THE GEORGE WASHINGTON UNIVERSITY LAW SCHOOL

GW LAW

ENVIRONMENTAL AND ENERGY LAW
Perspectives

PROGRAM ESTABLISHED 1970

WHAT'S NEW

ABA Recognizes GW Law's "Distinguished Achievement in Environmental Law and Policy"

At the American Bar Association Section Meeting in August, GW Law's Environmental and Energy Law Program received the 2014 ABA Section of Environment, Energy, and Resources (SEER) Award for Distinguished Achievement in Environmental Law and Policy. The award recognizes the collective achievements of the program, which has taught environmental law to more than 4,000 students over its 44-year history, more than 2,000 of whom are practicing environmental and energy lawyers. More than 1,000 alumni have graduated with an LLM degree in the field.

Sheila Hollis, a past GW Law adjunct faculty member and former Chair of SEER, nominated the program, noting that many students have gone on to shape environmental and energy policy at high levels in government, nonprofit organizations, and the private sector. "Few programs have had such a direct and palpable effect on a field of law and policy as the George Washington program has," she said.

The nomination also highlighted that the law school has contributed to the development of environmental and energy law and the work of the ABA. Notably, GW Law has trained perhaps half of the environmental lawyers who serve in the military service branches; in 2008 was the first law school to join the ABA–EPA Law Office Climate Challenge, which focuses on reducing the impact law-related organizations have on the environment through recycling and the use of recycled materials; in 2009 founded the *Journal of Energy and Environmental Law*, published in collaboration with the Environmental Law Institute; in 2013 launched a "Sustainable Energy Initiative" designed as an academic think tank that will play a significant role in the transition of the nation's energy systems; and today has one of the most comprehensive energy law curricula in the country. LeRoy C. Paddock, Associate Dean for Environmental Studies, observed "GW Law continues to build on more than four decades of leadership in environmental and energy law to enable our students to take on the complex environmental and energy challenges of the 21st century."

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PERSPECTIVES

Professor Emily Hammond, whose expertise lies in energy, environmental, and administrative law, has joined the faculty at GW this fall. She is a co-author of the nation's leading energy law casebook, Energy, Economics & the Environment. *The excerpt below is from the forthcoming fourth edition, which reorients the study of energy law around four recurring themes.*


Emily Hammond

Several distinct themes recur throughout energy law. These themes inform and help define energy law as a distinct and coherent conceptual approach to evaluating legal problems. The themes are: (1) ownership; (2) monopolies vs. competition; (3) externalities and risk concepts; and (4) governance.

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What's New

Update on GW's University-Wide Sustainability Initiative:

Appointment of Kathleen Merrigan as Executive Director and Launch of the Capital Partners Solar Project

George Washington University's campus-wide Sustainability Initiative has continued to expand its impact through new initiatives, curricular offerings, and the appointment of Dr. Kathleen Merrigan, former Deputy Secretary of the U.S. Department of Agriculture, as Executive Director of its Sustainability Institute. Under the direction of Dr. Merrigan, GW will focus on becoming an international leader in multidisciplinary sustainability education, research, and outreach. Dr. Merrigan will also join the university's academic faculty.

Kathleen Merrigan, Executive Director of GW's Sustainability Institute.

The university has already received recognition for its efforts to "green" the campus—including a Gold rating for its sustainability performance in its first submission to the Sustainability Tracking, Assessment & Rating System—and continues to make progress on this front. For example, GW was the first school in D.C. to sign the American College and University Presidents' Climate Commitment (ACUPCC), making a commitment to reduce its carbon footprint and to measure its greenhouse gas emissions. GW released its Climate Action Plan in May 2010, which aims for carbon neutrality by 2040, and a reduction in on-site carbon emissions from its buildings, transportation, and energy use by 40 percent by 2025.

To help achieve its climate action goals, the university developed an innovative solution for acquiring electricity from renewable energy sources: the Capital Partners Solar Project. The university partnered with American University and George Washington University Hospital to submit a joint request for 52 megawatts (MW) of solar photovoltaic (PV) power, in response to which Duke Energy Renewables is developing a 450-acre solar farm to supply the electricity. This farm will be the largest

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Paddock Joins Academic Advisor Group of Energy

Associate Dean Lee Paddock

In 2013 Associate Dean Lee Paddock was invited to join the Academic Advisory Group (AAG) of Energy for the International Bar Association's (IBA) Section on Energy, Environment, Natural Resources, and Infrastructure Law. The AAG produces a book published by Oxford University Press every two years. Dean Paddock and 2012–2014 Environmental Law Fellow Jessica Wentz wrote a chapter for the AAG's newest book, "Energy Underground," comparing the approach Pennsylvania has taken to managing hydraulic Fracturing to the approach taken by New York. Dean Paddock presented the research at the IBA Section meeting in Berlin in late April and at a seminar at Oxford University in early May. ■

New Course: Electric Energy Systems in Transition: A Comparative Review

On April 7 the GW Law faculty approved a new course—*Electric Energy Systems in Transition: A Comparative Review*. The course is designed to help students understand how energy systems are changing in several regions of the world. ■

Molly Masterton, JD '14, Awarded 2014 Jamie Grodsky Prize

Molly Masterton

The 2014 Jamie Grodsky Prize for Environmental Law Scholarship was awarded to Molly Masterton, JD '14, for her paper "Promoting Marine and Hydrokinetic Energy and Managing Environmental Risk: Toward an Adaptive Management Strategy." Ms. Masterton's innovative paper highlights the uncertainties associated with marine and hydrokinetic (MHK) technologies, and proposes three mechanisms through which Congress or the Federal Energy Regulatory Commission (FERC) could formally integrate adaptive management principles into the regulatory framework for licensing MHK projects: (1) amending Section 10 of the Federal Power Act to formally require that FERC consider whether a project developer has prepared an Adaptive Management Plan (AMP) when deciding whether to issue a license for the project; (2) issuing a FERC regulation that requires preparation of an AMP for issuance of a license; and, (3) amending the 2007 Energy Independence and Security Act (EISA) to create an adaptive management fund that could be used for current small-scale projects and continued through the project expansion phase. Ms. Masterton's paper was published in the summer 2014 issue of the GW *Journal of Energy and Environmental Law* (JEEL) and is available at bit.ly/gwlaw_masterton. ■

Community of Practice on the Legal Aspects of Sustainable Energy for All

SUSTAINABLE ENERGY FOR ALL

As part of GW Law's Sustainable Energy Initiative, many of the school's faculty and students have been involved in a Community of Practice (CoP) on the Legal Aspects of Sustainable Energy for All (SE4All). The CoP, which is part of the Global Forum on Law, Justice, and Development's Thematic Working Group on Environmental and Natural Resource Law, provides a focal point for discussing the following legal barriers and opportunities associated with implementing the primary goals of the U.N.'s SE4All initiative: (1) ensuring universal energy access, (2) doubling the global rate of improvement in energy efficiency, and, (3) doubling the share of renewable energy in the global energy mix.

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GW at the International Union for Conservation of Nature Academy of Environmental Law 2014 Colloquium

In early July the International Union for Conservation of Nature (IUCN) Academy of Environmental Law (AEL) hosted its 12th Annual Colloquium in Tarragona, Spain. The theme of the 2014 Colloquium was the intersection of sustainable energy and law. Several GW Law faculty members and students who are currently involved in a global Community of Practice on the Legal Aspects of Sustainable Energy for All (see Community of Practice, at left) attended the Colloquium and presented research on a variety of topics. Associate Dean Lee Paddock gave a presentation on the regulation of hydraulic fracturing, comparing the legal requirements in Pennsylvania with those proposed in New York State should New York lift its moratorium on hydraulic fracturing. Professor Robert Glicksman teamed up with Professor Thoko Kaime from the University of Leicester, United Kingdom, to present a paper that argues in favor of recognition of a right of access to modern energy services under international law. Jessica Wentz, 2012–2014 Environmental Law Fellow, and LLM student Chiara Pappalardo, gave a presentation on how to create an enabling policy and regulatory framework for financing community-based renewable mini-grids and microgrids. ■

Jessica Wentz and Chiara Pappalardo presenting their paper on development of rural micro grids in Africa at the IUCN Academy of Environmental Law Colloquium in Tarragona, Spain.

