



SCIENCE, DEMOCRACY, AND FRACKING

**A Guide for Community Residents and Policy Makers
Facing Decisions over Hydraulic Fracturing**

Introduction

If you are an active citizen in a community facing decisions about fracking, this toolkit is for you. It provides practical advice and resources to help you identify the critical questions to ask and get the scientific information you need when weighing the prospects and risks of shale oil or shale gas development in your region.

Hydraulic fracturing—or “fracking”—involves drilling a well into shale formations deep underground and injecting millions of gallons of water under high pressure, along with chemicals and sand, to break open fissures in the rocks and release oil and natural gas. Recent advances in fracturing technology and other forms of “well stimulation” such as acidization, coupled with horizontal drilling (rather than conventional vertical drilling), have made it easier to reach previously inaccessible oil and natural gas reserves, leading to a rapid expansion in domestic oil and gas production.

The pace of growth is driving many communities to make decisions without access to comprehensive and reliable scientific information about the potential impacts of hydraulic fracturing on their local air and water quality, community health, safety, economy, environment, and overall quality of life.

To make sound decisions about fracking, we need independent science to play a strong role in informing our public dialogue. **This toolkit can improve decision making on fracking by helping you to:**



- Identify critical issues about the potential impacts of fracking in your area, and how to obtain answers to your questions



- Distinguish reliable information from misinformation or spin—and help your neighbors and local decision makers do the same



- Identify and communicate with scientists, journalists, policy makers, and community groups that should be part of the public discussion



- Identify and engage with the key actors in your community to influence oil and gas policy at the local and state level



Identifying the Critical Issues in Your Community

If oil or gas deposits have been found in or near your community and fracking operations are being considered or are ongoing, you are likely facing some difficult questions and active discussions on whether or how to proceed. Like most residents, you want to know about the risks and safety of hydraulic fracturing operations, consider any potential threats these operations might pose to your community, weigh the potential economic benefits and risks, and understand how to protect your community's health, safety, and quality of life.



A Brief Overview of Oil and Gas Operations and Commonly Used Terms



Throughout this toolkit, the term **unconventional oil and gas development** is used to encompass the many aspects of the shale oil and shale gas extraction process that can affect a community, including well development, production, wastewater disposal, distribution, and storage. **Hydraulic fracturing** is one step in this larger process, which begins after an operator acquires the legal right to explore and drill, usually through a lease from the owner of the subsurface oil and gas mineral rights (whether privately held or tribe- or government-owned).

After acquiring these rights, an operator will conduct tests to understand the site's geology, and build any necessary access roads and one or more **well pads**, which encompass the well site itself and space for aboveground drilling machinery and support activities such as water and wastewater storage. Some states allow **open containments** for wastewater—reservoirs that can be several acres in size—while others may require waste be kept in various types of containment vessels.

Drilling will then begin, which may be done vertically or horizontally. Unlike a vertical well, extending straight down to the oil or gas-bearing formation, a horizontal well extends down and laterally for several thousand feet. After drilling the hole (or **bore**), the operator will install a steel **casing** down the edge of the well and cement it in place to prevent leakage between the well and nearby water and land. Operators will often conduct additional tests at this stage to ensure the construction process has been successful.

At this point, the operator will hydraulically fracture (or **frack**) a well to extract fuel from shale. Once the well has been fracked, it can often produce oil or gas for years. Some wells may only be fracked once, while others may be repeatedly fracked over the course of their lifetime to increase productivity. When the well is no longer producing oil or gas economically, the operator will either **idle** it (in hopes of a future use) or abandon it (**plugging** it to prevent potential oil or gas leakage).

The complete process of hydraulic fracturing for oil and gas development, from exploration to production, can affect a community's well-being in numerous ways. Here are some critical areas to consider:

WATER QUANTITY AND QUALITY

Hydraulic fracturing can use vast amounts of water—as much as a few million gallons for a single well. This may place competing claims on water in regions with limited resources. While some water used for fracking can be recycled, the process consumes large quantities of water. For instance, a single well may require 3 million to 12 million gallons of water when it is first fracked.

In terms of water quality, oil and gas drilling can potentially contaminate drinking water supplies in several ways, most commonly from flaws in the well bore, methane migration, and wastewater. Chemicals, fuel, and drilling wastewater can spill or leak while they are being transported, while they are stored and handled during the operation itself, and when they are treated and disposed of after fracking. Leaks can also occur in producing wells or improperly plugged wells. Faulty well construction has also contaminated groundwater, and there is ongoing scientific debate about how hydraulic fracturing itself could contaminate groundwater.

Baseline testing and monitoring of groundwater, nearby surface waters, and private wells before, during, and after drilling are critical to determine whether chemicals or other pollutants from fracking operations are contaminating drinking water supplies, and to verify whether water used by municipal suppliers is contaminated.

