

infrastructure

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The Emerging Impact of Shale Gas Resources

By John W. Rowe and Ed Fortunato

The first natural gas well in the United States was a shale gas well. In 1821, a 27-foot well was dug deep into a Devonian shale formation in Fredonia, New York, and the gas was piped through a wooden pipe to the town to illuminate its streets. In 1839, a geological survey team found gas in a shale formation outside the town of Marcellus, New York, and named it Marcellus Shale. The Marcellus Shale formation begins in central and western New York, and travels through central and western Pennsylvania into West Virginia. Originally, the formation was not considered viable due to the depth of the formation—almost twice as deep as others in the area.

Today, 170 years later, we have moved from 27-foot-deep wells shoveled straight into the ground to wells that are thousands of feet deep and drilled horizontally. Technological advances allowed for the rediscovery of Marcellus Shale in 2008, and have since provided the drilling capability to extract large amounts of natural gas at competitive prices. In fact, the Marcellus Shale “discovery” in 2008 marks the beginning of a paradigm shift in long-term gas production according to Terry Engelder, a professor of geosciences at Pennsylvania State University.¹ This shift represents a move away from importing natural gas into the eastern United States and towards



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Ed Fortunato

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domestic sources and international exports.

Shale is a fine-grained sedimentary rock that may contain high concentrations of natural gas. Shale gas is a growing source of current and future natural gas supply in the United States and currently represents about 17 percent of total U.S. supply.² The Pennsylvania Department of Environmental Protection (Pa DEP) stated that Marcellus Shale production could contribute up to 10 percent of the total U.S. natural gas supply by 2014.³

Deregulation of Natural Gas and Electric Industries

The natural gas and electric industries are very similar both in structure and operation. Prior to deregulation, local natural gas and electric utilities handled all three phases of the business (supply, transmission, and

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Chair's Column

By Thomas P. Gadsden

"The role of the public utility lawyer is changing and becoming more important. He must continue to be an effective advocate before regulatory commissions on rate matters, which are themselves changing to reflect sociopolitical as well as economic factors.

But, as deregulation of formerly all-regulated industries sweeps the country, as antitrust, labor and tax laws reach out to utilities, as financing difficulties increase, and as energy supply becomes our most vital national domestic issue, the public utility lawyer must advance persuasive legal arguments and lead political/ public opinion in these areas as well."

So wrote Chair David R. Toll in his 1980 report to this Section's membership. Although some of us might resist the moniker "public utility lawyer" (and the gender-specific pronoun), perhaps thinking it a bit restrictive in the 21st century, the challenges described by David Toll are no less real 30 years later.

The Section of Public Utility, Communications and Transportation Law is unique in several respects. Unlike other groups, our principal focus is on a particular industry or, more accurately, group of industries, rather than a specific discipline (e.g., taxation). That said, our work cuts across multiple practice areas. Thus, we are transactional lawyers, regulatory attorneys, and litigators, bound together by our common interest in companies whose product

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Editor's Note

By Judge Richard D. Cudahy

This issue contains articles on subjects about as diverse (and important) as could be imagined. One is on the crucial development of shale gas as

a decisive addition to the United States supply of natural gas and the implications of this event for electric generation. The latter aspect is emphasized by the authorship of the article, which features John W. Rowe, CEO of Exelon Corporation, one of the world's largest electricity generators (and a major nuclear force) and Ed Fortunato, a leading manager of that company. Obviously, huge supplies of domestic shale gas will have an impact on the authors' generation plans if the environmental problems of rock fracturing are successfully dealt with.

The companion article concerns a critical issue "fracturing" the Internet world—"net neutrality." As the article states, "Net neutrality" is shorthand for both the historically open nature of the Internet and the principles necessary to preserve and promote that openness." The FCC is the scene of a battle over proposed "net neutrality" rules, and all the various Internet players and observers are locked in controversy over the subject. The presentation in this issue takes the fitting form of a pro and con discussion, which manages to be both very lively and very enlightening. This is a technology that is revolutionizing the world, and the current debate will determine its direction.

Net Neutrality: Point and Counterpoint

By Theodore A. Livingston and Christian F. Binnig

“Net neutrality” is a hot-button issue in the communications and Internet world. It features heated debate in Congress, at the Federal Communications Commission (FCC), on the blogosphere, and among academicians, economists, and media pundits. At the FCC, a battle is brewing over proposed “net neutrality” rules and a potential fundamental change in the way Internet access service is regulated.

In what follows, we attempt to strip away the rhetoric that has frequently burdened the net neutrality debate and present the opposing positions in point/counterpoint fashion.

Moderator: Could you begin by explaining what net neutrality is?

Proponent: “Net neutrality” is shorthand for both the historically open nature of the Internet and the principles necessary to preserve and promote that openness. By “open” we mean that the Internet is, literally, *neutral*—that is, it is equally accessible to anyone with a basic understanding of its protocols. That openness and neutrality has encouraged and empowered individuals and companies to innovate and develop a constantly expanding universe of different content, applications, and services that have improved the lives of Americans and contributed greatly to economic growth and development. The FCC in 2005 articulated the principles necessary to safeguard and promote this openness and neutrality.¹ These principles are that consumers (i.e., users of broadband Internet access) of services are entitled to (1) access to any lawful Internet content of their choice; (2) run applications and use services of their choice; (3) connect their choice of legal devices that don’t harm the network; and (4) competition among network providers, application and service providers, and content providers.

