of blasting large volumes of wastewater underground.²⁴⁹ Filling the regulatory gaps governing unconventional natural gas can be done in a manner that sustains energy innovation as well as robust public health/environmental measures.

2. Energy Security, Climate Stability, and Good Governance

This author recommends that the leakage rates of unconventional natural gas extraction be ascertained and compared with the greenhouse gas footprint of other energy options before public/private resources are committed to further development. Debating the relative emissions of natural gas flaring and leakage²⁵⁰ as opposed to mountain top removal coal production strikes this author as a race to the bottom. Broadly sharing accurate life-cycle analysis across all energy options can facilitate energy sustainable development.

²⁴⁸ Environmental Protection Agency, *Natural Gas Drilling in the Marcellus Shale: NPDES Program*, at 3, available at http://www.epa.gov/npdespub/pubs/hydrofracturing_faq.pdf; R. Marcus Cady, II, *Drilling Into the Issues: A Critical Analysis of Urban Drilling's Legal, Environmental, and Regulatory Implications*, 6 TXWLR 127, 146 (2009); see also 'Shale' We Drill? *The Legal and Environmental Impacts of Extracting Natural Gas From Marcellus Shale*, 22 Vill. Env'tl. L.J. 189 (2011). (discussing recycling, treatment, and injection of wastewater underground.) *Id.*

²⁴⁹ Officials - 4.0 Magnitude Quake in Northeast Ohio Related to Wastewater Injection Well, WASH. POST, Dec. 31, 2011, at 1, available at http://www.washingtonpost.com/business/40-magnitude-quake-strikes-in-northeast-ohio-the-latest-near-a-gas-drilling-injection-well/2011/12/31/gIQAhiRoSP_email.html (noting that, "[o]fficials said Saturday they believe the latest earthquake activity in northeast Ohio is related to the injection of wastewater into the ground near a fault line, creating enough pressure to cause seismic activity.") *Id.*

²⁵⁰ 'Shale' We Drill? *supra* note 248 at 198 (2011) (noting that, "[a]ir pollution occurs at nearly every stage of the construction and drilling phase of an oil and gas well.") *Id.*

First and foremost strict regulations need to be enforced to prohibit flaring natural gas.²⁵¹ Industry flaring, venting, and release of natural gas have substantial climate destabilizing consequences. Less clear are the rates of flaring and the projected leakage rates for natural gas production/transport. Yet, these numbers matter when trying to assess the relative impacts of natural gas *vis a vis* coal, oil, or nuclear cradle to grave impacts. Cornell professors are struggling to come to terms with whether natural gas should be come a bridging fuel.²⁵² This author recommends enhancing disclosure requirements for the full range of data with which to generate lifecycle analysis, including industry wide greenhouse gas emissions rates. This can be done at the stage of participating in the stock market, obtaining insurance, qualifying for public subsidies, before receiving tax advantaged status, amendments to existing environmental statutes such as the Clean Air Act, or by EPA rule-making just to mention a few approaches. Given the international nature of the climate collective action problem such legal requirements could be written into the climate instrument that countries have recently committed to ratifying by 2020. A Rip Van Winkle siesta until then is not advisable which leads to the need for local momentum to continue to propel environmentally sound decisions into the constrained market place. Local impacts in the form of cancer spikes in given communities allow ordinary citizens to highlight the inequity of allowing large corporations to continue to externalize pollution costs. Neighboring communities care both about steady employment and averting terminal illnesses as a result of exposure to contaminants. All this is well-trodden ground by this author and many others across a myriad of fields of inquiry and yet all this inquiring has yet to alter the corporate

²⁵¹ Anna Driver and Bruce Nichols, *Shale Oil Boom Sends Waste Gas Burn-off Soaring*, July 25, 2011, at 1, *available at* <http://www.reuters.com/article/2011/07/25/us-shale-flaring-idUSTRE76O4SU20110725> (noting that flaring of natural gas substantially adds to climate warming") *Id.*