CRITICAL QUESTIONS TO ASK:

- **Where are my drinking water and other water resources located in relation to oil and gas wells and reservoirs? Where could spills or contamination occur in my community? How might they affect my drinking water?**
- **How much water will a typical well in my region use, and where will it come from? Are our planners and local decision makers undertaking a trade-off analysis to see how fracking operations may affect water availability and competing demand for (and use of) this resource?**
- **How and where would drilling companies dispose of their wastewater, chemicals, or other potentially harmful materials?**
- **Is my public water treatment facility accepting fracking wastewater? Is it able to adequately treat the volume and quality of this wastewater?**
- **How could potential changes in drinking water quality or quantity affect the health of my community, especially among those most vulnerable (including children and those with illnesses)?**
- **What safeguards and emergency preparedness measures are in place to deal with potential spills or contamination?**



AIR QUALITY

Some research suggests that unconventional oil and gas development can affect air quality. Drilling may produce and increase emissions of methane, ozone, and hazardous air pollutants including benzene and xylene around the well site. Workers or others close to the site may be exposed to high levels of silica dust. Oil and gas drilling often involves high levels of truck traffic, which can increase diesel exhaust and soot (fine particulate) pollution near wells.

CRITICAL QUESTIONS TO ASK:

- **Could pollutants from oil and gas drilling, machinery, or increased trucking change air quality?**
- **Could these changes cause health problems in my community?**
- **Who is responsible for baseline testing and ongoing monitoring to understand any air quality changes, and how would local officials respond if the data reveal a problem?**
- **Who is responsible for community health assessments or studies that can determine whether fracking is adversely affecting public health?**

LAND USE AND ECOLOGY

Unconventional oil and gas development can have a major impact on the landscape of your community. For example, hydraulic fracturing requires a network of “feeder” pipelines that can degrade ecosystems or break up wildlife habitats. Construction of well pads and access roads may cause similar ecological disruptions. This could be especially troublesome in areas with higher levels of oil and gas development, or in areas with at-risk ecosystems and wildlife.

CRITICAL QUESTIONS TO ASK:

- What are the land use implications of oil and gas drilling in my community?
- What ecological resources and protected wildlife exist in and around my community?
- Would oil and gas drilling occur in or near these resources? If so, how is the industry planning to prevent or address the potential negative impacts?
- What measures are in place to protect our ecosystems and wildlife?



INFRASTRUCTURE

Increased truck traffic during well pad construction, hydraulic fracturing of wells, and fuel production can strain roads and bridges (especially if they were not built for industrial use) and interfere with local traffic.

CRITICAL QUESTIONS TO ASK:

- How many trucks can my community expect? How could that affect traffic conditions?
- Will new roads be needed? Where will they be located?
- What route would trucks take to and from the well pads, and would this affect schools and other sensitive areas?
- How would my community’s roads and bridges be affected?
- Is my local government considering options for managing these impacts, such as financially insuring or “bonding” the roads (i.e., requiring companies to sign road use agreements and assigning liability for infrastructure damages)?

EARTHQUAKE RISK

The process of hydraulic fracturing does not typically cause detectable earthquakes at the surface. However, deep-well injection of fracking wastewater has been linked to a handful of noticeable earthquakes in the United States.

CRITICAL QUESTIONS TO ASK:

- Will drillers dispose of their waste through deep-well injection? If so, where will those injection wells be?
- Would my region be prone to, or at a higher risk for, earthquakes resulting from deep-well injection (compared with existing levels of risk)?
- If disposal wells are located in or near my community, how will they be regulated?
- How is the oil and gas company planning to account for existing fault lines?



CLIMATE CHANGE

Methane can leak from a gas or oil well during and after drilling, although there is disagreement on how much leakage usually occurs. These emissions are explosive and can cause asphyxiation at high enough concentrations. Further, as a potent heat-trapping gas, methane can contribute to global warming. Methane leakage aside,

investment and reliance on fossil fuels such as oil and gas hampers the development of clean, renewable energy resources, further exacerbating climate change.

CRITICAL QUESTIONS TO ASK:

- **How can my community ensure that methane emissions from existing and abandoned gas or oil wells are properly measured?**
- **What kind of processes will oil and gas drillers use to minimize “fugitive” methane emissions so they do not contribute to global warming?**
- **Will operators be required to limit global warming emissions by capturing gas escaping from wells, or at least by burning (or “flaring”) it, rather than allowing its release into the atmosphere?**
- **How would oil and gas development in my region affect support for energy efficiency and renewable energy initiatives?**



SOCIAL AND ECONOMIC IMPACTS

Communities in which unconventional oil and gas development is under way typically experience an influx of oil and gas workers, higher traffic volume, and changing demands on public services, resources, and infrastructure. The negative impacts of these changes can include increased noise and light pollution, a drain on affordable housing, more traffic accidents, higher crime rates and violence against women, alcohol and drug abuse, and strains on emergency and social services. Yet oil and gas development can also boost local employment, businesses, and tax revenues.