Update from the Sustainable Energy Initiative

GW Law's Sustainable Energy Initiative (SEI) welcomed its new advisory board this spring. The board, consisting of alumni and other prominent energy practitioners, provides financial support and strategic direction for SEI. Through the board's contributions and other generous alumni gifts, SEI is providing financial support for a new international and comparative energy law course, GW's *Journal of Energy and Environmental Law*, and a newly established Energy Law Advisory Board Scholarship. The first scholarship was awarded in May to Adrienne Thompson (see profile on page 8), who will assist in implementing the SEI research agenda.

With the arrival of Professor Emily Hammond in fall 2014, GW Law is redesigning several of its energy courses to create a more comprehensive suite of options. If the law school's curriculum committee approves courses currently in development, students will have the choice of eight energy or energy-related law classes by the 2015–2016 school year including a core course on energy regulation; advanced courses on energy regulation, electricity, oil and gas, nuclear energy, energy derivatives trading, and international project finance; and a practicum in which students work with nonprofit organizations to write papers addressing real-world issues.

SEI's research agenda also continues to move forward. Through a collaborative stakeholder process, the Energy for the 21st Century (e21) Project is developing alternative business and regulatory models for Minnesota and its investor-owned utilities to better enable the state to meet its sustainability goals and adapt to evolving consumer expectations. e21 is a joint project of the Great Plains Institute, Center for Energy and the Environment, and SEI. In collaboration with Berkeley Law, SEI is developing a proposal, for which it will seek grant funding, to identify improved processes for integrated resource planning for the electric sector. SEI is also addressing the legal challenges of implementing the EPA's newly proposed greenhouse gas reduction targets for power plants through a proposed carbon-adder to be administered through the existing wholesale electric markets.

SEI's Donna Attanasio, Senior Advisor for Energy Law Programs, is leading an effort by the Energy Bar Association (EBA) to develop a report for issue next year on energy law education. These efforts will help ensure that GW Law, which has a 30-plus year tradition of teaching energy law, remains at the forefront of the field. ■

Energy Program Advisory Board Members

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Daniel F. Stenger, JD '80
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Alexander Schneider, JD '15, Receives $50,000 Scholarship in GW's First Innovation Task Force Competition

ITF scholarship winner Alex Schneider (second from left) with GW Senior Associate Vice President for Finance Dave Lawlor, fellow ITF scholarship winner Joe Holleran, and President Steven Knapp.

Alexander Schneider, JD '15, was recently awarded a $50,000 scholarship in GW's first Innovation Task Force (ITF) scholarship competition. Mr. Schneider was one of two GW students to receive this prestigious award for developing innovative business plans for sustainability on the George Washington University campus. President Steven Knapp established the ITF in 2008 to bring together students, faculty, and staff to improve GW's business processes and advance academic priorities. Mr. Schneider proposed an idea for computer energy conservation throughout campus. Estimating that university computers are not in use for approximately 120 hours per week, Mr. Schneider developed a plan by which the university could save money and reduce its carbon footprint by installing Energy Star energy management programs on campus computers and networks. ■

GW Law Students Attend Summer School at the University of Groningen

GW and Groningen students participating in the energy law summer school program in Groningen, Netherlands. Pictured in the front row are GW students Brittany DeBord (far left), Julia Dreyer (third from left), Alexandra Awad (fourth from left), and Alexaida Collet-Echevarria (far right).

The law school has had a student exchange and collaboration agreement with the University of Groningen, Netherlands, for several years. Groningen has one of the top law schools in the Netherlands, and its university—ranked among the top 100 universities worldwide—celebrated its 400th anniversary this year. One of GW's joint projects with Groningen is an annual summer energy school in which students from the law school collaborate with Dutch students on energy research projects. This year's summer school was held in Groningen during the week of August 17 and included classes and field trips. Four GW students participated in the program: Alexandra Awad, JD '15, Alexaida Collet-Echevarria, JD '16, Julia Dreyer, JD '15, and Brittany DeBord, JD '15. GW will host eight Dutch students in the program in spring 2015. ■

Recent Events

2014 J.B. and Maurice C. Shapiro Environmental Law Symposium

The 2014 Shapiro Symposium, co-sponsored by the Environmental Law Institute, and the University of Houston Law Center, brought together dozens of experts from the federal government, academic institutions, and NGOs to discuss "The Role of Planning in Federal Land Management." The two-day program covered a broad range of issues, including energy development, climate change adaptation, marine planning, and integrating federal, state, and local planning efforts. Many of the panelists will publish their papers in upcoming editions of the *Journal of Energy and Environmental Law* (JEEL). Slides from some of the presentations are also available on the law school's website at bit.ly/gwlaw_shapiro2014. ■

Symposium panelists Jay Jensen, Associate Director Land & Water Ecosystems, White House Council on Environmental Quality; Professor Robert Glicksman, GW Law; Professor Hope Babcock, Georgetown University Law Center; and Professor Zygmunt Plater, Boston College Law School

ABA Recognizes GW Law *from page 1*

Letters from four distinguished lawyers supported the GW Law nomination. Two alumni, J. Brett Grosko, JD '00, of the Department of Justice, Environment and Natural Resources Division, and Lawrence R. "Larry" Liebesman, JD '73, of Holland and Knight, wrote on the program's behalf along with former ABA SEER chairs Professor Michael Gerrard of Columbia Law School and Dean Irma Russell of the University of Montana School of Law.

The SEER award also honors important contributions of the Environmental and Energy Law Program's founder, Arnold W. Reitze Jr., J.B. and Maurice C. Shapiro Professor Emeritus of Environmental Law. Professor Reitze established the program in 1970 with a $250,000 grant from the Ford Foundation. Over the next 38 years, he built the curriculum to more than 20 courses taught by some of the leading environmental lawyers from all sectors in Washington, D.C.

Of five other law schools and two law clinics to have won the award over its 15-year history, GW Law is the first ranked in the top 20 law schools nationally. ■

Roundtable: The Intersection of Rule of Law and Sustainable Development

On April 8 GW Law and the American Bar Association (ABA) Section of Environment, Energy, and Resources (SEER)'s World Justice Task Force co-sponsored a roundtable discussion on "The Intersection of Rule of Law and Sustainable Development." Experts from government, NGOs, and private industry addressed critical issues relating to the implementation of environmental rule of law initiatives across the world, and the development of indicators to measure effective governance and public participation in environmental law. James Silkenat, President of the ABA and Vice President of the World Justice Project (WJP), delivered opening remarks in which he highlighted the importance of the WJP's Rule of Law Index. "When we measure and diagnose the rule of law with tools like the [Index]," Silkenat said, "we change behavior, approaches, and ultimately the law itself." Scott Fulton, former General Counsel of the EPA and Visiting Scholar at the Environmental Law Institute, moderated a subsequent discussion on the foundation, measurement, and implementation of environmental rule of law initiatives to meet sustainable development goals and principles. The participants included Juan Carlos Botero, Executive Director, WJP; Martha Rees, Assistant General Counsel, E.I. du Pont de Nemours and Company; Steve Wolfson, Attorney, Office of General Counsel, International Law Practice Group, EPA; Corinna Gilfillan, Director, Global Witness; and Lalanath de Silva, Director, The Access Initiative. ■

Upcoming Events

2015 J.B. & Maurice C. Shapiro Environmental Law Symposium: March 26–27, 2015

For the 2015 Shapiro Symposium, GW Law and the EPA, Environmental Law Institute (ELI), Erasmus University Rotterdam, Netherlands, and International Network for Environmental Compliance and Enforcement (INECE) will co-sponsor a program on "The Role of Advanced Monitoring, Remote Sensing, and New Forms of Information Gathering, Analysis, and Disclosure in Environmental Compliance and Enforcement." The symposium will be part of the law school's ongoing collaboration with the EPA and other institutions to explore and evaluate "next generation" approaches to environmental compliance and enforcement.

In December 2012 GW Law, EPA, ELI, and other institutions co-sponsored a workshop on this topic, providing a forum for academics, agency officials, and practitioners to discuss their recommendations and legal analysis of "next generation" technologies and management strategies that regulators can use to enhance compliance and enforcement efforts at the lowest possible cost. Papers from this workshop were compiled and subsequently published in a book, *Next Generation Compliance and Enforcement* (LeRoy C. Paddock & Jessica Wentz, eds., ELI Press 2014).

