



**What's Your Energy Future?  
Get Informed to Renew West Virginia!**

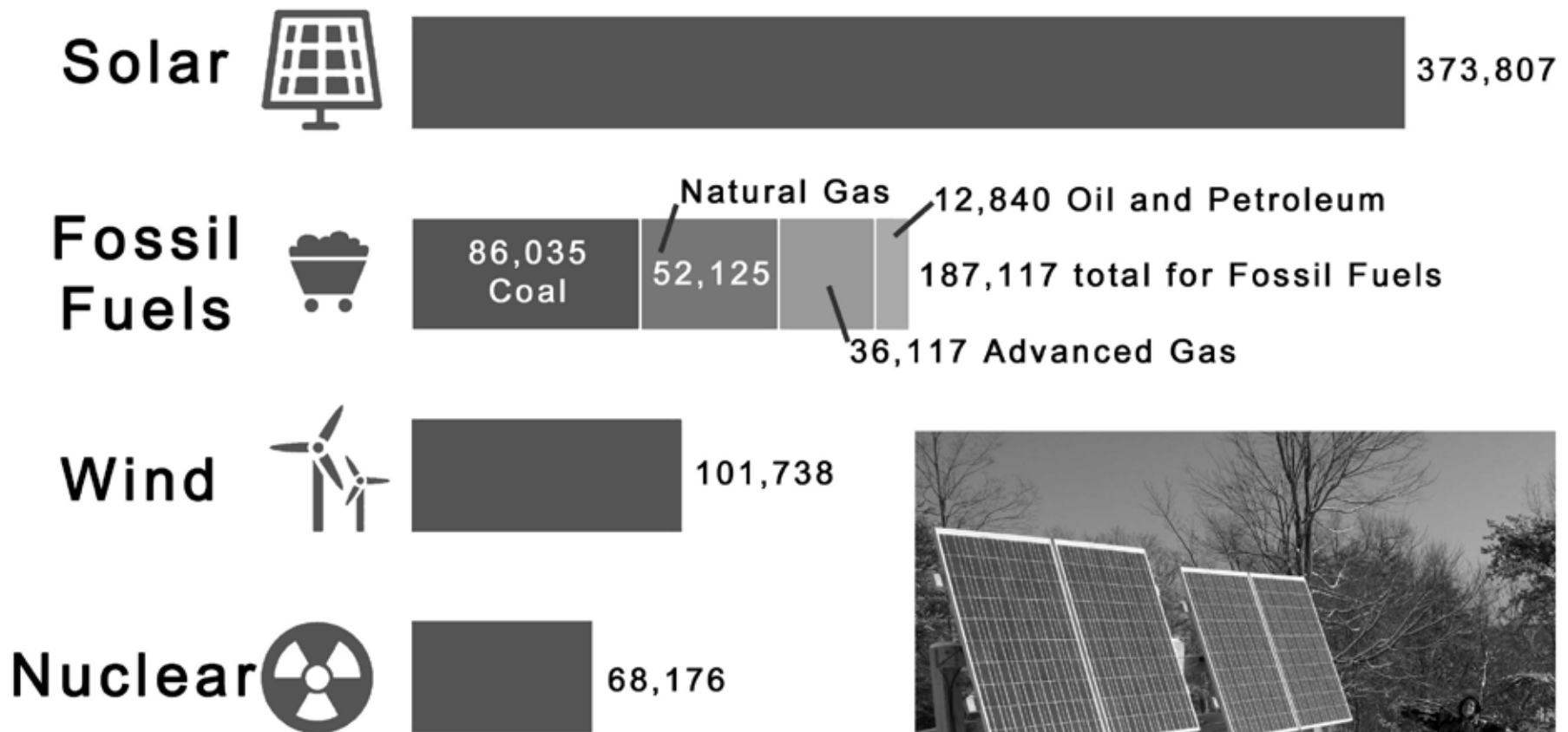


**Fracking Here? Pipelines Under the Ohio River?  
Big Trucks Clogging Our Roads? Or Solar?**



## Solar Employs More Workers Than Fossil Fuel And Nuclear Combined

Employment in energy generation by source in the U.S. in 2016



Source: U.S. Department of Energy



**Human Health Impacts of Fracking-Related Activities: Page 11.**  
**Citizen Wins on Surveying, Pipelines, and Eminent Domain: See pages 20-21.**  
**Want to Get Straight to the Good Renewable Energy News? Go to page 22.**