Research suggests that communities that proactively address oil and gas development by creating opportunities for citizen engagement, strong local leadership, and clear communication and collaboration among local government, businesses, social service providers, environmental groups, oil and gas companies, schools, workforce development organizations, and others are much more successful at managing both the opportunities and the challenges from such activity.

CRITICAL QUESTIONS TO ASK:

- **Could the location of wells and access roads cause problems with noise, dust, and light pollution?**
- **How many oil and gas workers could move to my community? How could this affect our services (fire, police, ambulance, schools, and hospitals), and for how long?**
- **How might an influx of workers affect property and rental values, and the affordability and availability of housing?**
- **How many jobs could oil and gas development bring to local residents?**
- **How much revenue could these operations bring to my local and state governments, and how will these revenues be distributed? How will our taxes be affected?**
- **Will oil and gas development negatively affect local outdoor recreation and tourism, disrupt culturally significant locales, or damage scenic vistas?**
- **What other kinds of social changes could oil and gas drilling bring to my community? Could it have an impact on public and mental health?**
- **What measures are in place to ensure the health and safety of oil and gas workers, and to respond to work-related accidents or health emergencies?**
- **To what extent is there communication and collaboration across the community on this issue, including regular meetings? Where can residents learn about what is occurring, engage in local decisions, and make their voices heard?**

Critical Questions to Ask

1

QUESTION

How will fracking affect my health, and the health of my family? Will there be chemicals or other pollutants that could get into the drinking water or air?

ACTION

Contact your state's environmental and public health departments for data on air quality and to request water testing for fracking compounds. Contact your state's agricultural extension office for soil testing. Other sources for information on air and water quality include federal agencies such as the Centers for Disease Control and Prevention, Environmental Protection Agency, National Institutes of Health, and U.S. Geological Survey, and peer-reviewed articles from researchers.



2

QUESTION

How will fracking affect my community's land use and quality of life? What impacts will truck traffic or noise have on my and my family's daily activities?

ACTION

Identify where well pads, wastewater storage tanks, water treatment centers, and major pipelines will be located and who is charged with monitoring. Search for this information on Fractracker.org and check with your local land management agency. Search for studies of estimated traffic increases and road damage (for example, see the Greenplan report *Land Use Analysis* for possible layout of well pads).



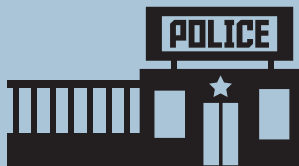
QUESTION

3

Does my community have adequate housing and emergency and social services to support all the new workers fracking will bring?

ACTION

Search for documents on preparedness for fire, police, and other emergency services, usually published by your local or county planning office or by your legislative committee on municipalities. For housing-related information, look to your state and local committees on housing. Check whether a community impact assessment has been conducted, which would estimate the impact that hydraulic fracturing development would have on these services in your area.



QUESTION

Where can I find out about the economic benefits and jobs that oil and gas development could bring to my community?

4

ACTION

Talk to elected officials and staff at your economic development agency. Look for studies of predicted economic impacts, revenue use, and income distribution by academic research institutions and local or state agencies such as the labor department or regional development offices.



5

QUESTION

How can residents of my community learn about what is occurring, engage in local decisions, and make our voices heard?

ACTION

Seek and share information through regular meetings with local government, workforce development agencies, school officials, businesses (including oil and gas companies), social service providers, and other nonprofit organizations. Early citizen engagement, strong local leadership, and clear communication and collaboration among these groups are crucial.





Assessing the Scientific Information

Scientific information about hydraulic fracturing technologies and impacts can be complex and uncertain. But even as this science evolves, there are still steps you can take to learn more about it from reliable, independent sources before your community makes important decisions on fracking in your region.

Tips for finding reliable information

- **Search smartly.** When searching for information online, use terms like “hydraulic fracturing” and “unconventional oil and gas development,” which will return technical and government resources that you may not find when using terms like “fracking” and “natural gas.”
- **Look for experts.** Reach out to scientists at nearby universities and state and federal government agencies. Since the impacts of drilling can vary by region, seek out local assessments and experts whenever possible. They may be able to help you find reliable sources, synthesize results, analyze the limitations of current research, and relate this information to your local needs.
- **Check for credentials and conflicts of interest.** Determine whether people being quoted have the knowledge and experience to speak authoritatively about the science. Determine whether these experts have ties to oil and gas companies, are consultants for companies or trade associations, or would directly benefit from drilling (for example, if they own property on which drilling would occur).
- **Get peer-reviewed publications when possible.** Rely on experts who contribute to and cite information from peer-reviewed journals—that is, research that has been examined by other experts—whenever possible. If someone discusses data from a report, try to find out whether the data were collected independently or self-reported by an oil or gas company.
- **Follow the money.** Seek out information on the organization’s funding and affiliations to help determine its independence. A data source with multiple affiliations (industry, government, nonprofits) may offer more comprehensive information on the topic.