The 2015 Shapiro Conference, which will be hosted at GW Law on March 26 and 27, will focus on legal and policy issues related to how new technologies and systems for collecting and analyzing data can contribute to regulatory compliance and enforcement efforts. A follow-up conference to will be held at Erasmus University Rotterdam in April 2015 to discuss the use of management systems and the role of behavioral motivations in environmental compliance and enforcement. ■

Hand held air quality monitor

Submarine Cables in the Sargasso Sea: Legal and Environmental Issues in Areas beyond National Jurisdiction: October 23, 2014

Co-sponsored by GW Law's Environment and Energy Program, the Centre for International Law, National University of Singapore, International Cable Protection Committee, and Sargasso Sea Commission, this one-day workshop will bring together legal and scientific experts, as well as industry representatives who are associated with submarine cables, to discuss current issues and challenges with the practice in the area of the Sargasso Sea in the Northwest Atlantic Ocean. Participants will give presentations on the legal framework under the U.N. Convention on the Law of the Sea, the role of fiber optic cables as critical international infrastructure, and perceived and real environmental impacts from laying and repairing cables on the seafloor. Discussion will follow on how to address these issues in the Sargasso Sea, with the workshop serving as the first of many future discussions on possible voluntary collaborations between the submarine cable industry and the Sargasso Sea Commission. Interested GW faculty and students are welcome to attend. Space is limited and prior registration is required; please contact Nicholas Bryner, nbryner@law.gwu.edu, for additional details. ■

Adaptive Management Workshop

On September 19 GW Law, the Society for Risk Analysis, and the Environmental Law Institute co-sponsored a one-day workshop on adaptive management, including a roundtable discussion among invited participants and an open dialogue with students, faculty, and members of the public. The workshop was designed with two main purposes. First, Professors J.B. Ruhl of Vanderbilt Law School and Robin Craig of the University of Utah School of Law have proposed in a recent article changes to the Administrative Procedures Act that would, in their view, facilitate the wider use of adaptive management to address difficult environmental problems. They presented their ideas and sought responses from the workshop participants. Second, the

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Profiles

Nicholas Bryner, JD '12, 2014–2016 Environmental Law Program Fellow


Nicholas Bryner

Nicholas Bryner joined the GW Law faculty this fall as Visiting Associate Professor of Law and Environmental Program Fellow for 2014–2016. His role for the next two years will include teaching, research, and other support for the Environmental and Energy Law Program. Mr. Bryner is returning to GW after receiving a JD with high honors and an MA in Latin American and hemispheric studies in 2012.

Mr. Bryner has worked most recently as a Public Interest Law Fellow at the Environmental Law Institute (ELI) and as Executive Office for the International Union for Conservation of Nature's World Commission on Environmental Law (WCEL). For WCEL, a global network of experts in environmental law and policy, he worked on developing project ideas and concept papers on natural resource governance, forest conservation, and other topics, while also assisting in coordinating meetings and events and communication with the Commission's membership. At ELI, he researched and analyzed national and subnational laws and policies on community-based forest management, environmental compliance and enforcement, and marine protected areas, and prepared grant proposals related to additional fields of environmental law.

Mr. Bryner grew up in Utah and Colorado, where he developed an appreciation for outdoor activities such as skiing, hiking, and camping. As a child he suffered from asthma, which led to an interest in air quality and other environmental issues. He attended the University of Utah, where he received a BA *magna cum laude* in political science, with minors in chemistry and Latin American studies. From 2003 to 2005, after his freshman year, he left his studies for two years to serve as a missionary for The Church of Jesus Christ of Latter-Day Saints in São Paulo, Brazil.

During his time at GW Law, Mr. Bryner served as an Articles Editor for *The George Washington Law Review* and received a Pro Bono Service Award for his work with The Nature Conservancy's Latin America and Caribbean Legal Team. In addition, he held an externship at the Inter-American Foundation and in the office of U.S. Senator Harry Reid of Nevada. In 2011, he spent the summer at the High Court of Brazil in the chambers of Justice Antonio Herman Benjamin conducting research on the role of the judiciary in the implementation of environmental law in the country. This work has been published as *Brazil's Green Court: Environmental Law in the Superior Tribunal de Justiça (High Court of Brazil),* 29 Pace Envtl. L. Rev. 470 (2012).

Mr. Bryner's current research is on the role of the judiciary in environmental law in Brazil, with a focus on constitutional issues at the intersection of private property rights and environmental law. He has spoken at major conferences in the United States and Brazil, in English and Portuguese, on topics including Brazilian environmental law, environmental human rights, and international environmental law. ■

2012–2014 Environmental Program Fellow Jessica Wentz has rejoined her alma mater as an Associate Director and Fellow at the Sabin Center for Climate Change Law at Columbia Law School.

Adrienne Thompson, Energy Law Scholar and Research Associate


Adrienne Thompson

Adrienne Thompson came to GW this fall as a Research Fellow for the law school's Sustainable Energy Initiative (SEI). Previously, Ms. Thompson served as a judicial law clerk to the Honorable Jack Landau of the Oregon Supreme Court. Over the next two years, she will pursue an LLM degree part time while working to advance the SEI's energy research agenda. Although she will work closely with the entire GW environmental and energy law team, the primary focus of her research will be energy, especially electric industry policy development.

Ms. Thompson first developed an interest in environmental and energy issues while growing up in a small town on the Oregon coast. She volunteered for several environmental causes while an undergraduate student at Walla Walla University. Initially, she studied Spanish and media communications in preparation for a journalism career, but eventually decided that a law degree would better position her to work on the issues that she cared about most. In between college and law school Ms. Thompson completed an internship in the Americas Program at The Carter Center and moved to Beijing for a year of Chinese language immersion. She returned to her native Oregon to study environmental law at Lewis & Clark Law School.

While at Lewis & Clark, Ms. Thompson served as a teaching fellow for various first-year courses, led the journal *Environmental Law* as its Editor-in-Chief, and graduated with honors in 2013. As a student, her interest in energy issues, and in renewable energy in particular, grew as she began to see the field as a crucial nexus between climate change policy, environmental stewardship, and economic growth, especially for developing countries.

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Joseph Dougherty, JD '15

Q&A with the *Journal of Energy and Environmental Law's* new Editor-in-Chief

Joseph Dougherty

How did you develop an interest in environmental law? My first significant exposure was as an undergraduate student. I worked as a research assistant for a group trying to bring P-Series fuel, a renewable alternative to gasoline, to the general market. The fuel is generated from organic waste, and our research indicated that many local businesses were interested in providing it at a low cost. Despite the general enthusiasm, however, the project failed to attract sustained support from local, state, or federal government. The setback introduced me to the idea that the science and economics of a project can be in place, but the legal side must be addressed as well or the foundation isn't secure.

Why did you choose GW for law school? Any specific program features that appealed to you? I've worked for the EPA for the past eight years in their D.C. headquarters, and I wanted to continue working at the EPA full time as I went to law school. GW had an exceptional environmental law program, which is what I wanted to study, and it was located right in the heart of D.C., so it was an easy decision for me.

What were some of your favorite classes, projects, or other opportunities during your first two years as a law student? The Environment and Energy class, taught by adjunct faculty members Dara Smith and Anne Finken, and the Environmental Negotiations class, taught by Assistant Dean Robin Juni, really stand out as classes that exposed me to an entirely different side of how environmental law is currently practiced.

As the new Editor-in-Chief of JEEL, what are your thoughts regarding the value of working on the journal? The incoming senior board is really excited about the opportunity to help JEEL continue to drive the conversation on energy and environmental law. Last spring's Shapiro Environmental Law Symposium provided a great opportunity for professors from around the country to come and present cutting edge solutions to pressing legal challenges in the field, and we received several follow-up articles from those who wanted to explore some of these solutions at greater length. The result is an exciting collection of papers that covers everything from electricity transmission to wildlife and land use concerns. For our JEEL members, they receive an invaluable opportunity to work on articles from leading scholars in the field that are really addressing issues that matter.

You mentioned that you've continued working full-time for the EPA while attending GW Law. Can you tell us something about your work? I'm in the Office of Air Quality. I started my career on the science side doing research for an EPA-NOAA-NASA project that evaluated whether satellites could be used to measure air quality, but when I started law school I gravitated more towards the legal side of the agency. My job now mainly consists of working on regulations, addressing public comments, and reviewing legal deadlines.