Opponent: A fundamental problem in discussing “net neutrality” is that the term often is defined in an open-ended way. My adversary’s definition suffers from this and



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Livingston



Christian F.
Binnig



other maladies. It conflates one historical attribute of the Internet (its “openness”) with “literal” neutrality (which the Internet has never encompassed); it presupposes (in a classic non sequitur) that regulation is “necessary to preserve and promote” this historical attribute; it fails to explain why the ends it espouses, in particular the concept of “literal” neutrality, are legitimate ends that promote consumer welfare and justify the type of regulation that it presumes (but never demonstrates) is necessary; and it largely ignores the facts.

Let’s start with some historical facts. As Justice Thomas succinctly described in the Supreme Court’s *Brand X* decision,² the Internet is nothing more than a network—albeit today a vast network—of interconnected computers. The Internet as we know it today had its beginnings more than 40 years ago, and initially involved *closed* packet-switching networks of interconnected computers with defined users and defined user rights. The historically “open” nature of the Internet to which my adversary refers didn’t really begin until after 1979, with the private-sector development of the USENET computer network, and it didn’t become widespread until the early 1990s, when the private-sector development of the World Wide Web and of browsers for navigating the Web popularized the Internet as a medium for information sharing and communication. Today, the Internet is best described as a privately-organized (as opposed to

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government-organized) collection of billions of interconnected computers and other software-driven devices that in this country is, and at all relevant times has been, free from the type of regulation my adversary espouses.

I agree with my adversary that this network, since the early 1990s, has been “open,” in the sense that it is accessible by anyone with a basic understanding of its protocols *and with the economic means to obtain such access*. But that “openness” has been market-driven, not regulation-driven. The principles that the FCC espoused in its 2005 Internet Policy Statement have already developed on the Internet *without* any command-and-control-type regulations such as those my adversary proposes.

Moderator: I understand the FCC is proposing to codify those principles as rules and to add a rule prohibiting discrimination by network providers. Could you explain why you believe these rules, and in particular the nondiscrimination one, are necessary?

Proponent: First, the principles enunciated by the FCC in its Internet Policy Statement are necessary to ensure that we continue to promote the innovation and development at the edge of the network by application, service, and content providers that enrich lives and spur economic growth. If such a provider knows that its applications, services, and/or content may be blocked or degraded, it is naturally going to be reluctant to take the risks and make the investments necessary to develop new applications, services, and content. And while policy statements are fine, their enforceability is questionable. Rules on the other hand are unquestionably enforceable and will provide both edge innovators and consumers with greater certainty and therefore will better promote investment and innovation.

Second, in addition to codifying as rules the original four principles, the FCC has proposed adding a fifth—a rule prohibiting discrimination: “Subject to reasonable network management, a provider of Broadband Internet access service must treat lawful content, applications, and services in a nondiscriminatory manner.” This means, among other things, that a network provider could not charge a content, application, or service provider a fee for priority or enhanced access to its access service customers.

This is critical. If a budding entrepreneur were forced to pay a fee for assured access to the network provider’s access service subscribers, that could disincite the very investment and innovation that has made the Internet such a success. In place of a neutral and open Internet, we’d have one that distinguishes between those edge

providers willing and able to pay and those who are not. More insidious, it would discourage investment and innovation even among those individuals and companies able to pay—because it would diminish or eliminate the potential profits they might otherwise expect to reap from new content, applications, and services.

On the other hand, the nondiscrimination rule won’t, as some have insisted, force network providers to treat all data packets the same. As part of “reasonable network management” during times of high network use and to respond to congestion, network operators may give priority to the latency sensitive applications and services. Moreover, the nondiscrimination rule would not prevent a network provider from charging its subscribers different prices for different services, meaning that a consumer who wants faster download speeds because he/she wants to receive high-quality video can be charged more than a consumer who is satisfied with lower download speeds.

In addition, the nondiscrimination rule wouldn’t relegate the Internet experience to a uniform best-efforts regime. First, content providers already employ private content delivery networks, or “CDNs,” to transport their content to servers close to the access service customers likely to seek access to it. These CDNs eliminate much of the risk of delays and disruptions from congestion in the public backbone and aggregation networks.

Second, the FCC explicitly recognizes that a category of “specialized” or “managed” services should be exempt from the nondiscrimination rule. These are Internet-Protocol-based offerings provided over the same networks used for broadband Internet access service but available only to those that subscribe to them separately from the access service. These include subscription video services, certain business services subscribed to by enterprise customers, and telemedicine, smart grid, and eLearning applications—all of which require a prioritization or enhanced quality of service rather than best-efforts delivery.

The fact that network providers can charge their subscribers different prices for different services, the existence and proliferation of CDNs, and the fact that “managed” or “specialized” services will be excluded from the nondiscrimination rule all clearly operate to incent investment in and deployment of broadband networks.

Moderator: The response?