Top Four Tips for Finding Reliable Information Online



- 1** When searching for information online, use terms like “hydraulic fracturing” and “unconventional oil and gas development,” which will return technical and government resources that you may not find when using terms like “fracking” and “natural gas.”
- 2** Combine “hydraulic fracturing” with the name of your state, municipality, or a federal or state agency (like “EPA” or “[your state] Department of Environmental Protection”). Include the current or previous year in your search terms to return the most up-to-date information.
- 3** Look beyond the first page of your search results for government and other trustworthy sources (since search engines like Google do not rank results based on accuracy and reliability).
- 4** Practice objectivity. Seek out and compare information from sources with diverse perspectives, including some with whom you may disagree.

Reliability Indicator

- Heavily weighted toward reliability **++**
- Some indication that the source is reliable **+**
- Needs further review **+/-**
- Raises some suspicions about unreliability **-**
- Heavily weighted toward unreliability **--**

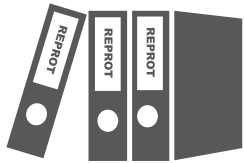
Checklist for Determining Reliable Information

News article or video



Cites or links to independent experts with relevant knowledge and/or to peer-reviewed science	++
Produced by an individual or organization that has a position on hydraulic fracturing (whether for or against)	+/-
Cites individuals without scientific or technical expertise as an authority on scientific questions	--
Presents diverse points of view fairly	+
Portrays individuals who have diverse perspectives with respect	+
Ignores or misstates information or arguments from an alternative perspective	-
Clearly distinguishes facts from opinions	+

Report or study



Authors are experts on the subject	++
Has been peer-reviewed	++
Individuals or entities with conflicts of interest contributed to the research or provided financial support	-
Authors disclosed their conflicts of interest and funding sources	+/-
Publisher has a preexisting policy or ideological position on the topic	+/-
Tone is strongly pro or con rather than objective	-
Describes potential positives and negatives in clear terms, cites and critiques conflicting findings	+

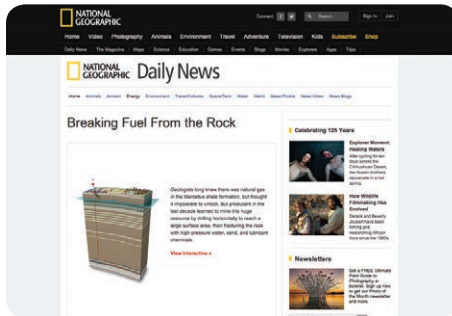
Other criteria to consider



Original sources of factual content are identified	+
Purpose is to provide general information, further scholarship, or offer a public service	++
Purpose is to persuade you of a particular point of view or advocate a policy	+/-
Mentions limitations or uncertainties in the science, or contrary evidence	++
Makes it easy to identify funding sources and ideological or policy positions	+

SUGGESTED RESOURCES TO JUMP-START YOUR SEARCH

Here is a sampling of good information on hydraulic fracturing and its impacts. For a more comprehensive list, see the Informational Resources Appendix at www.ucsusa.org/HFToolkit.



“Breaking Fuel from the Rock” (National Geographic)

<http://news.nationalgeographic.com/news/2010/10/101022-breaking-fuel-from-the-rock/>

Provides an interactive and easy-to-follow animation of each step in the horizontal drilling and hydraulic fracturing process, along with detailed information.



Natural Gas Extraction—Hydraulic Fracturing (Environmental Protection Agency)

<http://www2.epa.gov/hydraulicfracturing>

Overview of Environmental Protection Agency (EPA) studies and laws related to hydraulic fracturing, plus links to other sources that offer detailed information on shale gas and the fracking process.



FracTracker

<http://fractracker.org/>

Maps of well sites and community regulations, plus downloadable data on individual drill sites.

Critical Questions for Researchers to Ensure Credibility of Their Work



- Have you fully disclosed your funding sources, any in-kind contributions in support of your research, and any other potential conflicts?
- Do you or your co-researchers have any potential conflicts of interest that could influence (or be perceived as influencing) your results?
- In your writing and conclusions, are you staying close to your research findings, and not venturing into topics outside your expertise?
- In your publications, have you acknowledged, cited, and critiqued conflicting studies?



Navigating the Policy Process

Whether you are an informed citizen or a credentialed scientist, you can have a say in your community's policies and decisions on unconventional oil and gas development. To be most effective, you need to be aware of the typical stakeholders with whom you should engage, along with the primary regulatory approaches and policy solutions to consider.

IDENTIFYING KEY STAKEHOLDERS

Federal, state, tribal, and local stakeholders are often involved in creating, implementing, monitoring, and enforcing oil and gas policy. It's important to understand what powers and authorities they have, what their political and/or economic interests are, what other stakeholders influence their decisions, who their allies are, who their primary constituents are (e.g., industry, shareholders, the public), and who their opponents might be.