²⁵² Howarth, Robert W.; Ingraffea, Anthony (15 September 2011). *Should Fracking Stop? Extracting gas from shale increases the availability of this resource, but the health and environmental effects may be too high. Point: Yet, it's too high risk.* *Nature* (477): 271–275.

incentives or enhance disenfranchised community capacity to achieve environmental justice. Many ordinary individuals shy away from the term all together, not wanting to be seen as anything other than a well meaning, middle of the road, family oriented American. Pitting jobs against health is a no win proposition. Both are important and not mutually exclusive. Thus, governance plays an important role in ensuring that decision-making is not only not unconstitutionally arbitrary and capricious but in fact well reasoned and based on a sound understanding of the ramifications – economic, societal, and environmental.

Sound decision making can happen at all levels of governance and is facilitated by checks and balances both on the part of public sectors as well as members of the general public. Fewer members of the general public have the time, inclination, and resources with which to voice their perspectives than their corporate counterparts whose core business mandate often rests upon lowering regulatory requirements, and environmental protections. People take to the streets when they feel threatened. During the civil rights era taking to the streets raised enough visibility to create a legislative ground swell to enact equality provisions. In the past year, taking to the streets has had the effect of dissuading elected officials from voting on energy decisions in the US and has resulted in heads of state stepping down in the Middle East.

This author has written elsewhere supporting the establishment of Middle Eastern transboundary water commissions with which to build trust and enhance water governance.²⁵³ Given recent developments regarding hydraulic fracturing in the Delaware Basin, this author has had to re-analyze the inter-state compact model when energy-water decision-making is integrated into the same regional body. Ultimately, this author concludes that there is not a magic scale of governance at which decisions will always be made in an environmentally minded

²⁵³ See Elizabeth Burleson, *Equitable and Reasonable Use of Water in the Euphrates-Tigris River Basin*, 35 ELR 10041 (2005); see also Elizabeth Burleson, *Middle Eastern and North African Hydropolitics: from Eddies of Indecision to Emerging International Law*, 18 GIELR 385 (2006).

manner. International and national laws have the advantage of being able to protect drinking water across a broad area for many people and create a public health threshold. Yet, such protections can be swept away as easily as they can be created – if not more easily. There certainly are individuals at a local level with a stake in ensuring the integrity of local water supplies but without the constitutional support to prevent commerce in the form of drilling companies from coming into their local communities and engaging in business. Thus, the public health and environmental integrity measures that should be well established and whose enforcement should be well funded should be a cooperative commitment among all governance levels. This can involve clear roles for each level: citizen monitoring and suits, tribal inclusive decision-making, municipal authority to zone residential areas that are free from industry and that can depend upon adequate water supplies, state statutes and environmental regulations that ensure comprehensive environmental and public health impact studies as well as enough boots on the ground to monitor and enforce protection measures, and national drinking water and environmental laws that indeed protect drinking water and ecosystem services.

So where do transboundary water organizations fit into this cooperative mix. Should they play the lead in authorizing energy extraction? Should they receive the revenue derived from leasing fees for drilling? Should they be able to permit drilling in a state that has a moratorium preventing drilling? Should the governors of five states and a representative from the Army Corp of Engineers be able to take a single vote and allow unconventional natural gas extraction in the watershed upon which 15 million people depend for clean drinking water?²⁵⁴ If not these five then who? The legislature? The courts? EPA? Congress? The President? WHO standards for drinking water? The Bill McKibben inspired members of civil society willing to get arrested protesting at a DRBC meeting that will decide whether hydrofracking should be permitted by the

²⁵⁴ *Delaware River Basin Commission: Battleground for Gas Drilling*, NPR *supra* note 147.

DRBC? Is this optimal public participation? Is it effective? Can it result in nuanced land use regulation that balances private property rights with public health and environmental integrity? It is worth paying attention when large numbers of people take to the streets. Having the social license to operate is crucial especially when something as vulnerable as a pipeline carrying highly explosive gas is involved. This is the lesson learned by Shell in Nigeria²⁵⁵ – disenfranchised individuals can and will sabotage corporate profits when their family members become sick because their neighborhoods are no longer safe to live in given air pollution from flaring and water pollution.