Opponent: The premise of my adversary’s position—that codification of the principles enunciated by the FCC in its Internet Policy Statement is necessary to ensure

Openness is driven by the market, not regulation.



continued development of the Internet—is unproven and belied by the historical facts. The hundreds of millions of Internet-based applications and services that have entered the market over the past 15 years vividly disprove this purported need for regulation. In response, my adversary offers only a hypothetical scenario—that providers of applications, services, and/or content over the Internet will be reluctant to take the risks and make the investments necessary to develop new applications, services, and content if the provider is faced with the prospect that its applications, services, and/or content may be blocked or degraded. This scenario is purely speculative, unsupported by the facts, and contrary to basic economic tenets. The economic risks that such providers face are ordinary economic risks that any entrepreneur engaged in a market-driven economic endeavor faces. It is the potential rewards associated with those risks that are responsible for the explosion of Internet-based applications, services, and content that has occurred over the last 15 years and continues to occur in an exponential fashion today.

Of course, the economic reality is that, like any network or any productive economic activity, the Internet and its component pieces are, at any given time, of finite capacity and can become constrained. But those constraints are temporary. The capacity of the Internet is constantly expanding and, while these capacity increases are not without cost, they regularly and reliably have occurred in response to market-driven demand. The salient point here is that our market-driven economy's vigorous investment in Internet-based applications, services, and content has occurred in the *absence* of regulation, and there is no empirical evidence that such investment has been dampened or chilled by market failures, such as the existence of monopoly bottlenecks or the existence and exercise in an anticompetitive way of market power by Internet network facility owners or operators.

Against this backdrop, my adversary's extolling of the FCC's proposed nondiscrimination rule is particularly difficult to understand. In a market-driven enterprise like the Internet, the market itself is a far better arbiter of the terms and conditions upon which content, applications, and services are made available to consumers. It is an economic axiom that any service or product should bear the costs of the resources required to provide that service or product. This is a bedrock principle of market-based economies, not a barrier to entry. If the economic value of a product or service does not exceed the costs of the resources required to provide that service or product, then the market will allocate those resources elsewhere. It is this market-based efficiency, and not regulation, that has driven the growth of the Internet and produced the concomitant consumer welfare benefits.

But even if this were not so, the FCC's proposed nondiscrimination rule makes no policy sense. Internet-based services, content, and applications vary widely in

the amount of Internet capacity, or bandwidth, that they consume. Today, most of these services, applications, and content are made available to users on a "best efforts" basis without any guaranteed level of service quality, meaning that those services, applications, and content are subject to being degraded or blocked when capacity constraints occur. If a provider of bandwidth-intensive services, applications, or content wants to avoid such degradation or blockage, it should have the opportunity to purchase a higher level of service that guarantees that the amount of Internet capacity that its services, applications, or content require will be available—but it also should be required to pay for the additional costs (and the greater economic value) associated with such a guarantee. Economists and regulators in other network-based industries, including regulated industries such as the interstate natural gas transmission and interstate electric transmission industries, have long recognized this basic fact. In the interstate gas and electric transmission industries, differential pricing for "firm" transmission capacity and "interruptible" (or best efforts) transmission capacity is a long-established norm. Examples of this same type of differential pricing for different quality levels of service abound in unregulated industries as well. If I am an imported car dealer who wants to make sure that the cars I am offering for sale are delivered to my network of dealerships within, say, 10 days of those cars' manufacture, I am going to pay more for the car delivery service than I would if I chose to have those cars delivered on a less reliable basis, such as whenever the delivery service happened to have empty tractor-trailers available at the cars' port of entry.

My adversary's assertions that an Internet network provider's imposition of a fee for *assured* access to the provider's access subscribers would create an entry barrier that would transform a "neutral and open" Internet into an Internet "that distinguishes between those edge providers willing and able to pay and those who are not" ignores the cost and value difference between *assured* access and *unassured* (or best efforts) access and lacks any empirical support. There is no evidence that significant entry barriers exist for providers of Internet services, applications, and content. The rapid market success of such enterprises as Google, YouTube, Facebook, and countless other vibrant Internet-based businesses that started in someone's basement, garage, or dorm room, demonstrates the lack of such entry barriers. In any event, in a competitive market like the market for Internet access services, differential pricing of different quality levels of access service can exist only if there is a market demand for it.

My adversary's reference to the FCC's exceptions in its proposed nondiscrimination rule for "reasonable network management practices," for "specialized" or "managed" services, and for differential pricing of different quality of service levels provided to end-user subscribers, misses the primary policy point: Placing restrictions on, and

thereby reducing the value of, a network owner's property rights necessarily discourages the network owner's incentive to make further investments and distorts the allocation of resources that would otherwise occur in an unregulated market.

A nondiscrimination rule along the lines proposed by the FCC also would be legally suspect. Eight years ago, in a lengthy decision that subsequently was affirmed by the U.S. Supreme Court,³ the FCC held that broadband Internet access services are "information services" under the Communications Act of 1934, as amended, and pursuant to Congress's directive, are exempt from regulation under Title II of the Act, which governs the regulation of common carrier services.⁴ The D.C. Circuit's recent decision in *Comcast/BitTorrent*,⁵ although tailored to the facts of that particular case (which involved an Internet network access provider's temporary degradation of a bandwidth-intensive Internet application as part of its network management practices), strongly suggests that the FCC's ancillary authority under Title I of the Act does not extend to the regulation of the terms and conditions upon which an Internet network access provider provides its access services. The decision effectively precludes the FCC from relying on either section 230(b) or section 706 of the Act as a basis for the FCC's exercise of its Title I ancillary authority over an Internet access provider's service terms and conditions. Neither the FCC nor my adversary has identified any other provision of the Act that would support the FCC's assertion of its ancillary jurisdiction under Title I. To the contrary, the FCC has initiated a proceeding to "reclassify" broadband Internet access services as "telecommunications services" subject to common carrier regulation under Title II—a proposal that is equally problematic from both a legal and policy standpoint.