Do you have any special plans for your final year at GW Law? My biggest goal for this year is to build on the past successes that JEEL has had, expand the journal's readership, and continue to ensure that we are publishing a top-tier law journal.

Do you have any advice for current or prospective students with interests that are similar to yours? Reach out! GW has an unbelievable collection of professors and advisers who work or have worked at the highest levels of environmental law, whether it was with a corporation, private law firm, the government, NGOs, or elsewhere. Dean Paddock, Dean Juni, Ms. Smith, Ms.Finken, Katie Lannon [who teaches in the journal writing program], and Matthew Morrison [who teaches Air Pollution Control], and many, many others have taken the time to sit with me and discuss paper ideas, journal challenges, career issues, or anything else I brought up. It's a rare opportunity, and definitely one that you do not want to pass up! ■

Thompson *from page 8*

After graduating from Lewis & Clark, Ms. Thompson moved to Washington, D.C., for a short-term internship in the climate and energy program of the Worldwatch Institute. Her research at Worldwatch allowed her to explore her interests in electric utility business model innovations, state net-metering policies, as well as microgrids and virtual power plants. Following her summer stint in D.C. and a rewarding year as an appellate court clerk, Ms. Thompson says she is excited to be working on important energy policy issues and advancing the goals of GW's Sustainable Energy Initiative. ■

Adaptive Management Workshop *from page 7*

workshop served as an opportunity for participating government personnel to share the latest thinking and developments in adaptive management in a roundtable format. The program provided a unique opportunity for the participants to understand how agencies are using adaptive management tools, the challenges being faced in utilizing adaptive approaches, and to share ideas about how to address these challenges. ■

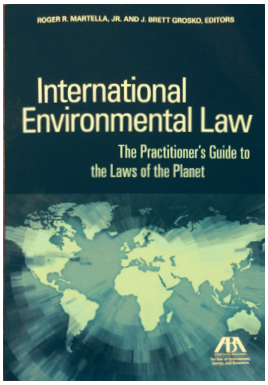
In Print

Steve Charnovitz

Steve Charnovitz published a book review of *International Economic Law in the 21st Century* by Ernst-Ulrich Petersmann, *Journal of International Economic Law* (2014).

Robert L. Glicksman

Robert L. Glicksman published "Regulatory Safeguards for Accountable Ecosystem Service Markets in Wetlands Development," *Kansas Law Review* (2014); "Functional Government in 3-D: A Framework for Evaluating Allocations of Government Authority," *Harvard Law Journal on Legislation* (2014); and "Wilderness Management by the Multiple Use Agencies: What Makes the Forest Service and the Bureau of Land Management Different?," *Environmental Law* (2014). He also published "Landscape Level Management of Parks, Refuges, and Preserves for Ecosystem Resilience" in *Social-Ecological Resilience and Law* (Garmestani & Allen eds.) (Columbia University Press, 2014); and "EPA's Retreat from Enforcement Will Harm the Chesapeake Bay," *Center for Progressive Reform Issue Alert #1402* (2014). He wrote a chapter on natural resource management and protection in *International Environmental law: The Practitioner's Guide to the Planet* (R. Martella & J.B. Grosko [JD 2000], eds.) (ABA Section of Environment, Energy, and Resources, 2014).



Emily Hammond

Emily Hammond published "Civil Remedies," in *Global Climate Change and U.S. Law* (2d ed., Michael B. Gerrard & Jody Freeman, eds.) (with David L. Markell) (2014); "Energy Sources for Electricity," in *Global Climate Change and U.S. Law* (2d ed., Michael B. Gerrard & Jody Freeman, eds.) (with David B. Spence) (2014); "Administrative Proxies for Judicial Review: Building Legitimacy from the Inside-Out," 37 Harv. Envtl. L. Rev. 201 (2013) (with David L. Markell) (selected as one of the top environmental articles of the year, for inclusion in Land Use & Envtl. L. Rev.); and "Nuclear Power in the United States: An Overview," ABA Section of Environment, Energy, and Resources (2014), available at bit.ly/gwlaw_Hammond_ABA.

LeRoy C. Paddock

Lee Paddock published, with Jessica Wentz, "Hydraulic Fracturing in the United States: A Study in Contrasts, in *The Law of Energy Underground*, (Zillman, McHarg, Barrera-Hernandez, and Bradbrook, eds.) (Oxford University Press, 2014).

Lee Paddock and Jessica Wentz published, as editors, Next Generation Environmental Compliance and Enforcement (ELI 2014).

Lee Paddock, with Robert Glicksman and Jessica Wentz, wrote a chapter on Dutch environmental law in *International Environmental law: The Practitioner's Guide to the Planet* (R. Martella & J.B. Grosko [JD 2000], eds.) (ABA Section of Environment, Energy, and Resources, 2014).

Dinah L. Shelton

Dinah L. Shelton published, as editor, *The Oxford Handbook of International Human Rights Law* with new essays by more than 40 leading experts in the field (Oxford University Press, 2013) and *The UN System for Protecting Human Rights, Vol. IV: The Library of Essays on International Human Rights* (Ashgate Publications, 2014). She also published "Trade and Environment" in the *Handbook of Trade Policy for Development* (Oxford University Press, 2013); "International Trade and Investment Law and Carbon Management Technologies" (with Nigel Bankes, Anatole Boute, Shi-Ling Hsu, Sarah McCalla, Nicolas Rivers, and Elizabeth Whitsitt), *Natural Resources Journal* (2013); "Remedies and Reparation" in *Global Justice, State Duties: The Extraterritorial Scope of Economic, Social, and Cultural Rights in International Law* (Cambridge University Press, 2013); "Réflexion Introductive: Environnement International et Patrimoine Commun de L'humanité," *Marché et Environnement* (Editions Bruylant, 2014); and "International Law and 'Relative Normativity," *International Law* (M. Evans, ed., 2014). Her book, *Remedies in International Human Rights Law*, specifically about the "principles" behind awarding damages, was cited by the UK Supreme Court in the case of *R (on the application of Faulkner) (FC) (Appellant) v. Secretary of State for Justice and another (Respondents)* [2013] UKSC 23. ■

Student News

GW Environmental Law Association

The GW Environmental Law Association is planning a busy fall semester to follow up on the success of its recent activities. This past spring, ELA hosted its annual Sustainability Week in which students took breaks from their studies to plant potted herbs and to attend a career panel on international environmental law. The week culminated with the Shapiro Environmental Law Conference on federal public land management. Plans for the fall semester include a trip to the national arboretum, a career panel event, apple picking, a day of kayaking on the Potomac, and networking events with professionals. Some of these events will be conducted jointly with other environmental law student groups in the D.C. area. ■

GW Law students enjoyed a day in the sun at an ELA-hosted apple picking adventure.

Recurring Themes in Energy Law *from page 1*

Ownership of Energy Resources

The twin concepts of property and ownership are fundamental to American law. Deeply held notions of what it means to "own" something both provide explanatory power for much of energy law and raise challenges to innovation in energy technology, law, and policy. Furthermore, the choice whether energy resources are privately or publicly owned holds consequences for their management and regulation. This section provides a brief overview of some fundamental concepts; you will find numerous detailed examples throughout the book.

Not surprisingly, energy law frequently assumes that energy resources are privately owned. Although much oil and gas production occurs on public lands, the United States is the only major oil and gas producing country in which such interests are commonly held as private property. This private property interest is rooted in the *ad coelum doctrine*,[1] reinforcing ancient common-law concepts of near-absolute dominion over the resource. Other private property concepts modify the doctrine and shape the transferability, extraction, and use of such interests. Consider, for example, the rule of capture, which confers the right to produce all the oil and gas that flows through a well on one's own land, even if the minerals flowed from under another's land. This rule has been critical to oil and gas production for decades, and remains so today. *See* Coastal Oil & Gas Corp. v. Garza Energy Trust, 268 S.W.3d 1 (Tex. 2008) (extending doctrine in hydraulic fracturing context); cf. Stone v. Chesapeake Appalachia, No. 512-CV-102, 2013 WL 2097397 (N.D. W. Va. Apr. 10, 2013), *vacated on joint mot. due to settlement*, 2013 WL 7863861 (Jul. 30, 2013) (rejecting doctrine's extension in hydraulic fracturing context).