This author would like to argue that a better model for public participation involves (1) access to information (2) public participation in decision-making, and (3) access to justice. These ingredients of environmental justice require governments to establish laws that enhance procedural rights for civil society to genuinely achieve informed consent and meaningful input to draft legislation and rule-making. Broad standing provisions also provide a check and balance system with which to minimize the buying of politicians by corporate interests. Safe drinking water and clean air are non-negotiable and corporations are not people. Yet public interests compete – affordable winter heating sources also present a medical necessity as does having adequate funds with which to eat properly. These constraints are clear if often overlooked. Less clear to the general public are the intricacies of utility rate-making, the ability to raise the cost of natural gas or electricity based on the cost of new infrastructure investment for instance. Furthermore, the level of fossil fuel subsidization by the public sector also remains opaque, as does the full life cycle impact of the array of available energy resources.

²⁵⁵ See e.g. *Pipeline blown up in Niger Delta*, May 26, 2008, BBC NEWS, at 1, available at <http://news.bbc.co.uk/2/hi/africa/7419918.stm>.

The US NEPA pioneered recognition of procedural rights and while it has not lived up to its full stature, it remains a useful tool with which to insist that the federal government take stock of environmental impacts before proceeding with projects that impact public resources. Little NEPAs at the state level throughout the United States have also allowed for reflection periods prior to commencing projects that substantially impact ecosystem services and environmental integrity. The environmental impact assessment requirements pioneered by the United States have spread around the globe and become particularly effective in Europe. This author concludes that the United States could benefit by incorporating the best practices being implemented by the EU with regard to environmental law generally and the Aarhus Convention in particular.

E. European Union as a Comparative Model for the United States

The Aarhus Convention has codified a human right to a clean environment, granting citizens access to environmental information, participation in decision-making in environmental matters, and judicial redress.²⁵⁶ It sets forth a human right to a clean environment and picks up where NEPA leaves off by clearly delineating the scope of rights to (1) access to information, (2) public participation in decision-making, and (3) access to justice. The body of cases that have developed pursuant to the Aarhus convention can facilitate energy-water-climate good governance wherever energy use impacts public health and environmental integrity. The United States Congress should require quarterly data reports to be filed with a federally and adequately funded clearinghouse of natural gas materials.²⁵⁷ The Aarhus Convention provides a model with

²⁵⁶ Convention on Access to Information, *Public Participation in Decision-Making and Access to Justice regarding Environmental Matters* (Århus Convention), June 25, 1998, 38 I.L.M. 517 (1999) (entered into force Oct. 30, 2001), available at <http://www.unece.org/env/pp/documents/cep43e.pdf>.

²⁵⁷ EPA and local communities could link websites with a single information portal.

which to balance access to information with the administrative cost of compliance.²⁵⁸

Including citizens in environmental protection increases the effectiveness of that protection because people often have a deep interest and are affected by the state of their surrounding environment.²⁵⁹ This rights-based approach prohibits discrimination on the basis of citizenship, nationality, or domicile. While the Convention is not focused on the private sector, when environmental regulation has been devolved to privatized bodies, these entities are covered under the definition of public authorities.²⁶⁰

The RDSGEIS recognizes the lack of a US-based metric to evaluate the environmental ramifications of various chemicals associated with unconventional natural gas extraction – noting that the “most significant environmentally conscious hydraulic fracturing operations and regulations to date are likely in the North Sea. Several countries have established criteria that define environmentally beneficial chemicals and utilize models and databases to track chemicals overall hazardousness against those criteria.”²⁶¹ Several international best practices can inform genuine efforts to minimize chemical exposure rates. First, the Oslo-Paris Convention (OSPAR) list of environmentally sound chemicals.²⁶² Second, the Norwegian Pollution Control Authority oil and gas industry chemical coding approach.²⁶³ Inclusive decision-making can lead to robust chemical approval lists and lists of banned chemicals based on “low biodegradability; high

²⁵⁸ Århus Convention *supra* note 256.