Moderator: Do you agree that the FCC lacks authority to adopt and enforce the proposed rules?

Proponent: I agree that the D.C. Circuit's *Comcast/BitTorrent* decision casts serious doubt on the FCC's ability to use its Title I ancillary jurisdiction to promulgate and enforce net neutrality rules. While it might be possible, consistent with *Comcast/BitTorrent*, to cobble together a justification that may pass muster in the courts, relying solely on Title I, if the FCC were to attempt to do that, it would clearly lead to protracted litigation and uncertainty—which the industry and the country can ill afford.

The best way for the FCC to deal with the cloud cast by *Comcast/BitTorrent* is to render it irrelevant by simply classifying the pure transmission component of Internet

access service as a telecommunications service. If that were done, it would remove any doubt that the FCC has the requisite authority. And that's precisely what the FCC has suggested it is planning to do in the Notice of Inquiry issued on June 10, 2010.

The opponents to such a reclassification assert that it would be unlawful for the FCC to in effect change its mind and decide now that Internet access is really two distinct services—a telecommunications service and a separate information service. I disagree. As the Supreme Court said in *Chevron*,⁶ "[a]n initial agency interpretation is not instantly carved in stone" and an agency is free to "consider varying interpretations and the wisdom of its policy on a continuing basis," in response to changed circumstances—including even a change in administration.⁷ The agency simply must adequately explain the reason for the change. Here, the FCC could justify reclassifying high-speed Internet access as a "telecommunications service" simply by reanalyzing the statute, agreeing with Justice Scalia's views expressed in his dissent in the *Brand X* case, and explaining how the policy landscape (or at least the FCC's perception of it) has changed.

The FCC's original classification decision turned on its view of the word "offer." That is, because the Internet access service provider did not "offer" a separate stand-alone transmission service, the FCC concluded that the provider did not "offer" for sale a "telecommunications service to the public" and therefore that the only thing the provider did offer was an information service. Justice Scalia concluded that this was "an implausible reading of the statute."⁸ Justice Scalia stated that it is flatly inconsistent with the common sense understanding of the term "offer" to construe it to apply only where the individual component is actually offered for sale on a stand-alone basis. To Justice Scalia, "[t]he relevant question is whether the individual components in a package being offered still possess sufficient identity to be described as separate objects of the offer, or whether they have been so changed by their combination with other components that it is no longer reasonable to describe them in that way."⁹ He uses as an example a car dealer and a pizzeria. He agrees that the car dealer "offers" cars and does not "offer" their component parts—e.g., steel and carpet. On the other hand, he asserts that everyone would agree that the pizzeria "offers" delivery even if it only delivers pizzas that it makes—i.e., it does not "offer" delivery on a stand-alone basis.¹⁰ Justice Scalia puts the transmission component of Internet access service, which he calls "high speed access

Reclassify pure transmission as telecommunication.



to the Internet,” in the same category as pizza delivery: It is a separate thing; and that is precisely how a consumer would view it. Accordingly, he concludes that “high speed access to the Internet” is a “telecommunications service” subject to Title II common carrier regulation and that the “applications and functions” to which the user gains access is a separate “information service.”¹¹

Opponent: My adversary suggests that the FCC can solve its current “authority” dilemma by “simply classifying the pure transmission component of Internet access service as a telecommunications service” subject to common carrier regulation under Title II of the Act. But to do so, the FCC would have to reverse the conclusions it reached in its prior orders classifying broadband Internet access service as a single, integrated information service subject only to Title I of the Act. While my adversary suggests the hurdle that the FCC must clear in order to reverse course is not very high, the hurdle may not be as low as my adversary posits. The legal test for determining whether an administrative agency has a reasoned basis for making such a change almost assuredly requires the agency to do more than decide it wants to rely post hoc on a Supreme Court justice’s dissenting opinion. Of course, relying on such a dissenting opinion as the basis for revising one’s legal analysis is a legally risky proposition in virtually any circumstance. It is all the more so in this case, because redefining Internet access service in the manner the FCC proposes is difficult to reconcile with Congress’s intent in enacting the exemption from Title II regulation for “information services” as part of the Federal Telecommunications Act of 1996. The definition of “information services” that Congress enacted, which essentially adopted the same definition the FCC had used beginning in the late-1980s to identify “enhanced services,” states that all information services are provided “via telecommunications.” In other words, all information services have a telecommunications component used for transmission. But that telecommunications component does not mean the service is classifiable as a telecommunications service or severable into separate telecommunications service and information service pieces. The purpose of Congress’s enactment of an “information services” definition was to exempt from Title II regulation services used for information creation, gathering, and sharing (rather than for mere information transmission)—precisely the type of service that broadband Internet access service is.