To what extent should private property concepts be extended from one resource to another? For example, should the rule of capture similarly apply to wind? Like oil and gas, wind is fugacious—it flows across properties without regard to ownership—and it is not valuable as an energy resource until it is captured. To the extent that the rule of capture rewards the initiative and labor necessary to bring value to an energy resource, applying it to wind may promote increased development of this renewable energy resource. On the other hand, an unfettered rule of capture leads to economic and physical waste, as described in more detail in Section 3 below. Relatedly, mineral interests may

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[1] The full statement of the doctrine is *cujus est solum, ejus est usque ad coelum et ad inferos* (to whomever the soil belongs, he owns also to the sky and to the depths).

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be severed from the land they underlie, but owners of mineral rights retain an easement to use the surface as is reasonably necessary to access the minerals. Many landowners in areas with plentiful wind have executed deeds severing wind rights that are modeled on such transfers in the oil and gas context. But there is uncertainty as to whether this approach is permissible; many jurisdictions permit wind easements and leases, but some have enacted statutes banning wind severance, and others have not addressed the issue. Uncertain property rights, of course, may deter investors and slow development of alternative energy resources.

The dominant private property pedigree for energy resources strongly influences legal and policy decisions in other contexts as well. For example, a consequence of making energy resources subject to private ownership is that government regulation of those resources can lead to takings challenges. The classic regulatory takings case, *Pennsylvania Coal Co. v. Mahon*, 260 U.S. 393 (1922), involved energy resources. Suppose that a city ordinance prohibits drilling new oil and gas wells near a lake that serves as the city's primary drinking water supply. Should the holders of mineral rights who are now unable to extract those minerals be compensated under a regulatory takings theory? See City of Houston v. Trail Enters., Inc., 377 S.W.3d 873 (Tex. Ct. App. 2012) (no taking given strong government interest and low investment-backed expectations, even given significant economic impact on claimants).

Indeed, the police power and other sources of law limit common-law property doctrine and accompanying rights, and thus narrow property rights and reasonable expectations associated with those rights. Many of these limits are described in the following sections, and are imposed to promote certainty, encourage investment, and manage externalities and risks. Although the default may be private ownership, the public interest may justify numerous inroads into the traditional private property rights to exclude, possess, use, and transfer. For example, owners of electrical transmission lines operating in the wholesale market must make transmission services available to others on a non-discriminatory basis. To what extent should concepts of open access reach even further?

Of course, not all energy resources are considered private property. Early in the development of hydropower, a major debate concerned whether the government or the private sector is better positioned to develop hydroelectric dams. The United States favored public ownership and development of dams, which stands in contrast to most other energy resources. Government ownership of federal land, moreover, has important implications for such energy resources as minerals and wind, as well as siting of electricity transmission lines and oil and gas pipelines. Although private ownership gives rise to numerous challenges described in the sections below, public ownership presents its own set of problems. How should government decisionmaking with respect to public property operate to ensure transparency, avoid capture, and foster fairness and accountability?

Ownership as a theme of energy law goes beyond corporeal property. Consider, for example, that intellectual property law and policy relate deeply to energy as well. As scarce resources, opening markets, and environmental concerns highlight the need for new technologies, a fundamental promise of intellectual property law is that inventors may receive limited monopolies, thereby allowing them to profit from their work, in exchange for disclosure of their inventions. But what if the promise of the intellectual property system is insufficient to spur innovation? To what extent should public funds be expended on this goal—and if funds are expended, to whom should the resulting property belong? On the other hand, is more regulation needed to open markets to innovators? Or less?

Monopoly vs. Competition

Energy projects are often major infrastructure undertakings that require an enormous commitment of financial capital. Throughout the history of the United States the development of new types of energy resources raised questions about whether the development and delivery of these resources is best approached by the government granting a monopoly to a single firm, or whether a development of a competitive market would be a fairer and more efficient way of developing and delivering the resource. John D. Rockefeller's success in monopolizing the oil business led to the antitrust laws in the nineteenth century. Samuel Insull's similar success in the electric power business encouraged strict regulation of that industry, including the development of the public utility approach to regulating electric power that was prevalent for much of the twentieth century.

Regulation of energy resources by state and local governments began late in the nineteenth century. The production of oil and gas was initially regulated by state agencies to avoid physical waste and, not coincidentally, to keep prices high. Local governments typically granted a monopoly to a private company to sell gas and electricity to consumers by issuing a public utility franchise that provided that the company's rates and service were subject to local regulation. As these franchises proliferated,

state legislatures often preempted the local regulation of rates and services by creating a public utility commission (PUC)—a single agency to regulate the prices at which energy was delivered to consumers. Most energy resources were regulated at the state or local level, if at all. This early regulation, primarily by state PUCs, focused on setting the rates for a local monopoly-franchised utility and protecting the utility from competing firms. The need for such regulation was largely perceived as a response to the market failures associated with monopolies: that left unregulated, a single firm operating as a monopoly will charge higher prices and produce less of a service than a competitive firm would. Regulators, by contrast, could mimic the result of the competitive market by setting rates based on the cost of service and requiring the utility to serve customers within its geographic franchise service area.

In this sense, one of the major regulatory objectives in energy law is protecting consumers from the ills of monopoly and ensuring that, where appropriate, suppliers face an even playing field in energy production and delivery. The cost-of-service approach to utility regulation is often termed a "regulatory compact," a contract of sorts whereby regulators ensure the firm would be able to recover the costs of the infrastructure in which it had invested; in return, the firm would subject itself to regulation to ensure its rates are reasonable. Not surprisingly, this regulatory compact has produced some mistakes, in no small part due to the lag time between the decision to favor a particular technology, the actual deployment of that technology, and the window of time it takes to pay for it. Over time, technological advances have made competition among different parts of the energy sector more feasible.

For example, nuclear power plants—once considered "too cheap to meter"—produced notorious cost overruns in the 1960s and 1970s. Newer technologies could produce power more cheaply than nuclear plants, yet regulators had already approved utilities charging customers for some of these plants. The resultant "stranded costs" slowed the adoption of newer technologies. A challenge that energy law consistently must confront is how to balance these kinds of regulatory commitments—necessary to induce investment in infrastructure—with the adoption of new technologies. The theme is recurring: Today some coal plants may be facing similar stranded-cost issues given the availability of much lower-cost natural gas resources in many parts of the United States.

Economic regulation of utilities and other entities involved in providing energy resources may fall short of its intended goals for several reasons. First, the regulatory process itself is imperfect, especially if regulated firms are able to capture or control the outcome of the process. Some argue that this is a recurring problem in the energy regulatory sector, where large corporations have wielded enormous influence on the political and regulatory process. Yet much of energy law is focused on ensuring that the public interest does not yield to private interests. Second, regulation may cause regulated firms to incur excessive costs or adopt inefficient methods of operation. Some economists have suggested that price regulation has induced many public utilities to artificially inflate their rate base and to overinvest in capital assets upon which they can earn a regulated rate of return—e.g., to build too many power plants for their customer base. The effect of this is to create a surplus of power and to inflate the ultimate costs to consumers.

In recent years, public choice theory, which applies critical economic analysis to government institutions and the decision-making processes of politicians and bureaucracies, has raised the concern that government regulation itself is prone to certain failures. If the purpose of government regulation is to correct market failures, but regulation as implemented results in solutions that do not approximate the results of a well-functioning market, then regulation itself may have imposed unnecessary costs or inhibited self-correcting incentives. Competition among rent-seeking private investors, imperfect though it may be, may be better at pricing and allocating energy

resources than regulation by rent-seeking government officials and lawmakers. On the other hand, regulation exists for a reason, and private choices about energy resources may impose unnecessary costs on consumers.

These kinds of issues have revived age-old questions about the proper approach to economic regulation. Many markets that impose cost-of-service regulation on the public utility model share a common trait: the services provided in them are in fact several different markets with varying characteristics. For example, consider the natural gas market. There are thousands of gas producers and literally millions of consumers of natural gas. Apart from the need to transport gas, the gas sales market is as close to the economist's competitive ideal as any market can be. Transportation of gas through pipelines, however, is subject to large economies of scale and is a natural monopoly. Yet historically, sales of natural gas and its transportation have been bundled within a single rate-regulated service. Similarly, electric power generation and electricity transmission have traditionally been bundled into a single rate-regulated

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service, even though power generation, like natural gas sales, possesses characteristics of a competitive market.

