

Managing the risks of shale gas development using innovative regulatory approaches

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Extended Abstract

Shale gas development is increasing rapidly in the United States; natural gas extracted directly from deep shale formations comprised a negligible portion of total U.S. gas production in 2000, reached about one quarter of U.S. production by 2010, and is projected to comprise one half or more of U.S. production by 2040. These resources can now be exploited cost-effectively by operators due to advances in a combination of two critical technologies, hydraulic fracturing and horizontal drilling. The use of these technologies to extract gas from deep shale formations has generated significant economic benefits, but regulators and the public have raised concerns about associated risks to the environment and human health.

The extensive spatial distribution of shale plays throughout the continental United States means that many U.S. shale plays are being developed in states with rich histories of oil and gas exploitation and regulation (e.g., Texas and Oklahoma), and others in states with little such history, at least in recent years (e.g., Ohio and New York). States have long been the primary regulators of oil and gas development, and have retained that role as shale gas production has expanded, though both federal and local authorities play some role. The regulatory framework for managing risks from shale gas development is, thus, an evolving, dynamic patchwork of approaches.

In many instances, regulators have used innovative approaches to managing shale gas development risks. This paper first describes current federal and state regulatory approaches to managing risks from shale gas development to air, surface water, and groundwater quality; to species habitat; and to communities.

We then define three categories of innovative approaches that may be used and, in some cases, have been used to regulate these risks: market-based regulations, liability rules, and non-binding cooperative agreements with industry.

- Market-based regulatory approaches include information disclosure policies, local impact fees and state severance taxes, and tradable permit programs (for example, for water withdrawals or air pollutant emissions).
- Liability rules alter the underlying rules of common law liability by changing liability standards (strict vs. negligence), shifting burdens of proof, establishing financial responsibility requirements, limiting or expanding liability, etc.
- A recent agreement between Pennsylvania environmental regulators and shale gas operators to voluntarily prevent wastewater shipments to certain

waste treatment facilities is one example of a cooperative approach with industry. For each of these innovative approaches, we will discuss steps already taken, models proposed by other researchers, and opportunities for further innovation.

Flexible, innovative regulatory approaches hold great promise as cost-effective alternatives to prescriptive regulation, but it remains to be seen whether they are appropriate for managing shale gas risks. We consider the pros and cons of using each such approach, and assess their likely effectiveness in selected cases in which they have been applied.

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