In order for Congress’s definitional distinctions to have meaning, some limiting test must be applied. The problem with Justice Scalia’s dissent in the *Brand X* case is that the test it purports to apply is so fuzzy and subjective as to make it impossible to predict ex ante the outcome of its application to a particular service. In contrast, the FCC’s prior orders classifying broadband Internet access services as information services applied an *objective* test that focused on the *functionality* of the Internet access services that were being bought and sold in the

marketplace. This test is not appreciably different than the test that federal courts—including the U.S. Supreme Court—have used for years to define “product markets” in the antitrust context. Moreover, the relevant facts regarding the functionality of broadband Internet access services being bought and sold in the marketplace today haven’t changed since the FCC conducted its prior analyses. The FCC’s proposed reclassification of these services as telecommunications services therefore would be hard to describe as anything other than arbitrary and capricious.

Finally, even if the FCC’s proposed reclassification of broadband Internet access services as telecommunications services could survive legal challenge, the consequences of such reclassification would be antithetic to consumer welfare. The FCC’s “Third Way” proposal to classify these services as telecommunications services subject to Title II common carrier regulation, but then to “forbear” from applying most of the provisions of Title II to those services, is far different from declaring those services to be free from any regulation under Title II—which is the regulatory status those services have enjoyed since the Internet’s inception. At a minimum, the FCC’s proposed reclassification is sure to inject greater uncertainty and greater investment risk into the marketplace, especially if the FCC can change its mind about the regulatory status of those services as blithely as my adversary contends.

Endnotes

1. Appropriate Framework for Broadband Access to the Internet Over Wireline Facilities; Review of Regulatory Requirements for Incumbent LEC Broadband Telecommunications Services; Computer III Further Remand Proceedings; Bell Operating Company Provision of Enhanced Services; 1998 Biennial Regulatory Review—Review of Computer III and ONA Safeguards and Requirements; Inquiry Concerning High-Speed Access to the Internet Over Cable and Other Facilities Internet Over Cable Declaratory Ruling; Appropriate Regulatory Treatment for Broadband Access to the Internet Over Cable Facilities, Policy Statement, 20 FCC Red 14986, 14987-88, para. 4 (2005) (Internet Policy Statement).
2. National Cable Telecomms. Ass’n. v. Brand X Internet Services, 545 U.S. 967 (2005).
3. *Brand X*, *supra*.
4. In the Matter of Inquiry Concerning High-Speed Access to the Internet Over Cable and Other Facilities, GN Docket No. 00-185, 17 F.C.C.R. 4798, 202 WL 407567 (FCC 2002).
5. Comcast Corp. v. FCC, 600 F.3d 642 (D.C. Cir. 2010).
6. Chevron USA v. Natural Resources Defense Council, 467 U.S. 837 (1984).
7. See Chevron, 467 U.S. at 863-64; Motor Vehicle Manufacturers Association v. State Farm, 463 U.S. 29, 46-57, 59 (1983).
8. *Brand X*, *supra* note 2, at 1005.
9. *Id.* at 1006-07.
10. *Id.* at 1007.
11. *Id.* at 1008.

The Emerging Impact of Shale Gas Resources

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distribution) in a “vertically integrated” manner. Deregulation subsequently separated these three previously integrated phases and typically divested each function into separate companies.

Federal and state regulation of public utilities dates back to the 1930s. Over the years, there have been a number of regulations, including the Public Utilities Holding Company Act of 1935, Natural Gas Act of 1938, Public Utilities Regulatory Policy Act of 1978, and Energy Policy Act of 2005, which have shaped the relationship between utilities and their customers.⁴ The 1985 Federal Energy Regulatory Commission (FERC) Order No. 436 (Open Access Blueprint) established the *voluntary* framework under which interstate pipelines were to offer transportation services to customers on a first-come-first-served basis.⁵ Essentially, this order granted industrial customers the freedom to purchase gas directly from the producers and to use the pipelines as transporters rather than as merchants.⁶ Order No. 436 resulted in immediate cost savings for end users, as spot gas prices were significantly lower than the contract prices traditionally offered by the pipelines. Subsequently, in 1992, FERC issued Order No. 636 (the Restructuring Rule), which *mandated* the unbundling of sales services from transportation services.⁷ Mandatory unbundling increased competition among gas sellers and eliminated the market power of pipeline companies. Though each policy act addressed different aspects of the business, *interstate* commerce has always been under the authority of the Federal Energy Regulatory Commission (FERC), whereas *intrastate* affairs are regulated by the applicable state public utility commission.

Deregulation of the natural gas and electric industries opened the price of commodity supply to competition. However, the transmission and distribution of natural gas and electricity is still regulated, and not open to choice, as the prices for these services continue to be set by state- and federally-approved tariffs.

Natural Gas Market Evolution

The FERC orders stimulated natural gas trading activity on the New York Mercantile Exchange (NYMEX, currently CME) and resulted in market signaling to both consumers and producers. From 1996 to 2006, NYMEX prices indicated constraints in domestic natural gas production and a lack of opportunities to increase domestic natural gas production.⁸ Highly volatile prices during that period were a clear manifestation of these supply constraints. Increasing the import of natural gas, primarily through liquefied natural gas (LNG), was the solution to meeting current supply deficiencies, with prices set by

international gas pricing mechanisms. This view peaked in 2008, as the entire NYMEX natural gas curve shifted upward to reflect international pricing mechanisms.⁹

From 2006 to 2008, high price signals indicated to gas producers that they would be well paid to increase domestic production. This high premium for gas induced innovative production techniques. Unconventional extraction techniques such as horizontal drilling and fracturing, first developed in the oil industry, were applied to natural gas. These innovations enabled economically feasible shale gas extraction.