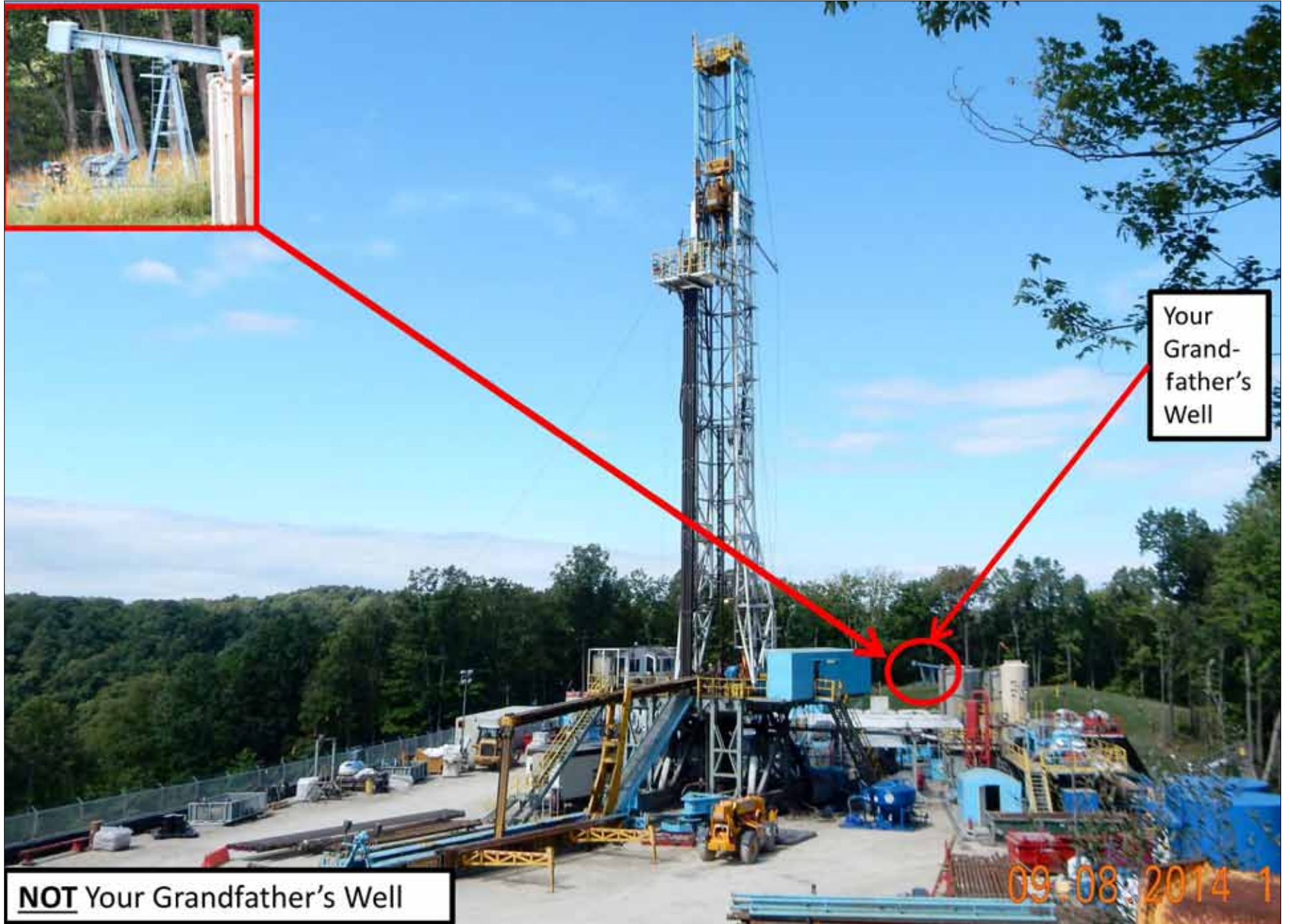


[www.ohvec.org](http://www.ohvec.org)

Renew WV is a publication of  
OVEC - Ohio Valley Environmental Coalition  
PO Box 6753  
Huntington, WV 25773-6753  
phone: 304-522-0246  
e-mail: [renew@ohvec.org](mailto:renew@ohvec.org)

When you are finished with this publication, please pass it along.  
Want to learn more, or host a meeting on these issues in your neighborhood? Contact us!

