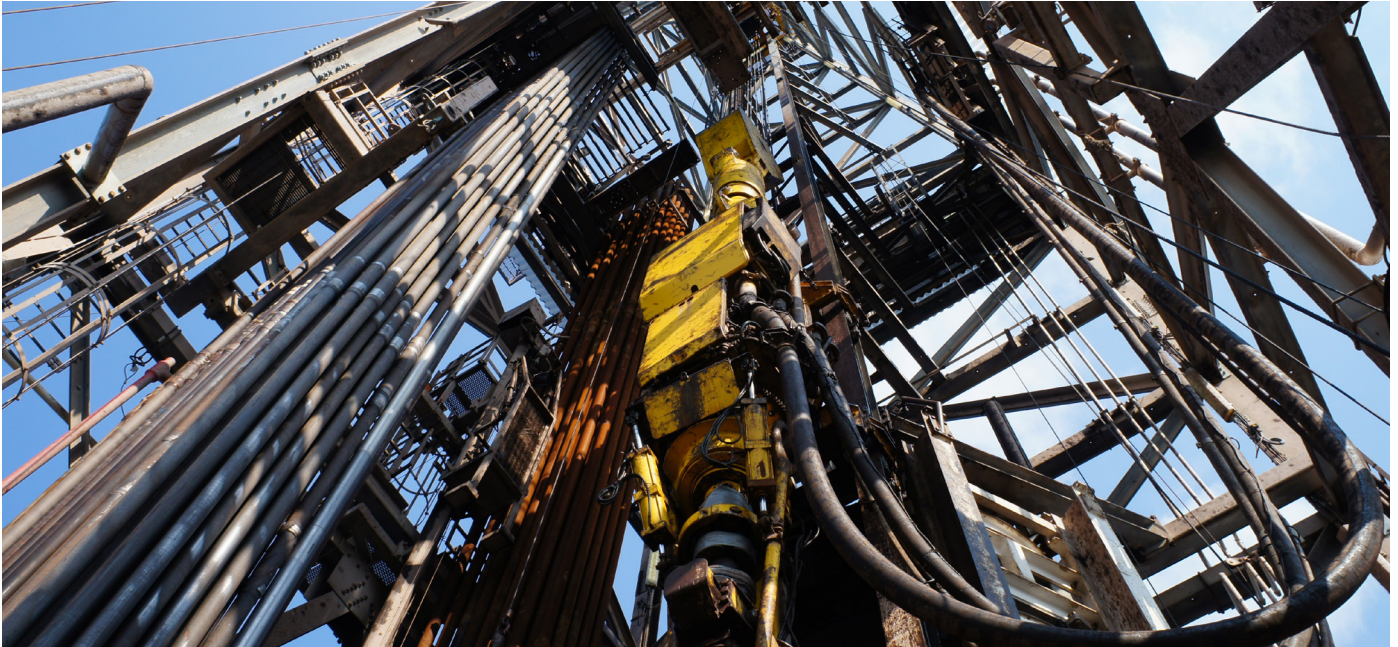


# SHALE ENERGY | 10 POINTS EVERYONE SHOULD KNOW

- 1 Hydraulic fracturing** will account for nearly 75 percent of natural gas development in the future.<sup>1</sup>
- 2 The economic impacts** of developing shale gas resources are revolutionary.
- 3 Robust state and federal regulations** for hydraulic fracturing already exist.
- 4 Industry has standards** and practices for continuous improvement.
- 5 Careful well construction** keeps groundwater safe.
- 6 The contents of fracturing fluids** (which are mainly water) are disclosed.
- 7 Water is managed effectively** and fluids are handled to prevent spills.
- 8 Wastes** from production activities are managed responsibly.
- 9 Hydraulic fracturing** does not cause earthquakes.
- 10 Air emissions** from production activities are carefully monitored, managed and reported.

