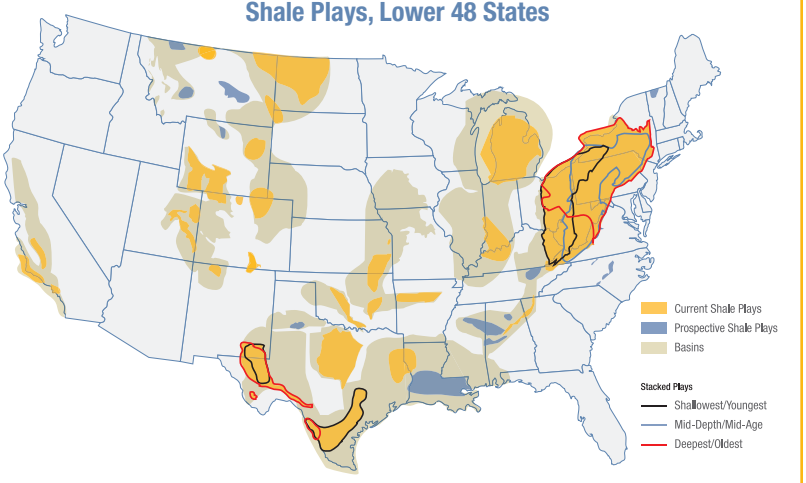
SHALE ANSWERS

EnergyFromShale.org

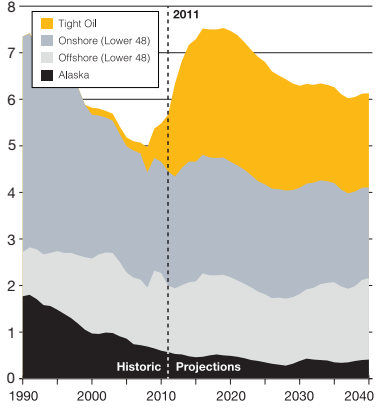
Natural gas and oil are trapped within shale formations.

Hydraulic fracturing enables the production of natural gas and oil from rock formations deep below the earth's surface.

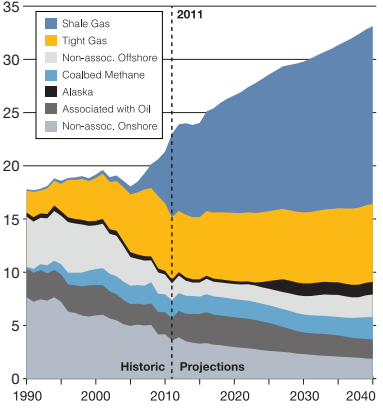


Source: EIA, based on data from various published studies. Update: May 9, 2011.

U.S. Crude Oil Production (Millions of Barrels per Day)



U.S. Dry Gas Production (Trillion Cubic Feet per Year)



Source: EIA, *Annual Energy Outlook 2013 Early Release*

Hydraulic fracturing currently accounts for 34 percent of our oil and 58 percent of our natural gas production.[1]

Hydraulic fracturing and horizontal drilling technology make it commercially viable to recover natural gas and oil. Without these advanced technologies, we would lose 45 percent of domestic natural gas production and 17 percent of our oil production within 5 years.[2]

[1] EIA, *Annual Energy Outlook 2013 Early Release*.

[2] IHS Global Insight, "Measuring the Economic and Energy Impacts of Proposals to Regulate Hydraulic Fracturing," 2009.

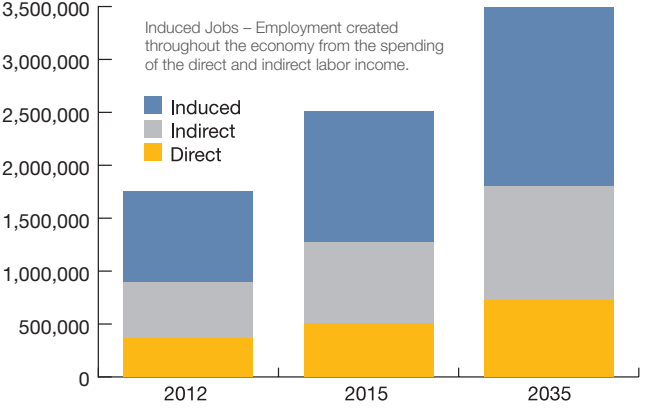
Shale energy development equals more jobs.