# Not Your Grandfather's Oil and Gas Industry



In the western half of West Virginia, we are used to the oil and gas industry. Communities and the industry have long existed side by side, as drillers have produced oil and gas in some of the shallower geological layers that lie beneath our state. Some of us earn our livelihood within this conventional oil and gas industry.

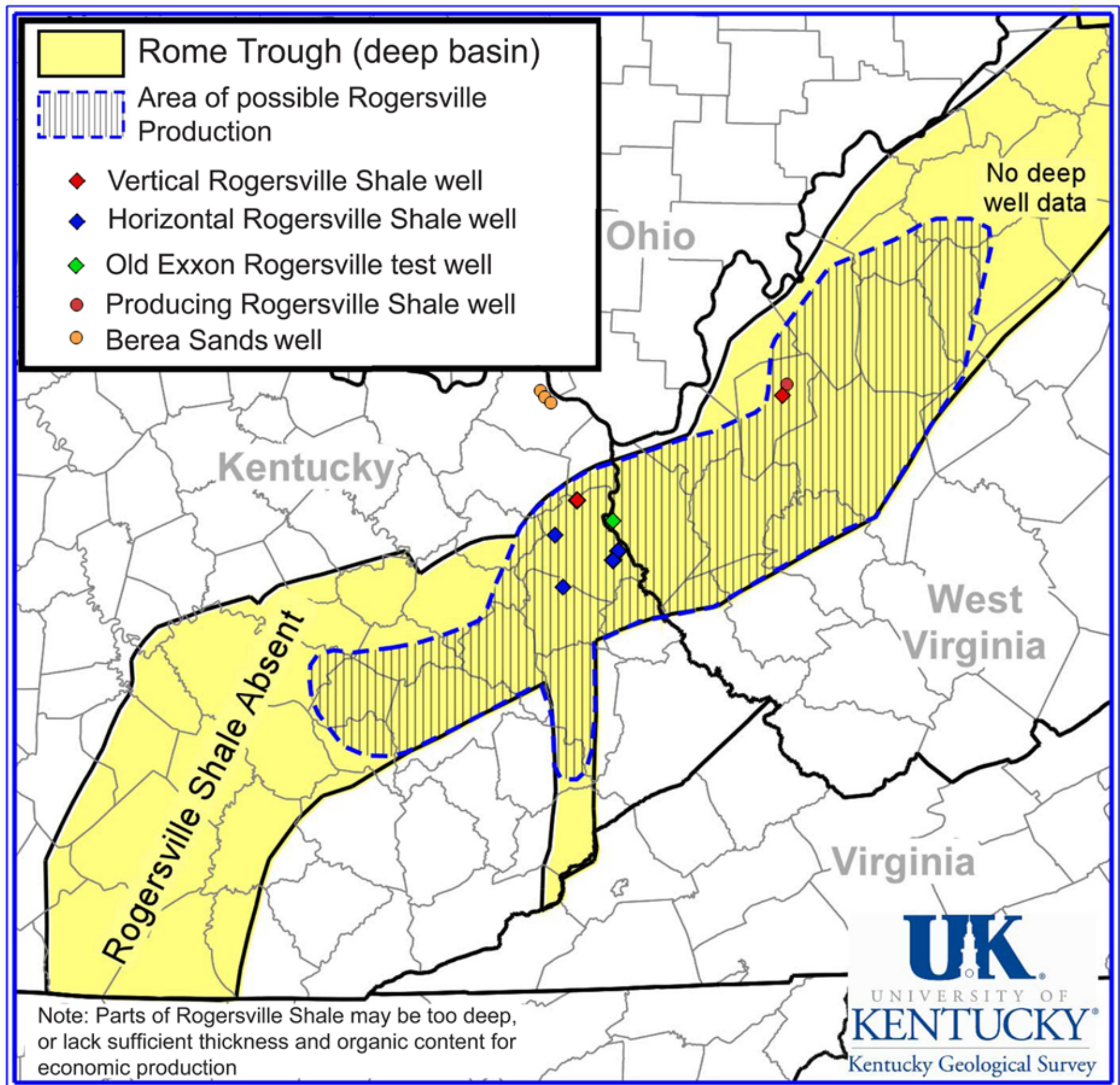
But, for about the last decade, our neighbors in north-central West Virginia have witnessed the rise of unconventional oil and gas drilling and related activities. With these activities, called hydraulic fracturing processes, companies seek the oil and gas locked in deep layers of shale below us. Because that is a mouthful, people commonly call what is going on “fracking.”