## RESOURCES

- <sup>1</sup> America's New Energy Future: The Unconventional Oil and Gas Revolution and the US Economy, Volume 1: National Economic Contributions. October 2013.
- <sup>2</sup> IHS Global Insight, Measuring the Economic and Energy Impacts of Proposals to Regulate Hydraulic Fracturing, 2009.
- <sup>3</sup> America's New Energy Future: The Unconventional Oil and Gas Revolution and the US Economy, Volume 3: The Manufacturing Renaissance. October 2013.
- <sup>4</sup> American Chemistry Council, "Shale Gas and New Petrochemicals Investment: Benefits for the Economy, Jobs, and U.S. Manufacturing," March 2011.
- <sup>5</sup> PriceWaterhouseCoopers, "A Renaissance in Shale Gas?" December 2011.
- <sup>6</sup> America's New Energy Future: The Unconventional Oil and Gas Revolution and the US Economy, Volume 3: The Manufacturing Renaissance. October 2013.
- <sup>7</sup> STRONGER is a non-profit, multi-stakeholder organization which specializes in assessing the overall framework of environmental regulations supporting oil and gas operations. Their collaborative review teams encompass industry, regulators, and environmental/public interest stakeholders. Since its initiation, the state review process has completed reviews of 21 state programs responsible for the regulation of over 90% of the domestic onshore production of oil and natural gas. Stronger has completed specific hydraulic fracturing reviews in Colorado, Louisiana, Oklahoma, Pennsylvania, and Ohio. For more information, see <http://www.strongerinc.org/>
- <sup>8</sup> Stanford University geophysicist Mark Zoback said recently said that the energy released in tremors triggered by fracking, "is the equivalent to a gallon of milk falling off the kitchen counter." "Experts: Okla. Quakes too powerful to be manmade," Associated Press, <http://www.businessweek.com/ap/financialnews/D9QS5GT00.htm>
- <sup>9</sup> [http://www.epa.gov/ogwdw/uic/pdfs/poster\\_uic\\_uic\\_program\\_30\\_years.pdf](http://www.epa.gov/ogwdw/uic/pdfs/poster_uic_uic_program_30_years.pdf)



## Shale Energy: 10 Points Everyone Should Know

### **1** Hydraulic fracturing will account for nearly 75 percent of natural gas development in the future.<sup>1</sup>

Hydraulic fracturing and horizontal drilling apply the latest technologies and make it commercially viable to recover shale gas and oil. Without it, we would lose 45 percent of domestic natural gas production and 17 percent of our oil production within 5 years.<sup>2</sup>

### **2** The economic impacts of developing shale gas resources are revolutionary.

Development of oil and natural gas shale resources supported more than 2.1 million jobs in 2012.<sup>3</sup> The number of direct and indirect jobs is constantly increasing. Affordable, domestic natural gas is essential to rejuvenating the chemical, manufacturing, and steel industries. The American Chemistry Council determined that a 25 percent increase in the supply of ethane (a liquid derived from shale

gas) could add over 400,000 jobs across the economy, provide over \$4.4 billion annually in federal, state, and local tax revenue, and spur \$16.2 billion in capital investment by the chemical industry.<sup>4</sup> They also note that the relatively low price of ethane would give U.S. manufacturers an essential advantage over many global competitors. Similarly, the National Association of Manufacturers estimated that high recovery of shale gas and lower natural gas prices will help U.S. manufacturers employ 1,000,000 workers by 2025 while lower feedstock and energy costs could help them reduce natural gas expenditures by as much as 11.6 billion by 2025.<sup>5</sup> An IHS report estimates that mainly due to lower energy prices, average disposable income per household increased by more than \$1,200 in 2012. Unconventional revolution's annual contribution to the average household is estimated to grow to more than \$3,500 by 2025<sup>6</sup>

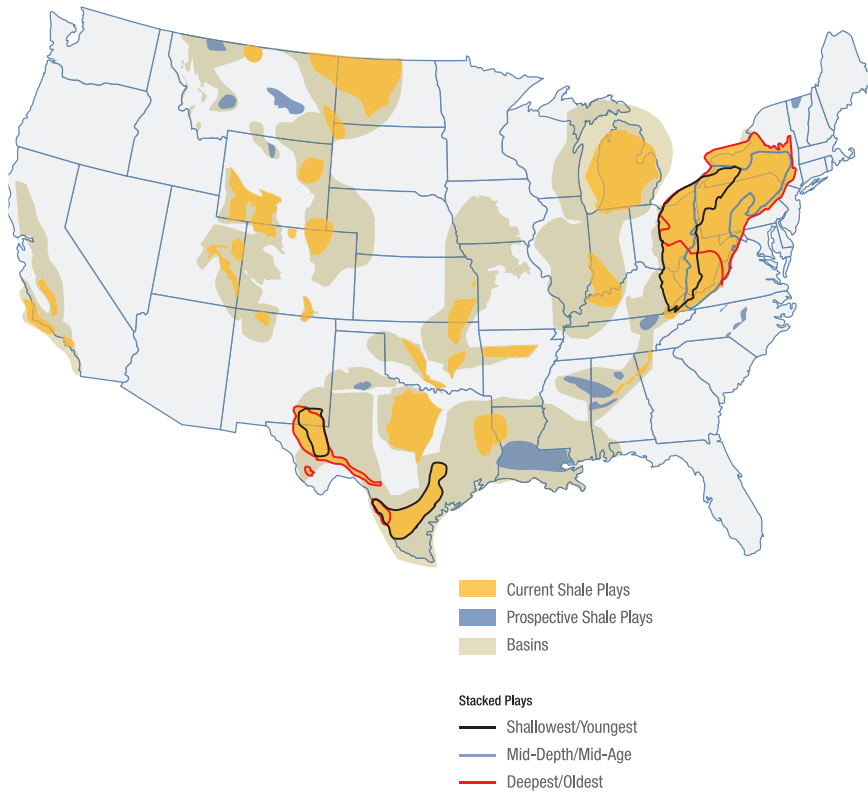
### 3 Robust state and federal regulations for hydraulic fracturing already exist.