Congress began restructuring the natural gas industry in the late 1980s by unbundling gas sales from pipeline transportation services and providing equal access to the latter. FERC then undertook to restructure the electric utility industry in a similar fashion. Again, this approach has two steps: first, recognizing that there are two or more distinct markets bundled together, only one of which is a natural monopoly (i.e., the "pipes and wires," or transmission service); second, after unbundling the two distinct markets, then implementing an equal access regulatory scheme that applies only to the natural monopoly market so that all gas producers and electricity generators can ship their gas or electrons to the buyer who offers them the best deal. However, because FERC's jurisdiction over electric utilities does not extend as far as its jurisdiction over natural gas pipelines, the states retain jurisdiction over many aspects of the electric power industry. Some states, such as California, Texas, and Pennsylvania, have introduced new regulatory regimes that give some consumers a choice of their retail electricity supplier, much as consumers are able to choose their long-distance phone provider.

In addition, FERC and state PUCs have embarked upon a series of incremental changes to traditional utility price regulation. More than thirty states have instituted competitive bidding regimes for electric utilities, which require utilities to consider and solicit bids before building new power plants. FERC has approved market-based rates, which displace traditional cost-of-service filings, for power sellers that meet certain conditions. FERC and many PUCs have also adopted incentive regulation to encourage a variety of non-traditional utilities to enter into power markets. Together, these new regulatory efforts have sparked considerable growth of new firms in traditional markets and have led to the emergence of new pricing markets, such as spot and futures markets in which electricity or other energy resources are traded on a short-term basis.

In the United States, there are a wide range of well-established markets for stocks and commodities that have continued to enjoy investor confidence, despite economic cycles and occasional financial scandal. When energy markets are mentioned, however, the ghost of Enron looms. The manipulation of the California energy market by Enron and other traders in 2000–2001 is not easily forgotten. Even respected markets like the NYMEX oil trading market have been accused of being a playground for speculators during the volatile 2007–09 period.

Current efforts to monitor energy markets are overlapping, expensive, and hampered by the speed of trading technologies and the energy buyers' needs for fast delivery. Will it be possible to regulate energy trading—and carbon emission trading—to prevent speculators from profiting from commodity or price "bubbles" that do not reflect underlying economic realities—or to prevent the traders from demanding government aid because they are deemed too important to fail? Will stable contract and property norms exist to attract energy project financing for massive capital investments designed for the long term in light of regulatory transitions in the industry and volatile markets?

Even as competition has been introduced in energy markets, the reality is that vital components of the industry remain heavily regulated. Most regulators still consider gas and oil pipelines and electric power transmission and distribution lines to be natural monopolies—better provided to customers by a single firm than two or more firms. These essential network facilities play a crucial role in modern energy markets. Without pipelines or power transmission lines, energy commodities cannot be delivered to consumers in the first place. The history of energy law focused on control of these network resources, as they were crucial to preserving the market power of energy firms. For example, early in the expansion of electricity transmission to rural communities, pursuant to a program sponsored by the federal government, private utilities battled with rural electric cooperatives over customers. Today regulators are struggling with how to attract sufficient investment in this infrastructure, how to regulate access to it, and how to price it. Again, history repeats itself: Today, new entrants generating electric power by wind want to have similar access to transmission as incumbents have, many of which are generating electric power via conventional fuels. How to provide for access to and price network infrastructure is one of the major issues facing energy industries today, even where energy is freely traded as a commodity in a competitive market.

Managing Energy Externalities and Risks

Increasingly, society has become aware of additional consequences of ownership structures, market failures, and policy choices favoring incumbents over new entrants. The environmental regulatory era produced an important source of new law and policy impacting energy resources. Today, concerns about greenhouse gas emissions from fossil fuels and the urgency of climate change have created a convergence in environmental and energy law. The wide variety of energy externalities—which are essentially market failures—is often used to justify regulation going beyond price controls. However, other tools for reducing negative externalities include market-based mechanisms, technological and financial assistance, and private law remedies. In addition, the concepts of uncertainty as well as risk assessment, perception, and management inform and even dictate modern approaches to energy law and policy.

Externalities

As introduced above, an externality is produced where an entity engaged in an activity produces a cost or benefit that is not borne within that entity, but rather is transferred to society. Externalities can be negative or positive. An example of a

negative externality is the air pollution released by a coal-fired power plant that is exempted from compliance with the Clean Air Act (CAA). Such pollution imposes a cost on society for which the power plant producing does not pay. An example of a positive externality is a homeowner's green rooftop. Her neighbors might enjoy aesthetic value from the greenery, but they do not pay for that enjoyment. Externalities represent a form of market failure; in the case of negative externalities, correction of this market failure is often offered as a justification for regulation.

Negative energy externalities include overuse of resources, physical waste, and environmental harm, among others. The classic resource paradigm of the "tragedy of the commons" bears on this discussion, and often appears as an energy policy issue. In a 1968 article in the journal *Science*, ecologist Garrett Hardin recounted the story of the tragedy of the commons as an allegory explaining the need for regulation of environmental pollution and natural resource use. Herdsmen sharing a common grazing area, said Hardin, face an ever-present temptation to increase the size of their herds because they capture all the benefits of the use of the common grazing land (through ownership of their individual herds), but shift some of the costs of use to others. Each herdsman acts in his own self-interest, continually increasing the size of his herd, but collectively they produce "ruin," the destruction of the commons. Hardin's prescription for this problem was "mutual coercion, mutually agreed upon"—in other words, government regulation. *See* Garrett Hardin, The Tragedy of the Commons, 162 Science 1243 (1968). Without government regulation, individual economic actors might burn coal without pollution controls, thereby "consuming" clean air, harvest biomass at unsustainable rates, or pump oil from a reservoir in inefficient and wasteful ways. Imposing limits on these activities, by issuing permits for example, is thus a way of controlling the externalities that the activities produce.

Regulation through permits is not the only method of managing negative externalities. Common law causes of action such as nuisance, negligence, and trespass can allocate costs and benefits. These private mechanisms have a long history and remain relevant today. See Prah v. Maretti, 321 N.W.2d 182 (Wis. 1982) (recognizing common-law cause of action in nuisance for claim of interference with plaintiff's solar collector). The relationship between private law and public law in the energy field is constantly in flux. Advocates of stronger action to address externalities often pursue both strategies, particularly if one appears to be momentarily stymied. For example, facing a lack of comprehensive federal climate change legislation, many plaintiffs sought common-law remedies from oil and gas companies, electricity generators, and states for contributing to climate change or failing to take measures to mitigate it. *See, e.g.,* Am. Electric Power Co. v. Connecticut, 31 S. Ct. 2527 (2011) (holding federal common-law nuisance claims were displaced by Congress's delegation of regulatory power over greenhouse gases to EPA under the CAA).

Market-based mechanisms can also assist in managing negative externalities, though they often depend as much on government regulation as do permits or more explicit regulatory commands. Recent climate bills considered by Congress include cap-and-trade schemes that created markets for carbon allowances and credits—an approach California and the Northeastern region of the United States have already adopted. Others argue a carbon tax would most efficiently reduce greenhouse gas emissions. This approach, called a Pigovian tax, is meant to force internalization of negative externalities by requiring the generator of the externality to pay a tax equal to the externality's cost.

Other tools for managing negative externalities and spurring economic growth include technology- and information-sharing, education, and funding for research and development. These tools are part of the existing global and domestic landscape for climate change mitigation and adaptation, and have been used in many other contexts. Often, they can be first steps towards a more robust legal framework. For example, the Atomic Energy Act of 1954 represented a deliberate choice by Congress to shift information, technology, and property rights involving atomic energy from the military to the civilian sector. This shift, overseen by the Atomic Energy Commission (now the Nuclear Regulatory Commission, or NRC), enabled the development of civilian electricity generation using nuclear power and closely followed President Eisenhower's announcement of the Atoms for Peace program. This program offered sharing of nuclear technology for peaceful purposes like medical uses and electricity generation while attempting to stall nuclear weapons proliferation. Though the program is criticized (for example, it gave political cover to the United States in its own buildup of a nuclear arsenal), it also led to the creation of the International Atomic Energy Agency and various new treaties and laws governing the nuclear resource.