Conventional drilling involves a vertical insertion of a drill bit and pipe underground to pierce a reservoir of product and extract the product, similar to a straw in a glass. Although conventional gas requires fewer wells spaced further apart, careful seismic and exploratory drilling is often necessary and the most productive fields tend to require long lead times. Shale gas drilling involves initially drilling vertically in the ground up to 5,000 feet then moving horizontally across a field, up to 10,000 feet. Unlike conventional drilling, this method of drilling requires fewer unsuccessful exploratory wells and has shorter lead time requirements. Shale gas offers a lower cost, fewer barriers-to-entry, and a more efficient drilling alternative to the conventional gas drilling technique. Drilling in shale requires a hydraulic fracturing process (the high pressure pumping of large volumes of liquids into the rock, often referred to as *fracking*), that allows trapped natural gas to migrate away from the rock and into pipelines.

Shale gas exploration has changed the U.S. supply outlook from “opportunity constrained” to “opportunity rich.” Shale containing both oil and natural gas lies beneath millions of acres in a U-shaped formation extending from northeastern British Columbia and adjacent southern Alberta to Montana and North Dakota, continuing through Wyoming, Colorado, New Mexico, Texas, Louisiana, and then north into the Illinois and Appalachian Basins and into Quebec, New Brunswick, and Nova Scotia. In all, shale formations exist beneath six provinces of Canada and 23 U.S. states and are now recognized as promising sources of natural gas. This large area of opportunity, combined with the lower cost of extracting shale gas compared to conventional methods (millions versus billions of dollars) offers fewer barriers to entry for potential natural gas producers. As a result, large numbers of small gas producers have begun to drill for shale gas, in contrast to the relatively small number of large players that have the capability of conventional drilling in the Gulf of Mexico.

The large Marcellus Shale formation is not the only

Appendix: Table 1

Major Legislative and Regulatory Actions (1935-2008)

The Public Utility Holding Company Act of 1935
Natural Gas Act of 1938
“Phillips Case:” Supreme Court Decision Giving FPC Jurisdiction Over Wellhead Prices (1954)
Natural Gas Policy Act of 1978
Tax Credits for Unconventional Gas Recovery (1980)
FERC Order 380: Eliminated Minimum Bills for LDCs (1984)
FERC Order 436: Open Access Blueprint (1985)
Canadian Regulatory Reform Leads to Long-Term Increase in Sales to the United States (1985)
FERC Order 500: Take-or-Pay Cost Recovery (1987)
Repeal of the Power Plant and Industrial Fuel Use Act (1987)
Natural Gas Wellhead Decontrol Act of 1989
Clean Air Act Amendments of 1990
Moratorium on Offshore Drilling (1990)
NYMEX Issues First Natural Gas Futures Contract (1990)
FERC Pipeline Construction Rules Since 1991
FERC Order 636: The Restructuring Rule (1992)
Energy Policy Act of 1992
FERC Policy on Natural Gas Gathering System Ownership Since 1992
North American Free Trade Agreement (1994)
Outer Continental Shelf Deep Water Royalty Relief Act of 1995
FERC Order 637 (2000)
2002 Amendments to Deepwater Port Act of 1974
FERC’s Hackberry Decision (2002)
The Maritime Transportation Security Act of 2002
The Pipeline Safety Improvement Act of 2002
The Alaska Natural Gas Pipeline Act (2004)
American Jobs Creation Act of 2004
The Energy Policy Act of 2005
The Gulf of Mexico Energy Security Act (2006)
The Pipeline Inspection, Protection, Enforcement, and Safety Act of 2006
The Energy Independence and Security Act of 2007
Lifting of the Moratorium on Offshore Drilling (2008)

Source: www.eia.doe.gov/oil_gas/natural_gas/analysis_publications/ngmajorleg/ngmajorleg.html

shale formation in the United States. Nevertheless, only one other shale gas site, the Barnett formation in Fort Worth, Texas, has seen substantial development. Shale drilling techniques were first developed, over a period of 15 years, at the Barnett Shale site. These techniques later enabled the economic feasibility of shale gas development. Other sites, including Marcellus (PA), Bakken (ND), Eagle Ford (TX), Woodford (OK), and Fayetteville (LA) are in the initial stages of development with many more (Utica – N.Y., Antrim – MI, New Albany – IN) in the infancy stages.

Shale gas has the potential to revolutionize the domestic as well as international energy market. Other countries, including several in Eastern Europe as well as China and India, have begun to explore shale gas drilling, and their initial results seem encouraging. Increased amounts of domestic natural gas production, particularly from the Marcellus Shale, could have significant geopolitical implications. Industry experts have begun to discuss the possibility of exporting Marcellus gas to Europe in the form of LNG. Europe, a large importer of LNG, currently receives most

of its natural gas supply from Gazprom, a large Russian gas supplier.¹⁰ U.S. natural gas exports could challenge Gazprom's market power over European gas supply. Increased competition in the European natural gas market could weaken the price link between oil and natural gas, a relationship Gazprom has aggressively attempted to preserve as recently seen through its winter natural gas shutoff to Europe in 2009.¹¹ Because natural gas prices are generally linked to the price of crude oil, a breakdown in the international oil to gas price relationship could reduce the cost of fuel in Europe, and across the globe. Ultimately, a decrease in natural gas revenue to Russia and the Ukraine could destabilize existing markets in Eastern Europe, and reduce prices for gas supply to Western Europe.