Most of the stakeholders listed in the table on p. 12 have websites with information on the best way to contact them on specific issues, but don't be afraid to call their general office number if you are unable to identify an appropriate department or individual. Your state representative or elected municipal official's staff may also help steer you toward the relevant stakeholders.

To build the most effective relationship with these stakeholders, engage with them during each phase of the discussions. Establish contact early in the process—before drilling decisions are made. If drilling proceeds, stay in touch throughout the development process and continue discussions after drilling is completed.



Here are some stakeholders who can influence decisions on hydraulic fracturing in your community:

Stakeholders	Roles	Typical Realm of Engagement*
Mineral rights lessors	Negotiate leases for access to land, influence political actors and regulatory agencies, organize landowners, gather and publicize information	Federal, state, tribal, and local
Oil and gas operators, contractors, service companies, and transmission companies	Develop roads and infrastructure; drill and operate wells; build/operate gathering lines, pipelines, and compressor stations; in some cases conduct community relations	National, state, tribal, and local
Residents near wells	Ask questions about the risks and impacts of fracking, organize community committees to seek information that will help inform decisions	Federal, state, tribal, and local
Oil and gas trade associations	Influence political actors, conduct community relations, communicate with companies about best practices and other issues	Federal and state
Community groups	Gather information, educate and organize residents, work with companies, pressure political actors and regulatory agencies	State and local
Environmental groups	Influence political actors and companies, gather and publicize information, organize local residents	Federal, state, and local
County, city, and town elected officials and their staffs	Represent constituents' concerns, pass local regulations in some cases, negotiate with well operators and transmission companies, pressure other political actors, coordinate policy development with officials from nearby towns	State, tribal, and local
Public and environmental health officials (e.g., state and local departments of health, environmental protection, ecosystems management)	Help individuals and communities understand health and environmental impacts	Federal, state, tribal, and local
Legislative committees on energy extraction, environmental affairs, budgeting, and public works	Hold hearings, request reports, draft and pass legislation	Federal and state
Oil and gas and environmental regulators	Pass new regulations and enforce existing regulations for operations, pipelines, and transmission; conduct ongoing air/water quality monitoring; provide public information	Federal and state
Scientists and researchers	Gather and disseminate technical information	Federal, national, state, and local

*Remember that working at one level often influences what happens at another level.

POSSIBLE REGULATORY RESPONSES

After considering the critical questions and identifying key stakeholders, you may want to explore different types of policies that could be discussed during your town or state's decision-making process. The federal government regulates many aspects of oil and gas development on public lands, but states and tribes play a critical role in proper enforcement of laws and management of drilling activities.

Major federal regulations

Many existing federal laws could effectively govern activities associated with hydraulic fracturing. However, several of these laws currently include loopholes that exempt the oil and gas industry from comprehensive regulation. While such laws provide the grounds for studying the health and environmental impacts of unconventional oil and gas development, and for appropriate governance and monitoring, improvements are needed to ensure these laws will be effective.

Safe Drinking Water Act. Potentially gives the EPA the authority to regulate much of the hydraulic fracturing process related to groundwater quality. *Exemption: The Energy Policy Act of 2005 exempted hydraulic fracturing unless the fracking fluid contains diesel fuel.*

Clean Air Act. Gives the EPA the authority to limit air pollution from hydraulic fracturing operations. *Exemption: Pollution from groups of oil and gas wells cannot be aggregated for the purpose of determining regulatory standards.*

Clean Water Act. Gives the EPA the authority to regulate impacts of hydraulic fracturing on surface waters and prevents the dumping of certain wastes into surface waters. *Exemption: Fracking wastewater is not considered to be a pollutant if the waste is managed by the state and therefore a federal permit is not needed for disposal.*

Emergency Planning and Community Right-to-Know Act. Requires well operators to keep a record on-site of all hazardous chemicals used. *Exemption: The EPA decided that oil and gas exploration is not one of the sectors covered.*

Resource Conservation and Recovery Act. Gives the EPA the authority to regulate hazardous waste and non-hazardous solid waste. *Exemption: Wastes from oil and gas fields are exempt because of the costs of compliance and the existence of similar regulations in some states.*

Local and state regulations

What counties, cities, and towns can do about hydraulic fracturing depends on the degree of authority granted to them by the state. Here are some examples of the kinds of decisions undertaken at the state and local level.