²⁵⁹ *Id.*

²⁶⁰ *Id.* at 518.

²⁶¹ NYSDEC, REVISED DRAFT SUPPLEMENTAL GENERIC ENVIRONMENTAL IMPACT STATEMENT ON THE OIL, GAS AND SOLUTION MINING REGULATORY PROGRAM 1080 updated August 2011, *available at* <http://www.dec.ny.gov/data/dmn/rdsgeisfull0911.pdf>.

²⁶² The Convention for the Protection of the Marine Environment of the North-East Atlantic (the “OSPAR Convention”) was opened for signature in 1992. The Convention entered into force on March 25, 1998.

²⁶³ Regulations Relating to Conduct of Activities in the Petroleum Activities, § 56b. For a North American model see the Canada-Newfoundland and Labrador Offshore Petroleum Board, Offshore Chemical Selection Guidelines for Drilling & Production Activities on Frontier Lands, April 2009, *available at* http://publications.gc.ca/collections/collection_2009/oneneb/NE23-151-2009E.pdf.

bioaccumulation potential; high acute toxicity; and detrimental mutagenic or reproductive effects.”²⁶⁴

REACH also provides a best practice, demonstrating regulation of the Registration, Evaluation, Authorization and restriction of Chemical use in the European Union.²⁶⁵ The European Commission explains that “[m]anufacturers and importers are required to gather information on the properties of their chemical substances, which will allow their safe handling, and to register the information in a central database run by the European Chemicals Agency.”²⁶⁶ The European Chemicals Agency is establishing a robust public database for civil society to find hazard information.

Europeans are no strangers to difficult natural gas energy security debates given ongoing discord between Russia and much of the rest of Europe that have resulted in winter home heating fuel insecurity. The EU seeks to reduce reliance upon Russian natural gas supplies, particularly in the wake of Russia-Ukraine pricing conflicts resulting in supplies being halted to Western Europe in the winters of 2006 and 2009.²⁶⁷ While this has incentivized European exploration of non-Russian energy alternatives, this energy insecurity has not kept Europeans from putting into place comprehensive environmental enforcement measures.

²⁶⁴ JOINT COMMENTS *supra* note 182 at 87.

²⁶⁵ EC 1907/2006, entered into force on 1 June 2007 and its provisions are being phased-in over 11 years; *see also* European Commission, REACH, at 1, *available at* http://ec.europa.eu/environment/chemicals/reach/reach_intro.htm (noting that, “[t]he REACH Regulation places greater responsibility on industry to manage the risks from chemicals and to provide safety information on the substances.”) *Id.*

²⁶⁶ European Commission, REACH, at 1, *available at* http://ec.europa.eu/environment/chemicals/reach/reach_intro.htm.

²⁶⁷ *Russia Shuts Off Gas to Ukraine*, BBC News, Jan. 1 2009, at 1, *available at* <http://news.bbc.co.uk/2/hi/europe/7806870.stm> (noting that, “[m]uch of the EU's gas from Russia arrives via Ukraine.”) *Id.*

EU pollution provisions provide broad energy-water governance thresholds.²⁶⁸ The plain language of the Mining Waste Directive 2006/2²⁶⁹ requires coordination with the Water Framework Directive 2000/6.²⁷⁰ The Water Framework Directive provides a best practice upon which other jurisdictions can model water governance.²⁷¹ Together with the Ground Water Directive baseline chemical thresholds²⁷² and transboundary coordination provisions²⁷³ and the Drinking Water Directive,²⁷⁴ the Water Framework Directive can address important aspects of natural gas development. These provisions could be enhanced to specifically respond to the public health and environmental integrity issues that come with hydraulic fracturing that were not anticipated when these directives were drafted.