Shale Gas and Its Environmental Impact

Shale gas is by no means a panacea for energy supply. In fact, shale gas raises significant environmental and regulatory issues. For example, the Marcellus site is very close to population centers and their associated water reservoirs. Protecting these reservoirs and groundwater quality in general has been a focal point of legislative and regulatory policy debate.

Due to the depth of Marcellus gas wells, which can reach up to 7,000 feet, drilling activity often pierces fresh water aquifers on its way to the natural gas production zones. The fracturing process involves injecting the well with between two to four million gallons of fluid at rates of up to 4,200 gallons per minute and pressures up to 15,000 pounds per square inch, in order to break the reservoir rock.¹² During fracturing operations, the fluids are pumped into the well and then returned to the surface where they are reinjected, stored, and/or discarded.¹³ This fluid injection process raises the risk of potentially contaminating underground fresh water aquifers, commonly used for drinking water. Although fracturing fluids are composed primarily of water, they also include numerous chemicals. For example, the Pennsylvania State Department of Environmental Conservation has identified the following chemicals used in fracturing fluids: diesel fuel, benzene, ethyl benzene, hydrochloric acid, toluene, xylene, naphthalene, polycyclic aromatic hydrocarbons, methanol, formaldehyde, ethylene glycol, glycol ethers, hydrochloric acid, and sodium hydroxide.¹⁴ These chemicals can be hazardous and will potentially infiltrate the drinking water reservoirs above the gas extraction site if not properly managed.

Additionally, natural gas development, production, gathering, and transportation activities release emissions, such as NO_x, volatile organic compounds,

particulate matter, SO₂, and methane.¹⁵ In February 2008, deteriorating air quality in the Greater Green River Basin was attributed to emissions from oil and gas development activities, prompting the first ever ozone-related human health warning from Wyoming's Department of Environmental Quality in a region renowned for its clean air.¹⁶ Further environmental concerns arose in Fort Worth and the surrounding areas as a result of suspected benzene emissions from Barnett

Shale wells and gathering system compressor stations.¹⁷ Currently, shale drilling is predominantly a state-regulated activity. Therefore, drilling companies are not required by federal law to report the chemical composition of fracturing fluid, an exemption under the Clean Water Act and Safe Drinking Water Act granted by the Energy Policy Act of 2005.

In June 2009, U.S. Rep. Dianna DeGette of Colorado and U.S. Sen. Robert Casey of Pennsylvania jointly introduced in the House and Senate the Fracturing Responsibility and Awareness of Chemicals (FRAC) Act, H.R. 2766,¹⁸ and S. 1215.¹⁹ Currently under committee review, the FRAC Act seeks to amend the Safe Drink-

ing Water Act by repealing the federal exemption of hydraulic fracturing under the Act and requiring public disclosure of the chemicals used in fracturing operations.²⁰

Additionally, state and local regulatory agencies are also proposing legislation to further regulate shale gas drilling. While the Pennsylvania and New York Departments of Environmental Protection and the Delaware River Basin Commission have focused considerable effort on identifying the chemicals used in the fracking process as well as mitigating the potentially hazardous effects on underground water tables, some state lawmakers and environmental lobbyists believe these regulations insufficient. State lawmakers continue to introduce legislation requiring stricter regulations, including a proposed moratorium prohibiting drilling near primary sources of water supply.²¹

Conclusion

According to Terry Engelder, there are 2.1 trillion barrels of oil in the world and we have already consumed about half.²² Of the 200 billion barrels of oil initially available in the United States, only 30 billion barrels remain.²³ Engelder further estimates that global shale gas offers an alternative fuel source equivalent to approximately four trillion barrels of oil; one-third of that shale gas resides in the United States²⁴ The Marcellus site alone offers an

Shale gas may revolutionize the energy market.



estimated 450 Tcf of commercially viable extractable natural gas, which could satisfy approximately 20 years of total U.S. energy demand at current levels.²⁵ Engelder often refers to the United States as the Saudi Arabia of shale gas.²⁶ Simply put, Chairman of IHS Cambridge Energy Research Associates (IHS CERA) Daniel Yergin has described the “discovery” of shale gas as “the most significant energy innovation so far this century.”²⁷

Recent developments in shale production have caused dramatic changes in the energy industry. The most striking change has been in natural gas prices. In 2008, gas prices exceeded \$10 throughout the forward gas market.²⁸ Currently, the average price of gas for the next 10 years is only about \$7.²⁹ Naturally, this price decrease in natural gas has resulted in lower energy prices across the country. Lower energy prices have enabled consumers to spend less of their income on energy, but they have increased their disposable income. Lower natural gas prices, in particular, have improved the security of domestic supply while boosting industrial demand.