Local regulations include:

- Bans
- Insurance and bonding requirements
- Land use ordinances (setback requirements, noise and dust mitigation, conditional or special-use permits, time-of-day limitations, aquifer and ecosystem protection overlays)
- Moratoria
- Monitoring and sampling
- Negotiated agreements
- Notice to nearby residents
- Road use agreements
- Taxes, fees, special assessments, and differential utility pricing
- Technical advisor funds
- Zoning laws

State regulations include:

- Air and water quality monitoring
- Air pollution controls
- Chemical disclosure requirements
- Environmental/ecosystem protections
- Insurance, bonding, and liability requirements
- Operational safety requirements
- Permitting and setback requirements
- Pipeline development requirements
- Plugging of abandoned wells
- Taxes and fees
- Venting and flaring regulations
- Wastewater transportation, storage, and disposal requirements
- Water acquisition and use controls
- Well integrity requirements

How Some Communities Have Taken Action on Fracking



Longmont, Colorado

In November 2012, amid concerns that areas leased for drilling were too close to a school, parks, recreational areas, and the city's reservoir, Longmont residents **passed a resolution** (supported by 60 percent of voters) to amend their city charter to prohibit hydraulic fracturing and the storage of related waste within city limits. Community **organizers led "fracking tours"** for citizens and public officials to nearby regions where hydraulic fracturing was occurring to give them a firsthand glimpse of the effects, and then to sites in Longmont that had been leased for drilling or could be in the future. The conflict between local and state authorities over oil and gas development is still being played out in the Colorado district court system.

Illinois

The state legislature, with **input from environmental groups, citizens groups, and industry**, voted overwhelmingly in 2013 to **adopt comprehensive regulations** for hydraulic fracturing operations. Operators must disclose how and where wells will be drilled, notify property owners within 1,500 feet of proposed wells, and allow for a 30-day public comment period after the state's Department of Natural Resources receives a drilling application. The new law does not permit individual counties to ban fracking.



Culver City, California

Located in Los Angeles County and bordering the Inglewood Oil Field, Culver City is the largest urban area in the United States confronting hydraulic fracturing. In 2012, residents organized in support of a **state moratorium**, and the city council unanimously **passed a resolution** urging the governor and state regulators to ban fracking until policies protecting public health, safety, and the environment can be put into place. Residents have also taken steps to **promote public education and engage with experts**. In 2013, a local citizens' group **organized a public event** called "Fracking—the L.A. Story: A Seminar on Hydraulic Fracturing and the Democratic Process."





Advancing an Informed Public Discussion

You can voice your concerns, questions, and opinions to policy makers via in-person meetings, phone calls, and letters, or at public hearings, town hall meetings, municipal votes or resolutions, town planning and zoning board meetings, rulemaking comment periods, and project reviews.

The following resources can help you determine the best time and place to engage and voice your concerns:

- Local newspapers, which often have public notices issued by your local government
- State legislatures, which are usually required to post the dates and times of public hearings and comment periods online
- Your municipality's website, which may have a schedule of upcoming hearings and votes

Check out our guide to the federal legislative process at <http://www.ucsusa.org/action/the-us-legislative-process.html> to identify where fracking decisions could be publicly discussed and made. The milestones of initial bill introduction, amendment or comment period, and signing by an executive are generally applicable to state government.

TAP INTO YOUR COMMUNITY'S RESOURCES

Local scientists and experts. Researchers, scientists, and engineers at local or nearby colleges and universities who are studying hydraulic fracturing and its impacts can discuss research findings with you, help identify reliable information, direct you to other organizations and resources, and even collaborate on specific actions. Local community health organizations, hospitals, or public health commissions can also be good sources of information.

Community groups. By joining a group already active in your community, you can immediately get involved in public discussions, share information, experiences, and resources, and engage with active and concerned residents. A simple Internet search for local environmental, health, or community organizations will likely give you a good starting point, but be mindful that such groups might have pre-existing positions or biases on the issue.

If you want to form your own local group focused specifically on fracking, it would still be helpful to reach out to these other organizations. Consider holding meetings and public discussions in a library, community center, house of worship, or local branch of a community service organization.

Local media sources. Connecting with the local media to raise awareness is a vital aspect of moving the discussion on fracking forward. The Union of Concerned Scientists Activist Resource Center at <http://www.ucsusa.org/action/activist-resource-center.html> provides tips on numerous activities including how to write an effective letter to the editor and how to raise issues at public meetings. Check local television station, newspaper, and radio websites for information on how to contact reporters, submit editorials or notices for publication or broadcast, or get a story or event covered.



Engagement strategies for communities facing oil or gas development

General strategies:

- **Make sure policy makers know your questions and concerns.** Identify venues for public discussion—interviews with the local media, community/town hall meetings, call-in days, meetings with elected officials—and have your say.
- **Demand adequate monitoring.** Encourage your region’s air and water quality monitoring agency (typically the state environmental department) to review its data for changes in air quality—especially ozone, to test water samples for common fracking compounds, and to monitor and disclose any spills or accidents by oil and gas companies. Ask your elected officials and regulatory agencies to require companies to fully disclose the chemicals they are using in hydraulic fracturing operations (to understand the effects hydraulic fracturing may have on air and water in your region).
- **Collaborate and communicate.** Urge your local government, business community, social service providers, workforce development organizations, environmental groups, and other nonprofits to meet regularly and share what each is experiencing and doing. This will help your community identify and respond quickly and comprehensively to challenges and opportunities.