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In sum, negative externalities are a feature of the world of energy. Regulation, private remedies, market-based mechanisms, and technology development are the most common approaches to correcting externalities. But determining the impacts of these externalities from a scientific or technical standpoint, and developing a mix of strategies that are effective, requires an understanding of concepts of risk.

The Roles of Risk and Uncertainty

Economically efficient outcomes are difficult to obtain, and moreover, individuals seldom behave as the purely rational economic actors that economic theory posits. Energy law and policy challenges can be understood through a framework of risk theory that includes risk assessment, risk perception, and risk management. Each of these components makes an important contribution to our understanding of energy law and policy.

Risk assessment refers to mathematical or engineering approaches of quantifying the likelihood that a particular hazard will cause harm. Assessing risk is a core component of many energy policy decisions. For example, how likely are security breaches in the electric grid, and what harms might be caused? How likely is it that hydraulic fracturing will contaminate groundwater supplies? How likely is it that radioactive materials from spent nuclear fuel will escape from a given repository and harm human health? Each of these questions is framed in such a way as to invite a scientific and technical assessment that can provide decision-makers with information about probabilities and the magnitude of harm.

Many areas of energy policy are susceptible to "punctuating events"—significant events, sometimes even catastrophes, that prompt close attention to how we manage particular risks. A first step in responding to such events is to update risk assessments. For example, after the September 11, 2001, terrorist attacks in the United States, many federal energy agencies conducted assessments of the risks that terrorist attacks would pose to important energy infrastructure. And after the 2011 earthquake that triggered the nuclear disaster in Fukushima, Japan , the NRC revised its risk assessment requirements for nuclear power facilities regarding earthquake risks. Concepts of risk assessment also inform the minutiae of the energy landscape; for example, risk assessments are fundamental to creating design standards such as those for hydroelectric dams, nuclear reactor vessels, and oil and gas pipelines.

But risk assessment is only part of the story of energy law and policy. For a variety of reasons, people frequently *perceive* risks as being of larger or lesser magnitude than an engineering risk assessment would indicate. Researchers have documented, for example, that in simple gambling situations, people will over-predict their odds of winning and under-predict their odds of losing. We are also more likely to perceive risks to be great if they seem urgent and imminent as opposed to remote in time or space. Risks that seem catastrophic and unfamiliar—"dread risks" like radiation and chemical contamination—are perceived as greater even than those that present themselves with much more frequency, like deaths due to smoking or bicycle accidents. *See* Paul Slovic, Perception of Risk, 236 Science 280, 281 (1987).

Other risk perception mechanisms are inextricably linked to individuals' views about social ordering, their obligations towards future generations, and the role of government in society. For example, people with strong individualistic tendencies may be less likely to perceive climate change as a serious risk because doing so would invite government regulation. On the other hand, when presented with market-based mechanisms as a way of mitigating climate change, individualists may be more likely to perceive the risk itself more seriously. People with strong egalitarian tendencies may be more likely to perceive nuclear power as a serious risk because they believe it means that disadvantaged groups or future generations will be singled out to bear the brunt of nuclear policy decisions. But when compared to the risks associated with coal-fired power's greenhouse gas emissions and contributions to climate change, egalitarians may perceive the risks of nuclear power as diminished in magnitude. *See* Dan M. Kahan, Hank Jenkins-Smith, & Donald Braman, Cultural Cognition of Scientific Consensus, 9 J. Risk Research 1 (2010).

A major concern about risk perception is that it can lead to inefficient levels of regulation, but as a practical matter, perceptions about risk cannot be ignored because they factor so strongly into energy policy decisions. Deciding whether and how to address a particular risk relates to risk *management*. Because

hazards always exist, it is impossible to entirely eliminate risk. But risk management mechanisms are meant to decrease the likelihood of a harm, its magnitude, or both. There is considerable overlap in the means of reducing externalities set forth above, and the potential options for risk management. The risk concepts described here, however, add nuances that both help explain energy policy choices that have already been made, and suggest additional ways of thinking about the policy choices that must be made going forward. As should be evident, risk assessments can give probabilities. However, they cannot eliminate uncertainty about the unknown or unknowable. The energy choices society makes may be informed by risk assessments, but the ultimate decisions in light of uncertainty reflect perceptions, values, and broader views about appropriate means of governance.

Public Governance of Energy Resources

A final theme that recurs throughout the history of energy law is who governs these problems: Is federal regulation necessary and when? Do the land use implications of many energy issues, and the localized nature of the impacts of electricity generation and fuel extraction, mean that state and local governments will always play a major regulatory role? Are some problems presented by energy resources international in scale, and what does that mean? Can any one regulator solve complex energy issues, or will a hybrid governance model always be necessary?

Federal Agencies

The twentieth century saw a significant growth in the expansion of federal regulation of energy resources. At the federal level, no single agency has plenary authority to address the full range of issues presented by energy resources. Energy policy is managed by the Department of Energy (DOE), which sponsors energy research and plays a key role in addressing international issues involving energy. But the DOE exercises powers delegated by Congress

and is constrained by limited statutory authority, leaving it unable to solve most issues on its own. The DOE also must work with some independent agencies such as FERC, which administers the Natural Gas Act and Federal Power Act. FERC regulates the construction of hydroelectric facilities and oversees the rates of natural gas and electricity to the extent they are transported in interstate commerce. Further, FERC articulates policies for the structure of natural gas and electric power markets. The NRC, as mentioned above, regulates the construction and operation of nuclear power plants.

Since their creation, these agencies have focused heavily on promoting stability in economic aspects of energy resources, but increasingly federal agencies are also being challenged to address some externality and risk issues associated with energy resources. Environmental pollution issues are largely regulated by agencies such as the Environmental Protection Agency (EPA) (which administers the CAA and Clean Water Act). EPA administers a variety of environmental programs that affect energy: for example, the CAA has a major impact on electric power plants and oil refineries, and the Oil Pollution Act affects the operation of oil tankers. Since many energy resources involve mineral rights or the rights to develop on public lands, the Department of Interior (DOI), plays a major role in formulating energy policy. DOI controls the federal lands, both onshore and offshore, from which much of our coal, oil, and gas resources are extracted, and regulates the surface mining of coal.

This list is by no means a complete description of federal regulatory agencies that affect the energy industry. Energy law practitioners need to be familiar with basic administrative law principles, but to be effective they need to be especially sensitive to the obligations and opportunities that federal agencies have to work together in resolving disputes. For example, building a transmission line may require the approval of as many as nine different federal agencies. Conversely, the failure of federal regulation with respect to many energy issues might be described as a coordination failure—a good example might be the worst oil spill in U.S. history, which polluted the Gulf of Mexico during 2010, and which was traced in part to a failure in cooperation between the activities of various federal agencies.

State and Local Agencies

Energy law is also immersed in federalism issues. State and local regulation of energy resources has always been important because energy has a major impact on land in its production and delivery. Although federal programs have expanded significantly, state systems of public utility regulation have not been replaced by federal regulation. PUCs continue to regulate the rates, facilities, and services of the private utilities that supply natural gas and electricity within the state. Defining the precise line between state and federal jurisdiction has produced a great deal of litigation with respect to almost every type of energy resource. The climate change context raises particularly difficult governance issues in deciding whether federal or state agencies—or both—should address this complex set of problems.

State governments also have environmental regulatory agencies that administer state programs and cooperate with the EPA in the administration of federal programs. For example, in cooperation

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with EPA, state agencies set water quality standards that have a major impact on the disposal of wastes from the production of energy resources. In some instances, federal statutes may give even greater power to states. State oil and gas conservation commissions regulate most aspects of well drilling and production under state laws designed to control the wasteful aspects of the common-law rule of capture. State natural resource agencies also participate in many energy resource decisions, such as the development of hydropower, that may affect wildlife. In the West, where many states own large tracts of land, state land agencies are also major players.

At the local level—where municipal governments or counties have regulatory authority—energy companies often must comply with a wide range of land use regulations. Construction of new power lines, for example, is likely to run into local concerns that may be expressed through prohibitory regulations. Even rooftop solar panels or wind generators have sometimes run afoul of local zoning laws. In some states, state laws have preempted these local regulations. Where permitted, many local governments also have detailed ordinances addressing safety and environmental issues associated with oil and gas drilling.