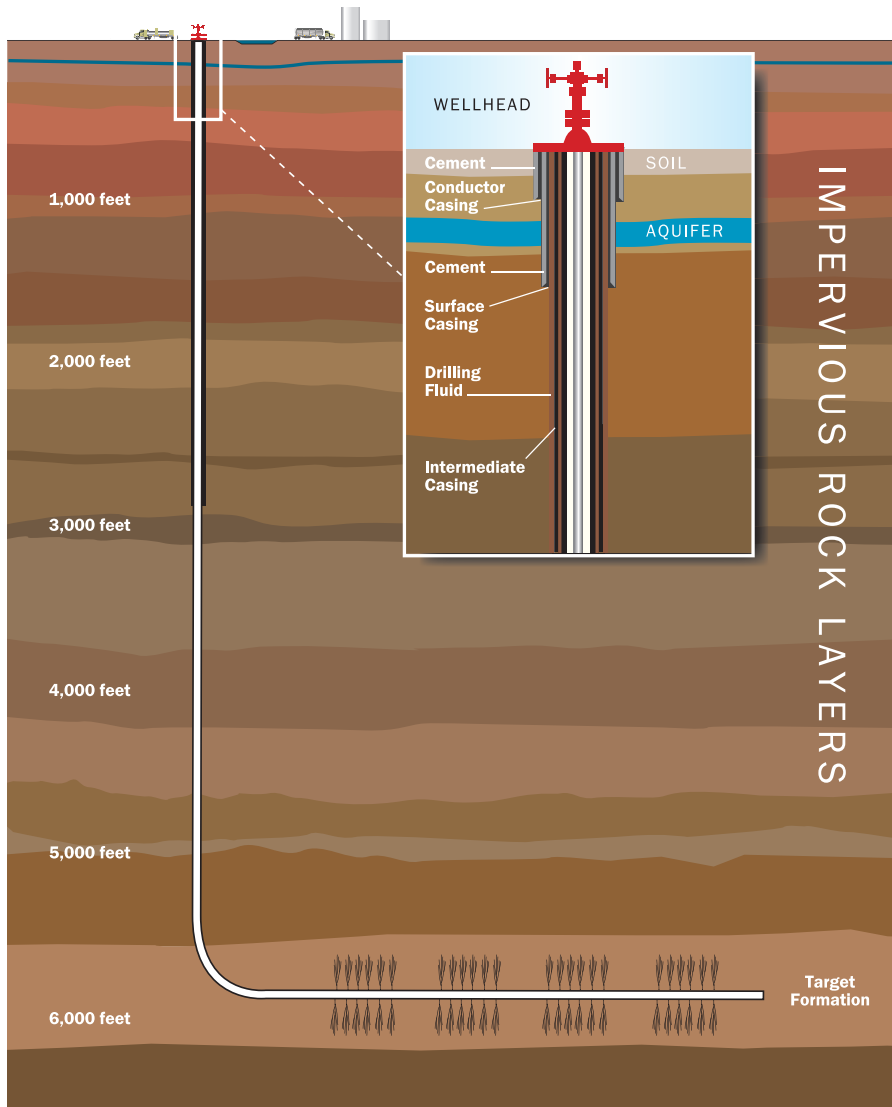
A comprehensive set of state, local, and federal laws address nearly every aspect of exploration and production. These include well design, water use, waste management and disposal, air emissions, surface impacts, health, safety, location, spacing, and operation. State regulation of oil and gas activities pre-dated federal regulation, and is particularly important because it allows laws to be tailored to local geology and hydrology. Organizations like the State Review of Oil and Natural Gas Environment Regulations (STRONGER) are available to help assess the overall framework of environmental regulations supporting oil and gas operations in any given state.<sup>7</sup>

States also exchange information on regulatory experiences and practices through periodic meetings of interstate organizations such as the Interstate Oil and Gas Compact Commission and the Groundwater Protection Council. To help protect environmental health and safety during oil and gas operations, companies must also comply with the following federal statutes and their supporting regulations: the Clean Water Act (CWA); the Safe Drinking Water Act (SDWA); the Clean Air Act (CAA); the Emergency Planning and Community Right to Know Act (EPCRA); and the Occupational Health and Safety Act (OSHA).