For communities considering the possibility of wells:

- **Demand baseline studies.** Urge your local and state governments to conduct stronger studies—by independent, certified firms—of the area’s air and water quality and environmental resources before a well is drilled. This will enable researchers to better study hydraulic fracturing impacts and help hold those responsible for any resulting pollution, harm, or damage accountable. Consider whether and how local groups can press for these kinds of studies.
- **Ask for impact assessment studies.** A “cumulative effects” analysis, conducted prior to any exploration or production activities, will describe how oil and gas development could affect the health, safety, economy, and environment of your community.
- **Don’t forget the landowners.** Landowners may be in the unique position to protect public health and the environment by controlling whether or not drilling takes place on their land.

For communities with existing or expanding wells:

- **Use enforcement when needed.** Stay informed about enforcement actions taken by government agencies against oil and gas companies, and don’t hesitate to report suspicious activity or wrongdoing. These agencies include the federal or state environmental protection agency and your state’s oil and gas commissions. If you are concerned about a recent spill, consider contacting your state agricultural extension office for free soil testing and your state public health agency for water testing.
- **Influence operations in your area.** Through contract agreements, city/town zoning ordinances, and local regulations or resolutions, you may be able to get oil and gas operators to change some of their operations strategies, like their hours or seasons of operation, their water source, or their traffic routes.

For communities with abandoned wells:

- **Ask for inspections.** Operators who have recently plugged a well may be required to monitor water quality near the well. Contact your state’s environmental department to obtain these data.
- **Monitor improperly plugged wells.** Particularly old or troublesome wells may not have been properly plugged, allowing substances to leak. If you suspect or notice leakage from an old well, contact your state’s oil and gas regulatory board. It may require the former operator to plug the well properly, or it may have a program in place to do so.

MOVING THE DISCUSSION AS A SCIENTIST OR TECHNICAL EXPERT

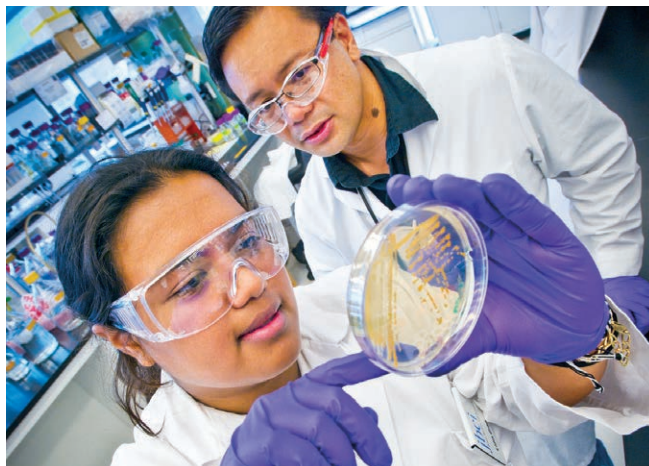
If you have scientific or technical expertise on unconventional oil and gas development, you can be an invaluable resource to local organizations, media outlets, policy makers, and your fellow citizens. Your perspective can help promote a more informed public dialogue and better decisions.

There are many ways to share your knowledge. You can “translate” and/or summarize the results of your own research into a readable and accessible format for non-experts. You can write op-eds for local newspapers, host “teach-ins” for local residents, tweet or write a blog, or engage with local and state politicians and their staffs. Before you do, it will help to be properly prepared.

- **Answer the following questions:** What is it about my research, technical understanding, or scientific perspective on this topic that relates to people’s daily lives, and how can I help them understand the issues better? Which aspects of my work will resonate with which audiences (businesses, city officials, specific demographic groups, etc.)?
- **As you prepare your comments or materials, avoid jargon;** include a clear and concise main message; provide memorable quotes that either contain vivid images, show how you feel about your work, or put your results into perspective (e.g., “For the first time ever, we found evidence that . . .”); and steer clear of speculation—be clear about what you don’t know.
- To make the most of your interactions with the media and policy makers—including tips on how to get a meeting and how to become a scientific resource and authority—**check out our *Scientist’s Guide to Talking with the Media*** at www.ucsusa.org/ScientistsGuide and the numerous other resources at www.ucsusa.org/scientiststipsandtools.
- Consider shaping your research agenda by **reaching out to citizens** who can help you understand your community’s biggest concerns.
- To help citizens concerned about the impacts of hydraulic fracturing but unsure of where to look for answers, **create a list of resources** (individuals, organizations, publications) you know to be reputable sources of information.