The emergence of shale gas and the resulting lower natural gas prices are expected to be game changers for the electricity generation business. The apparent abundance of domestic natural gas supply coupled with the continued slow economic recovery has translated into forecasts of low gas prices for a considerable period of time. Low-cost and abundant natural gas is putting competitive pressure on other fuel sources. Given current and potential Clean Air Act regulation by the U.S. Environmental Protection Agency and the possibility of legislative or regulatory carbon constraints, dirtier and more inefficient coal-fired power plants will be pressured to retire, while the technical and economic feasibility of new gas-fired plants reduces the reliability threat those retirements might otherwise mean for the nation’s electricity grid. Nevertheless, despite the promise of shale gas developments, the natural gas industry faces a number of new environmental and geopolitical challenges; protecting underground water reservoirs, higher taxes, royalties, and other regulatory issues remain to be addressed. The full impact of unconventional gas on the domestic as well as the global energy arena remains to be seen.

Endnotes

1. Terry Engelder, professor of Geosciences at the Pennsylvania State University, *Shale Gas: An industrial opportunity that can make a difference for America* (June 14, 2010).

2. *Marcellus Shale Safety Issues*, S. Envtl. Res. and Energy Comm., Session of 2010 (Pa. 2010) (testimony by John Hanger, Sec’y, Pa. Dep’t of Envtl. Prot.), available at http://files.dep.state.pa.us/AboutDEP/AboutDEPPortalFiles/RemarksAndTestimonies/TestimonyEOGSafety_061610.pdf.

3. *Id.*

4. A list of major legislative and regulatory actions is provided in the Appendix (Table 1).

5. See *Regulation of Natural Gas Pipelines After Partial*

Wellhead Decontrol, Order No. 436, 18 C.F.R. §§ 2, 157, 250, 284, 375, 381(1985).

6. See *id.*

7. See *The Restructuring Rule*, Order No. 636, 18 C.F.R. § 284 (1992).

8. Pricing data courtesy of CQG.

9. Pricing data courtesy of CQG.

10. See Andrew E. Kramer, *Russia Cuts Off Gas Deliveries to Ukraine*, N.Y. Times, Jan. 2, 2009, at A6, available at <http://www.nytimes.com/2009/01/02/world/europe/02gazprom.html?ref=business>.

11. See *id.*

12. Engelder, *supra* note 1.

13. *Id.*

14. Pa. Dep’t of Envtl. Conservation, *Chemicals Used by Hydraulic Fracturing Companies in Pennsylvania* (June 30, 2010), available at http://www.dep.state.pa.us/dep/deputate/minres/oilgas/new_forms/marcellus/Reports/Frac%20list%206-30-2010.pdf.

15. See Chesapeake Energy, *Water Use in Deep Shale Gas Exploration* (Mar. 2010), available at http://www.chk.com/Media/CorpMediaKits/Water_Use_Fact_Sheet.pdf.

16. Wyo, Dep’t of Envtl. Quality, *News Release: DEQ’s Upper Green River Basin Winter Ozone Study to increase level of air monitoring this weekend* (Feb. 27, 2009), available at <http://deq.state.wy.us/out/downloads/winterozonestudyfeb28.pdf>.

17. See Al Armendariz, professor of environmental and civil engineering at Southern Methodist University, *Emissions from Natural Gas Production in the Barnett Shale Area and Opportunities for Cost-Effective Improvements* (Jan. 26, 2009), available at http://www.edf.org/documents/9235_Barnett_Shale_Report.pdf.

18. Fracturing Responsibility and Awareness of Chemicals Act of 2009, H.R. 2766, 111th Cong. (2009).

19. Fracturing Responsibility and Awareness of Chemicals Act of 2009, S. 1215, 111th Cong. (2009).

20. See *id.* (referred to Senate Environmental and Public Works Subcommittee); H.R. 2766 (referred to House Energy and Commerce Subcommittee).

21. See, e.g., H.R. 2608, Session of 2010 (Pa. 2010) (prohibiting fracking operations or horizontal drilling within 2,500 feet of a primary source of water); H.R. 2609, Session of 2010 (Pa. 2010) (proposing one-year moratorium on issuance of new natural gas drilling permits).

22. Engelder, *supra* note 1.

23. *Id.*

24. *Id.*

25. *Id.*

26. *Id.*

27. Daniel Yergin and Robert Ineson, *America’s Natural Gas Revolution*, Wall St. J., Nov. 2, 2009, available at <http://online.wsj.com/article/SB10001424052748703399204574507440795971268.html>.

28. Pricing data courtesy of CQG.

29. Pricing data courtesy of CQG.

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Chair's Column

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historically has been deemed a public service.

Moreover, we are blessed to work with entities whose operations broadly define the quality of life that we enjoy. Reliable electric and natural gas service; a safe and continuous supply of potable drinking water; the instantaneous communication of voice and electronic data; the availability of multiple modes of transporting passengers and goods—these are all things that we tend to take for granted, but whose very existence requires constant investment and technological innovation.

I am deeply honored to lead, for the next year, a group of diverse and extraordinarily talented lawyers. Our committee chairs and vice chairs are busy at work developing programs on a wide variety of cutting-edge issues, ranging from pipeline safety to hydraulic fracturing to net neutrality to the Dodd-Frank Act to renewable energy incentives and so on. However, they need your help. If you are interested in publishing an article or assisting with a podcast or webinar or just becoming more actively involved in the work of the Section, please let me know at tgadsden@morganlewis.com. All comers are welcome and I promise I will get back to you.



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