In 2012, unconventional oil and gas development (predominately shale) supported 1.7 million jobs.[3] The American Chemistry Council determined that a 25 percent increase in the supply of ethane (a liquid derived from shale gas) could add even more jobs, provide billions in federal, state, and local tax revenue, and spur billions in capital investment.[4]

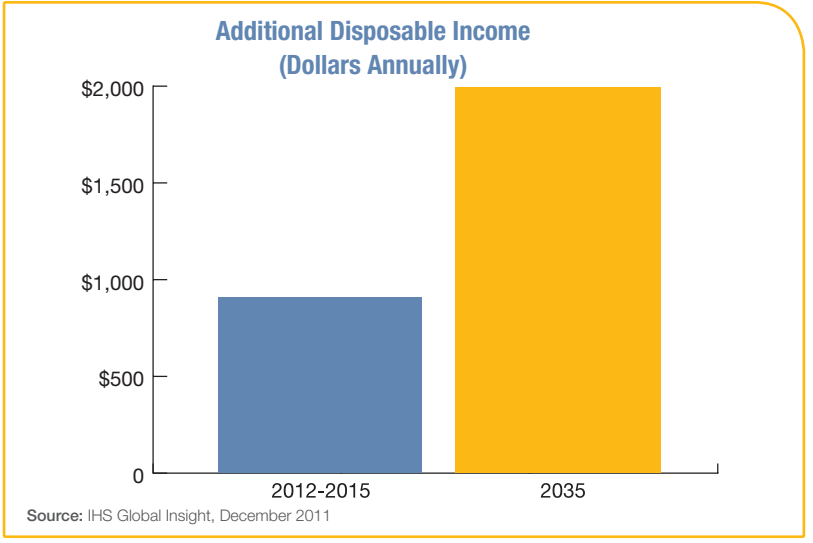
[3] IHS Global Insight, "The Economic and Employment Contributions of Shale Gas in the United States," December 2012.

[4] American Chemistry Council, "Shale Gas and New Petrochemicals Investment: Benefits for the Economy, Jobs, and U.S. Manufacturing," March 2011.

Unconventional Oil and Gas Employment Contribution (Number of Workers)



Source: IHS Global Insight, December 2012



Source: IHS Global Insight, December 2011

Development of shale energy equals lower household energy bills for consumers.

IHS Global Insight estimates that development of shale gas resources will add $926 of disposable household income annually between 2012 and 2015, and that amount could increase to $2,000 by 2035.[5]

[5] IHS Global Insight, "The Economic and Employment Contributions of Natural Gas in the United States," December 2011.

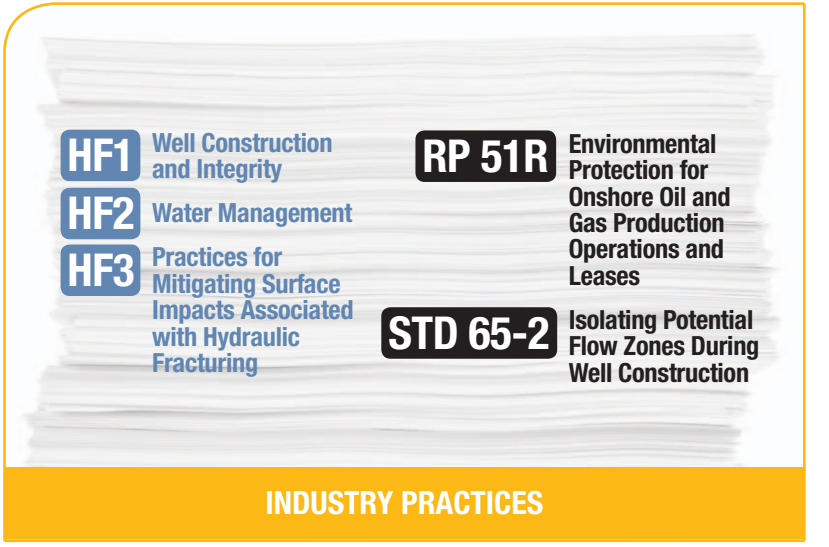
Comprehensive and robust regulations already exist for nearly every aspect of exploration and production, including hydraulic fracturing. Many other regulations address land use, safety, traffic and other potential impacts of shale energy development.

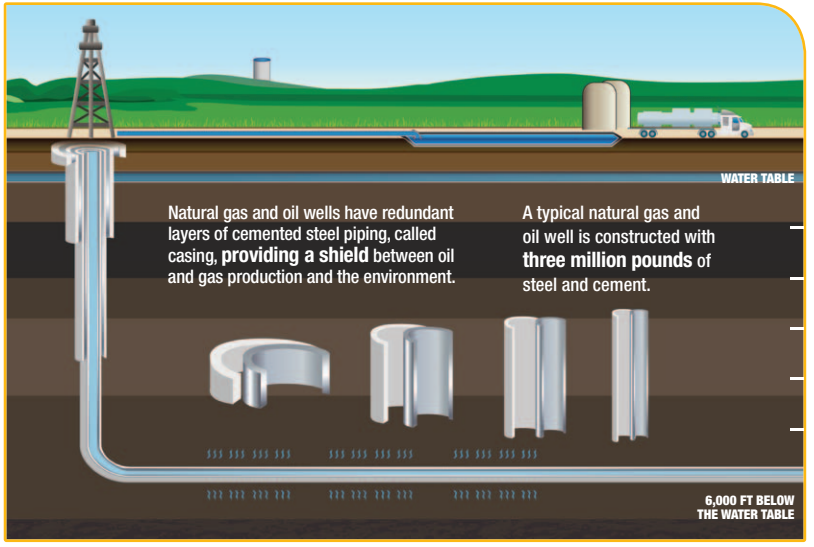
States have proven their ability to implement effective regulations.