Fracking is a controversial issue. You may face criticism, questions about your expertise, or even personal attacks from individuals who do not like your research results, conclusions, or recommendations. In anticipation of such circumstances:

- **Be prepared to answer difficult or off-topic questions.** Sometimes a few pre-determined words can help steer the conversation back to your main message (e.g., “I see where you’re going with that question, but what’s really important here is . . .” or “That’s not my particular field of research, but what I can tell you is . . .”)
- **Be clear about, and stay true to, your expertise and main message.**
- **Refer to our guide *Science in an Age of Scrutiny*** at www.ucsusa.org/scientistsunderscrutiny for details on these and other strategies.



Go to www.ucsusa.org/sciencenetwork for more resources specifically for scientists and experts.

Citizens and Scientists Shape Decisions about Fracking in Their Communities

Mora County, New Mexico

In April 2013, this rural ranching county became the first in the nation to pass a local ordinance banning the extraction of oil and gas. The ban was part of a **bill-of-rights ordinance** entitling citizens to clean air and water, a healthy environment, and self-governance. Residents voiced their concern over fracking in public meetings, and with elected county commissioners who would protect their interests. The commissioners in turn **sought out experts to help** them craft the ordinance.



Dryden, New York

When residents first learned and became concerned about the environmental and community impacts of hydraulic fracturing in 2009, Town Supervisor Mary Anne Summer began working with the **Tompkins County Council of Governments (TCCOG)** to better understand the potential effects of fracking on traffic, emergency response, the workforce, housing prices, and water quality. Citizens **attended educational meetings** hosted by the TCCOG, **talked with scientists** at nearby Cornell University, and **formed the Dryden Resource Awareness Coalition (DRAC)**. Armed with this knowledge, Dryden's residents **amended the town's zoning laws** to ban drilling.

Erie, Colorado

In 2011, this town already had more than 300 wells—and more than 18,000 in the county as a whole—but residents became concerned when they discovered plans for new wells less than 1,000 feet from an elementary school. A group of mothers formed Erie Rising to consider the risks, and one member **consulted with a NOAA chemist** who found elevated levels of ethane and propane in the air. Eventually, the town prohibited fracking in residential areas, then followed that with a town-wide moratorium. After the Colorado State Oil and Gas Conservation Commission expressed concern, residents successfully **negotiated an agreement** in which companies accepted the town's terms on banning the use of diesel, reducing truck traffic, and preventing spills of fracking fluids in exchange for ending the moratorium.



The Center for Science and Democracy at the Union of Concerned Scientists hopes you find this toolkit provides you with the practical advice, resources, and information you need to help your community weigh the prospects and risks of hydraulic fracturing and make informed decisions.

Available online resources

This toolkit, its appendices, and source materials are available online at www.ucsusa.org/HFtoolkit.

More information on many topics covered in this toolkit can be found in an accompanying UCS report; go to www.ucsusa.org/HFreport.



This toolkit was written by Danielle Fox, Jessie Agatstein, Deborah Bailin, Stephen Rabent, and Pallavi Phartiyal.
Design: Penny Michalak

The information contained in this report is the sole responsibility of the authors, and does not necessarily reflect the opinions of the individuals who reviewed and commented on it.

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The Center for Science and Democracy at the Union of Concerned Scientists

The Center for Science and Democracy works to strengthen American democracy by advancing the essential role of science, evidence-based decision making, and constructive debate as a means to improve the health, security, and prosperity of all people.

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The Union of Concerned Scientists puts rigorous, independent science to work to solve our planet’s most pressing problems. Joining with citizens across the country, we combine technical analysis and effective advocacy to create innovative, practical solutions for a healthy, safe, and sustainable future.

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How will fracking affect my family and my health?

Will there be chemicals or other pollutants that could get into the drinking water or air?

How will fracking affect my community's land use and quality of life?

What impacts will truck traffic or noise have on my and my family's daily activities?

SCIENCE, DEMOCRACY, AND FRACKING

A Guide for Community Residents and Policy Makers
Facing Decisions over Hydraulic Fracturing

Photo: © BLS

With your help we can promote evidence-based decision making, combat efforts to silence or misconstrue science in public discussions, and equip scientists, analysts, and policy makers with the resources they need to develop science-based solutions to our common problems.

Union of
Concerned
Scientists

National Headquarters
Two Brattle Square
Cambridge, MA 02138-3780
Phone: (617) 547-5552
Fax: (617) 864-9405

Washington, DC, Office
1825 K St. NW, Suite 800
Washington, DC 20006-1232
Phone: (202) 223-6133
Fax: (202) 223-6162

West Coast Office
2397 Shattuck Ave., Ste. 203
Berkeley, CA 94704-1567
Phone: (510) 843-1872
Fax: (510) 843-3785

Midwest Office
One N. LaSalle St., Ste. 1904
Chicago, IL 60602-4064
Phone: (312) 578-1750
Fax: (312) 578-1751