The Drinking Water Directive allows Member States to exempt “water intended exclusively for those purposes for which the competent authorities are satisfied that the quality of the water has no influence, either directly or indirectly, on the health of the consumers concerned.”²⁷⁵ As a human based standard this may not adequately take into account ecosystem services. Even within the context of the human based approach, this may not draw a broad enough circle around natural gas extraction with which to protect drinking water, particularly those relying on wells. This is not solely a hydraulic fracturing issue. It is also a matter of adequately regulating and monitoring cement casing, flowback, wastewater disposal etc. EU

²⁶⁸ European Parliament Directorate-General of Internal Policies, *Impacts of Shale Gas and Shale Oil Extraction on the Environment and on Human Health* at 53, available at <http://www.europarl.europa.eu/document/activities/cont/201107/20110715ATT24183/20110715ATT24183EN.pdf>.

²⁶⁹ Directive 2006/21, Article 2(1) covering “prospecting, extraction, treatment and storage of mineral resources.”

²⁷⁰ Directive 2006/21, Article 5(3)(g), waste management plans are required to include “measures for the prevention of water status deterioration in accordance with Directive 2000/60/EC.” See also Water Framework Directive (2000/60/EC).

²⁷¹ Directive 2000/60/EC, Article 1(d), 16(1).

²⁷² Directive 2006/118, Article 2.

²⁷³ Directive 2006/118, Article 3(3).

²⁷⁴ Directive 98/83, Article 1(2).

²⁷⁵ Directive 98/83, Article 3(2)(a).

Directive 2003/105/EC addresses large-scale hazardous material accidents²⁷⁶ and the Hazardous Waste Directive (1991/689/EC) likely covers some aspects of unconventional natural gas extraction waste processes.²⁷⁷ Yet, this article argues that unconventional extraction wastewater transport, processing, and storage need to be specifically regulated. This can be done by amending existing water and energy directives or drafting a new unconventional extraction directive.

More recently, the European Union has modeled good governance with strong procedural measures for access to information, public participation, and access to justice. For instance the Environmental Assessment Directive 85/337 mandates environmental impact assessments for public or private projects with significant environmental effects.²⁷⁸

Similarly, transboundary effects must be disclosed to those impacted in as timely a manner as the citizens of the country carrying out the activity learn of the dimensions of the project.²⁷⁹ Given the changes that have come with hydraulic fracturing, it would behoove the EU to reassess the thresholds for the volume of natural gas extracted in light of modern extraction practices in residential areas.²⁸⁰

Biodiversity provisions can also help the EU balance energy production with public health and environmental integrity. For instance, the Habitats Directive 92/43 protects endangered species and the habitats upon which they depend.²⁸¹ While not all natural gas production will impact endangered species or birds under the Birds Directive,²⁸² such nature-

²⁷⁶ Directive 2003/105/EC, Article 1.

²⁷⁷ Directive 1991/689/EC, Article 1(1).

²⁷⁸ Directive 85/337, Article 1(1).

²⁷⁹ Directive 85/337, Article 7.

²⁸⁰ European Parliament Directorate-General of Internal Policies, *Impacts of Shale Gas and Shale Oil Extraction on the Environment and on Human Health* at 78, available at <http://www.europarl.europa.eu/document/activities/cont/201107/20110715ATT24183/20110715ATT24183EN.pdf>.

²⁸¹ Directive 92/43, Article 2(1).

²⁸² Directive 2009/147, Article 1(1).

based provisions are part of the patchwork quilt of existing provisions impacting natural gas production.

EU Climate/Energy governance includes the Renewable Energy Directive, Revised Emissions Trading Directive, Geological Storage of Carbon Dioxide Directive, and Effort Sharing Decision that together seek to reduce greenhouse gases 20 percent by 2020.²⁸³ Here lifecycle analysis is crucial to determine whether the leakage of natural gas, methane being a far more potent greenhouse gas than carbon, is warranted when compared with the entire life cycle of other energy options.

The flexibility of EU directives provide member states the ability to tailor provisions to distinct geographic, cultural, and other realities while avoiding a race to the bottom with regard to basic protections. That said, it is fundamental to ensure a sound threshold at the outset for such an approach to achieve “best practice” status. This requires meaningful involvement from a wide range of stakeholders to find consensus regarding what constitutes safe thresholds.