States have a long and successful history of regulating oil and gas activities, and are best placed to tailor laws precisely for local geology and hydrology. State regulators continually review their regulations through collaborative efforts with industry and also with public-private partnerships like **FracFocus©**, the **State Review of Oil and Natural Gas Environmental Regulations** (STRONGER) and the **Groundwater Protection Council** (GWPC).

Working through API's ANSI-accredited standards program, the industry has adopted standards and practices for continuous improvement, hundreds of which are referenced in state regulations thousands of times.

Several federal agencies, including the **Environmental Protection Agency**, the **Bureau of Land Management**, and the **Occupational Safety and Health Administration**, also cite API standards.





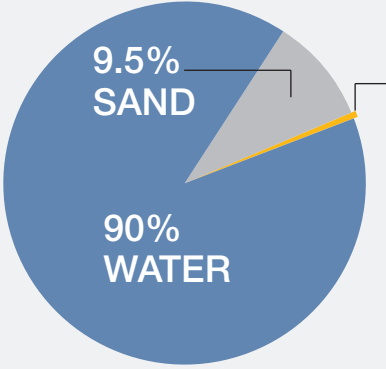
Proper well construction keeps groundwater safe.

Wells contain multiple layers of steel casing and cement to protect groundwater, and most are equipped with sensitive monitoring equipment and supervised by experienced, highly trained technicians.

The contents of fracturing fluids are disclosed.

The typical fracturing fluid is 90% water and 9.5% sand, with the rest being additives to aid well production. Through the efforts of the natural gas and oil industry to promote transparency, companies now voluntarily disclose the contents of fluids on **FracFocus.org**, run by the **Groundwater Protection Council**.

Volumetric Composition of a Fracture Fluid



.5%
ADDITIVES

- Acid .123%
- Friction Reducer .088%
- Surfactant .085%
- KCl .060%
- Gelling Agent .056%
- Scale Inhibitor .043%
- pH Adjusting Agent .011%
- Breaker .010%
- Crosslinker .007%
- Iron Control .004%
- Corrosion Inhibitor .002%
- Biocide .001%

For more information, visit www.energyfromshale.org

Source: DOE, *Modern Shale Gas Development in the United States: A Primer*, April 2009, page 62

Photo: Amy Emmert

Spill prevention, response, and clean-up procedures are implemented before drilling begins and are 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 any potential runoff.

Wastes from production activities are managed responsibly.

Along with natural gas and oil production, wells can also produce waste water. This waste water is collected at the surface and recycled for future use or carefully disposed of in compliance with the **Clean Water Act**, the **Safe Drinking Water Act** and appropriate state regulations.

Recycling of flowback water **reduces demand** for freshwater and reduces the need for disposal of waste water.

Source: "From Flowback to Fracturing: Water Recycling Grows in the Marcellus Shale", Journal of Petroleum Technology, July 2011.

Sophisticated monitoring: demonstrating photovoltaic solar panels transmitting well data.
Photo: Richard Ranger

Hydraulic fracturing does not cause earthquakes.

Seismologists and geologists across the country have determined that hydraulic fracturing does not produce vibrations of noticeable size, and there are no cases of injuries or damage as a result of the very low level of "seismicity" associated with fracturing.[6]

[6] "Is the Recent Increase in Felt Earthquakes in the Central US Natural or Manmade?," David J. Hayes, Deputy Secretary, U.S. Department of the Interior, http://www.doi.gov/news/doinews/Is-the-Recent-Increase-in-Felt-Earthquakes-in-the-Central-US-Natural-or-Manmade.cfm

Air emissions from production activities are carefully monitored, managed and reported.

Emissions from natural gas and oil activity must remain within prescribed limits, outlined by the **Clean Air Act** or state regulatory programs, to ensure the health and safety of local communities. Natural gas burns cleanly, with comparatively lower emissions of carbon dioxide, sulfur oxides and nitrogen oxides.

Photo: Richard Ranger

What can policymakers do?

- Increase access to natural gas and oil resources;
- Allow states to maintain the lead role in regulation;
- Improve and accelerate the leasing and permitting process; and
- Avoid punitive new taxes.

SHALE ENERGY IS THE ANSWER.

- **Creates jobs.**
- **Stimulates the economy.**
- **Provides a secure energy future for America.**

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Cover Photo: Richard Ranger

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