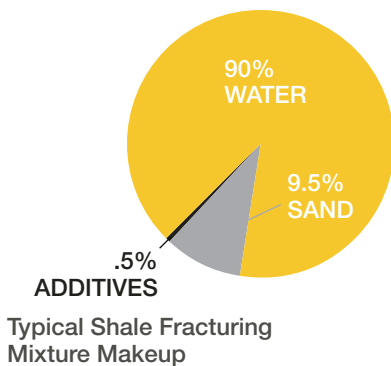
### 4 Industry has standards and practices for continuous improvement.

API has a standards program accredited by the American National Standards Institute (ANSI) which also accredits programs at several of our national labs, and has a long history of developing highly technical standards, recommended practices, and guidance documents for oil and gas operations. Hundreds of API's standards are referenced directly in state oil and gas regulations thousands of times. Three API guidance documents pertain specifically to hydraulic fracturing issues (HF1: Well Construction and Integrity, HF2: Water Management, HF3: Practices for Mitigating Surface Impacts Associated with Hydraulic Fracturing). An additional two documents, RP 51R: Environmental Protection for Onshore Oil and Gas Production Operations and Leases and Standard 65-2: Isolating Potential Flow Zones During Well Construction are also important for shale energy development. Although regional differences in state geology make a single set of regulations impractical, these documents provide a roadmap for responsible operations from the point of permitting to land reclamation after well closure, and Good Neighbor guidance on cooperating with landowners, host communities and other stakeholders.





Example of hydraulic fracturing for shale development



## 5 Careful well construction keeps groundwater safe.

Each well contains multiple layers of steel casing and cementing to effectively protect groundwater. Additionally, most modern wells are equipped with sensitive monitoring equipment and supervised by experienced, highly trained technicians.

**6 The contents of fracturing fluids (which are mainly water) are disclosed.** The typical fracturing fluid is approximately 90% water and 9.5% sand, with the remainder being additives that aid well production. The oil and natural gas industry has led the

way in its support for public information about fracturing fluids, industry voluntarily discloses the contents of its fluids on the website [FracFocus.org](http://FracFocus.org), which is run by the Groundwater Protection Council. FracFocus.org provides a public database that can be searched by well or well location so that concerned individuals can easily identify the constituents used to fracture specific wells. As of early 2012, nearly one hundred companies have already provided information about approximately ten thousand wells and that number increases every day.

## 7 Water is managed effectively and fluids are handled to prevent spills.

Although hydraulic fracturing operations use considerable volumes of water, the oil and gas industry's water use is small when compared to other industrial and recreational activities. Moreover, during permitting, operators typically must demonstrate that their water use and management plans will not adversely affect others in the region in times of flood or drought. Spill prevention, response, and clean up procedures are implemented before drilling activities begin and continually updated as operations progress. Numerous protective measures are in place at well sites including liners under well pads, rubber composite mats under rigs, storage tanks with secondary containment measures, and barriers to control and direct any potential runoff at the site. Appropriate on-site employees and contract personnel are trained in the safe and proper transportation, transfer, and containment of fluids and materials.

**8 Wastes from production activities are managed responsibly.** Operators manage waste conscientiously in accordance with applicable state and federal laws, as well as OSHA regulations. To the extent possible, fracturing fluid is recovered and recycled for re-use in future fracturing operations, or injected into Class II wells





**Example of a completed well**  
Photo by Richard Ranger

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as authorized under the Safe Drinking Water Act. Many state authorities require companies to submit waste management plans as part of the permitting process to ensure that waste management options are carefully weighed well in advance.

**9 "Microearthquakes" related to hydraulic fracturing are rarely strong enough to be felt at the earth's surface.** The process of hydraulically fracturing a well for hydrocarbon development has a very low risk of inducing seismic events that would be felt at the surface. While millions of hydraulic fracturing treatments have been performed over the last 60 years, there have been just a few isolated events of induced seismicity that have resulted in ground shaking, none of which resulted in damage of any significant consequence at the surface.<sup>8</sup> Most recent reports of seismic activity have stemmed from underground injection of wastes, which is strictly regulated by the EPA's Underground Injection Control (UIC) Program. The UIC program has been in existence for over 30 years and has regulated over 800,000 wells

used by industries that include chemical processing, wastewater treatment and mining, as well as oil and gas.<sup>9</sup>

**10 Air emissions from production activities are carefully monitored, managed and reported.** Any emissions from oil and gas activity must remain within prescribed state and federal limits to ensure the health and safety of local communities. Natural gas is considered a clean burning fuel because of its comparatively low emissions of carbon dioxide, sulfur oxides, and nitrogen oxides. Industry has made considerable strides in reducing emissions through voluntary measures, and is working with the EPA to define New Source Performance Standards (NSPS) that will give rise to additional reductions by requiring measures like green completion techniques. Furthermore, the Mandatory Reporting Rule may help provide a more robust data set to use in evaluating the emissions from shale energy production.