VII. Conclusion

Filling the regulatory gaps governing unconventional natural gas can best be accomplished through collaborative governance that is genuinely adaptive and cooperative. Inclusive decision-making should be guided by the best available science in an ongoing manner and citizen suits should be authorized to give members of civil society a compliance role that can balance the sway of the energy sector on public sector decision-making.

Public outcry has been most pronounced with regard to rights to know what chemicals are likely to enter the drinking supply as a result of unconventional natural gas development.

²⁸³ *see* European Commission Climate Action, *The EU Climate and Energy Package*, http://ec.europa.eu/clima/policies/package/index_en.htm.

Prior disclosure of chemicals across the cradle to grave lifecycle of natural gas development and wastewater disposal has yet to be integrated into an adequate regulatory safety net for public health and environmental integrity. Civil society is creating the checks and balances force requisite to enact such protections in the United States – a legal system susceptible to industry capture of elected officials. Civil society would be able to play this role more effectively with access to information not only to the chemical composition of hydraulic fracturing solutions but the radioactivity of wastewater flowback and alternatives ranging from least toxic fracturing solutions to ways to minimize or eliminate wastewater flowback. Environmental impact studies should first and foremost analyze these alternatives providing to the public real options with which to consider economic versus public health decisions.

Public outcry has been less pronounced regarding reclassifying floodplains to reflect the genuine risk of flooding. Here technical expertise is core to informing public regulatory decision-making regarding energy siting. It makes little sense to base permitting decisions on outdated floodplain maps when establishing regulations to protect drinking water. The IPCC indicates that wet places are getting wetter and that such places will increasingly need to respond to intense durations of heavy rainfall and resulting flooding. Updating flood maps to reflect increased frequency and severity of precipitation can enhance the public sectors capacity to protect public health and welfare.

Transboundary water organizations are in a position to show leadership by enhancing groundwater protection and being stewards of limited freshwater supplies. This requires coordinated analysis on the energy-water nexus – analysis that addresses the challenges of achieving energy/water security as well as balanced domestic water use among stakeholders.

Strong provisions for access to information, public participation, and access to justice can facilitate procedural good governance with which to ensure environmental and human health.

No single layer of government consistently provides optimal public health/environmental integrity protections. At times international, non-governmental, regional, federal, state, local, and individual players have provided sustainable development leadership. Some technologies and geographic realities may be better suited to a given kind of governance. Regional water-energy-climate collaborative governance may facilitate wave energy success along a coastline. Similarly, watershed management may benefit from regional transboundary commissions. Yet, such commissions will not by definition be insulated from persuasive and well-financed stakeholders seeking development permits that do not adequately take into account water quality/quantity needs of the watershed. Integrating the work of scholars conducting energy spectrum lifecycle analysis with the work of scholars analyzing best practices in collaborative governance continues to unfold. The national academies and a wide range of public/private studies can further this crucial work. In the context of unconventional natural gas, engineering, geology, innovation, and governance are colliding and better water-energy-climate coordination can further energy security.

It is crucial that industry provide the funding with which to conduct independent baseline assessments. The national academies should be involved in comprehensive evaluation of natural gas extraction as well as cradle to grave analysis of respective energy options. Hydraulic fracturing, drilling, casement/cement stability, release/leakage of methane and wastewater, and incentivizing green hydraulic fracturing solutions and lowering water intensity of natural gas production are all areas needing further analysis.

Hydraulic fracturing solutions vary from site to site given the range of shale characteristics. People should be able to use information that is put in the public domain that clearly identifies the range of chemicals being used. Buffer zones should be put around public drinking supplies. Permitting should not get out ahead of enforcement capacity. Industry fees should go towards public sector and independent, ongoing water quality monitoring tests both before and after industry activity. These tests should be both on-site and downstream. Yes, this all costs money so it needs to be funded properly. Fossil fuel extraction is a very lucrative industry and it is prudent to tie regulation fees to permitting application processes.