Some local governments operate their own electricity or gas distribution systems. Historically, federal and state legislatures have often granted incentives such as tax exemptions and inexpensive loans to municipal electric facilities and rural cooperatives, and have relieved them from some forms of regulation.

Local governments also exercise power over electric and gas companies through control over the local street that the companies need to use for delivery of services. In many places, local governments use regulatory programs as a revenue-raising device by adding various fees to consumers' utility bills. For people in many local communities, both in the United States and in rapidly developing countries like China, India, and Brazil, the presence of urban sprawl, dying species, traffic congestion, and unhealthy air arouse a public desire for greener communities, better mass transit, energy-saving appliances—and perhaps even a less frantic pace of life.

When are we likely to see state or local regulation favored over national or international approaches? State or local regulation makes sense in contexts where the impacts of energy activities are likely to vary based on geography, where they are focused on a particular jurisdiction, or where the expertise needed to manage these activities is geographically confined. In addition, local regulation has been favored over federal regulation because local governments might be more "adaptive" in their ability to solve problems. For example, state and local agencies have been quicker out of the gate in addressing problems such as climate change—a trend some in environmental law have praised as "adaptive federalism." *See* David E. Adelman & Kirsten Engel, Adaptive Federalism: The Case Against Reallocating Environmental Regulatory Authority, 92 Minn. L. Rev. 1796 (2008).

In instances where there is light-handed federal regulation of an activity—in hydraulic fracturing, for example—local regulation plays a significant role in managing energy resources and their externalities. Even where there is federal regulation, local governments often play an overlapping role with federal regulators. For example, many federal statutes envision local governments providing input to federal regulators, and in some instances local governments may have veto authority over energy projects, even where the federal government favors them.

Federalism Challenges

Where state or local governments continue to play a role in energy resource management, challenging legal issues can be presented. Subnational regulation may create negative spillover costs—a type of externality, albeit one created by jurisdictional lines—for other states or regions that outweigh any benefits associated with state or local control. In the Northeast, for example, pollution from automobiles may spill over from

one state to another, and this may invite some type of federal or regional solution. In addition, economies of scale in production may transcend state borders. For example, although the pollution from automobiles may not drift from one state to another outside of the densely populated Northeast, automobile production does exhibit significant economies of scale: the cost per vehicle of meeting one uniform regulation is much lower than the costs of meeting multiple regulations in multiple states. *See* Margaret A. Walls, U.S. Energy and Environmental Policies: Problems of Federalism and Conflicting Goals, in Making National Energy Policy 95 (Hans H. Landsberg, ed. 1993). *But see* Richard L. Revesz, Rehabilitating Interstate Competition: Rethinking the 'Race to the Bottom' Rationale for Federal Environmental Regulation, 67 N.Y.U. L. Rev. 1210 (1992). Where these spillover effects are international, they may demand a federal or even international response. Mining wastes from Canada may flow downstream to the United States, power plants in Mexico may pollute Texas air, and U.S. plants may pollute Canadian air. Greenhouse gases

emitted anywhere on the globe affect all of its inhabitants.

Several federalism issues have been litigated across a range of energy resources, and inform the ongoing significance of federalism to resolving many issues in energy law. *See, e.g.,* New York v. United States, 505 U.S. 144 (1992); Pacific Gas & Electric Co. v. Energy Resources and Development Comm., 461 U.S. 190 (1983); FERC v. Mississippi, 456 U.S. 742 (1982); New England Power Co. v. New Hampshire, 455 U.S. 331 (1982); Alliance for Clean Coal v. Miller, 44 F.3d 591 (7th Cir. 1995). And even absent any federal regulation, local governments may face challenges to their own authority within a particular state jurisdiction—a form of federalism internal to each state. For example, local governments' authority to issue bans on hydraulic fracturing activities depends on whether a state legislature must delegate such authority or has the power to prohibit such bans, or whether this is an inherently local power in states that recognize home rule for municipal governments.

The Rise of Regional and International Governance of Energy

With increased recognition that many problems associated with energy are global rather than local, the ability of state and national regulators to solve these problems on their own is increasingly called into question. Some of the most effective responses to these problems recognize that the scale of many modern energy problems transcends the power of individual jurisdictions to solve them on their own.

Within the United States, one response to this jurisdictional mismatch has been to recognize that energy disputes are increasingly regional in scope, or require some kind of hybrid governance solution. For example, some energy issues such as the disposal of low-level nuclear waste have been addressed through interstate compacts, or agreements between states that are authorized by Congress. Less formal cooperation between state governors and regulators is another way for states to resolve issues on their own at the regional level. A good example of this is the Regional Greenhouse Gas Initiative in the Northeastern United States—a cooperative agreement among nine states to cap and reduce carbon dioxide emissions from the electric power sector. In the electric power sector, there are also significant private agreements between utilities operating across multiple state jurisdictions that allow private governance between firms to solve some federalism problems.

Another response to the jurisdictional mismatch problem with national regulation has been an expansion of international law in steering energy policy. International law has played several distinct roles for energy resources. One prominent role has been the use of treaties as a way for nation states to share information, as occurs in the context of nuclear power risk assessment.

Another role for international law has been to help set goals and aspirations, as has occurred in the assessment of climate change risks by the Intergovernmental Panel on Climate Change (IPCC). International law has also shaped norms, especially with respect to climate change regulation, where individual nation states have made commitments that later influenced the adoption of domestic targets and policies.

These information-sharing and aspirational roles have been significant, but the binding nature of international law in setting a course for energy policy cannot be underestimated. Examples abound and include the International Energy Program Agreement, which commits the United States to plan for energy emergencies by maintaining strategic oil reserves and to provide assistance through the International Energy Agency in case of emergency situations; and the Nuclear Non–Proliferation Treaty and the programs of the International Atomic Energy Agency, which require the United States to restrict certain nuclear and related exports to nonsignatory countries and provide for international inspection systems. The United States also has entered into bilateral treaties and agreements with significant obligations concerning energy resources with Canada, Mexico, Venezuela, and Israel.

Notably, international law is also being used to limit domestic law regarding energy policy; for example, international trade law has been deployed as a limit on domestic subsidies for a variety of energy industries, most recently including renewable energy. Federal or state regulation of energy resources may conflict with U.S. obligations under international law. Among these obligations are the General Agreement on Tariffs and Trade ("GATT") and the North American Free Trade Agreement ("NAFTA"), which prevent the United States from unilaterally imposing impediments to trade with most of its energy trading partners.

Energy lawyers will confront new technologies and new challenges in the future. But history often repeats itself. As we move forward into the next era of energy law, attention to the same themes will ensure that energy law continues to play a significant role as a distinct field in addressing energy issues into our future.

—Excerpt from Joel B. Eisen, Emily Hammond, Jim Rossi, David B. Spence, Jacqueline Weaver & Hannah Wiseman, Chapter 1, *Energy, Economics & the Environment* (Found. Press 4th ed., forthcoming 2015). A full draft of the chapter is available for download http://ssrn.com/abstract=2464385. ■

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Sustainability Initiative Update *from page 2*

solar farm east of the Mississippi, with the partners purchasing a total of approximately 2.3 million megawatt hours (MWh) of solar power over a 20-year period. GW will be the largest purchaser, consuming approximately 70 percent of the electricity from the project.

This project is the largest non-utility purchase of solar power in the country according to the U.S. Environmental Protection Agency Green Power Partnership. The partners anticipate that the project will result in the abatement of approximately 60,000 metric tons of CO_2 per year, as well as economic savings for each institution as the price of other electricity sources is expected to increase over the duration of the project. ■

Community of Practice *from page 3*

Associate Dean Lee Paddock has spearheaded this collaborative effort along with representatives from the World Bank (WB), the International Development Law Organization (IDLO), the Environmental Law Institute (ELI), and a variety of other institutions and universities. GW Law faculty and students have contributed to the CoP's efforts by compiling a database of legal resources on this topic, as well as a list of organizations and initiatives that are also involved in the effort to understand the legal aspects of implementing SE4All. These resources are available at the CoP website at www.law.gwu.edu/gwl/se4all. In addition, several members from the GW Law community—Associate Dean Lee Paddock, Professor Robert Glicksman, 2012–2014 Environmental Program Fellow Jessica Wentz, and LLM student Chiara Pappalardo—presented research related to this topic at the 2014 Colloquium of the International Union for Conservation of Nature's Academy of Environmental Law. ■

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