In addition to public sector regulation, corporate responsibility needs to come in the form of doing everything possible to minimize the toxicity of operations and meaningfully disclosing chemical exposure. This author thinks it wise to highlight best practices and best companies – broadly sharing environmentally sound best practices.

Blowouts are not rare occurrences and blowout preventers leave much to be desired.²⁸⁴ Comprehensive regulation that ensures well integrity should be informed by blowouts in Pennsylvania as well as the inadequate cement job of the Deep Horizon Gulf Oil Spill. Inadequate cementing and casing is dangerous and should be taken seriously as unacceptable whether in a backyard in Pennsylvania, in the Gulf of Mexico, or in the Arctic. As the energy sector transitions from traditional to unconventional energy exploration/experimentation safety concerns intensify. Similarly, radioactive waste disposal capacity should predate generation of radioactive waste – this is common sense whether dealing with concentrated radioactive waste from nuclear power plants or radioactive shale from natural gas wastewater.

²⁸⁴ Latham, *supra* note 18, at 34. (noting that, “more than 100 blowout preventer failures at eighty-three deepwater wells were studied, and fifty-seven percent were labeled “safety critical failures. . . one blowout for every 387 wells drilled from 1992 through 2006.”) *Id.* at 37-38.

Energy security and economic development are very real drivers, as are efforts to ensure affordable energy. Yet, advances in drilling technology should not be the deciding factor in the absence of comparative lifecycle analyses across energy options. Transparency can help optimize unconventional natural gas sustainable development. Jurisdictions should analyze whether existing regulatory frameworks are adequate since unconventional extraction is quite distinct from the conventional extraction for which existing regulations were designed. Innovation and deregulation have enabled unconventional natural gas extraction.

Congress should restore hydraulic fracturing and related activities to federal environmental laws. This can be done by passing the FRAC Act -- closing loopholes and requiring chemical content disclosure. Genuine buffer zones should be put in place for flood plains, all drinking water sources, and endangered species habitats. EPA should enforce its prohibition on diesel use in hydraulic fracturing and establish mandatory, frequent monitoring of aquifers and rivers downstream from natural gas production. Permits should not be issued beyond regulatory capacity and fees for regulatory expenses should be substantial. Liability coverage should be required and adequate to make whole all people and ecosystems negatively impacted when regulations are not met.

Transitioning to environmentally sound energy use that minimizes public health and environmental impacts while contributing to energy security can best be done by looking to best practices throughout the world. Best practices should be researched, published regularly, and included in mandatory employee training. Greenhouse gas vapor control should be mandated and enforced.

One way to re-frame energy use and by doing so make energy production more environmentally sound is to coordinate water and energy discussions. Droughts and floods have

compromised energy production at alarming rates of late. This places water-energy-climate decision-making in the public discourse irrespective of efforts to discount climate trends for lack of scientific certainty. By definition scientific certainty will not be achieved which is why the international community committed to not letting uncertainty stand in the way of addressing climate change in agreeing upon the United Nations Framework Convention on Climate Change.²⁸⁵

A social license to operate an activity as strategic and volatile as natural gas extraction can best be accomplished in combination with a robust environmental and public health framework that balances energy and equity at local, regional, and international levels. Energy demand is projected to rise globally and natural gas is highly likely to fill the energy supply-demand gap. This can best be accomplished via comprehensive energy policy development that embraces sustainable development. Transboundary collaborative governance can help coordinate effective responses to shared energy-climate-water challenges.

²⁸⁵ United Nations Framework Convention on Climate Change, Intergovernmental Negotiating Committee for a Framework Convention on Climate Change OR, 5th Sess., Annex, UN Doc. A/AC.237/18 (PartII)/Add.1 (1992), 31 I.L.M. 849, (UNFCCC), one hundred sixty-five countries ratified the UNFCCC. The convention entered into force March 21, 1994; *see also* Elizabeth Burleson *Climate Change Consensus: Emerging International Law*, 34 WILLIAM AND MARY ENVIRONMENTAL LAW AND POLICY REVIEW 543 (2010).