With oil and gas prices on the rise, our region faces a potential rush for the oil and gas in the extremely deep Rogersville Shale. In pursuit of more profits, despite increased risks, companies have recently developed cheaper ways to produce fracked oil and gas. We face a push for large-scale, high-pressure pipelines to transport the oil and gas to market, including export markets.

Development of the Rogersville Shale and the pipelines and compressor stations would dramatically change our area. To learn what this oil and gas rush would mean for our communities, we look to our northern neighbors. Explore these pages to learn more about what our region faces, about fracking-related activities, and about cleaner, healthier alternatives.



# What Lies Beneath Your Feet?



OVEC added the Wayne County, WV, Exxon 1970's test well to UK's map, above. In addition to the wells shown here, there are also three horizontal wells permitted in Eastern KY. See page 6 for more details on several Rogersville Shale wells.

You can help OVEC, the publishers of this newspaper, monitor what's happening with the development of Rogersville Shale. Is activity going on in your area? Have you been approached by land men seeking your mineral rights or access to your property for pipelines? Contact us at [renew@ohvec.org](mailto:renew@ohvec.org) or 304-522-0246.

# The Rogersville Shale

During the 1970s, Exxon drilled an oil and gas test well into the deep Rogersville Shale layer beneath Wayne County, WV.

In 2014, the Kentucky Geological Service evaluated these Wayne County test samples. and reported that a “viable petroleum system exists in the Rogersville.”

The report also showed the presence of natural gas (methane) and natural gas liquids.

The report spurred an oil and gas company leasing boom.

At least 19 companies hoping to profit from fracking the Rogersville Shale have leased land in Kentucky and West Virginia. In southwestern West Virginia, Cabot Oil & Gas alone has leased close to a million acres.

In Eastern Kentucky, during an 18-month period ending in June of 2015, oil and gas companies bought more than 4,000 deep leases in three Kentucky counties, including Lawrence County, KY, which is adjacent to Wayne County, WV.

If the Rogersville Shale is extensively developed, the Huntington/Wayne County area, as well as portions of Putnam County, could be harmed by unusually deep fracking, with much of the oil and gas apparently slated to go overseas.

## Marathon Petroleum Plans to Develop the Rogersville Shale

Marathon Petroleum operates a large oil refinery at Catlettsburg, Kentucky, on the border with West Virginia near Huntington. In 2016, Marathon Petroleum bought

**If the Rogersville Shale is extensively developed, the Huntington/Wayne County area could be harmed by unprecedented deep fracking, with much of the oil and gas apparently slated for export overseas.**

MarkWest, a pipeline and fracking services company. We found an online report indicating that Marathon and MarkWest have budgeted **\$1 billion** to develop infrastructure for the Rogersville Shale.

So far, we have no indication of when Marathon plans to begin this work.

to investors indicated that Marathon is well positioned to “capture export possibilities” and that Marathon’s refineries are in “advantaged regions.”

Deep drilling and some fracking has already taken place in the Rogersville Shale.

A 2016 online resource from the

Kentucky Geological Service provides a great deal of information about the Rogersville Shale. (See [bit.ly/2iXC2pL](http://bit.ly/2iXC2pL))

The authors seem to believe that more fracking development of the Rogersville is going to happen once oil and/or fracked gas prices rise. These prices are rising now.

This report says that Kentucky regulators already have seismic monitors located near Rogersville oil and gas wells,

so they have information on earthquake-related activity before large-scale fracking is underway.

Also in eastern Kentucky, groundwater is being tested from private drinking water wells near current Rogersville Shale oil and gas wells. Regulators want to know what the water quality is like before more Rogersville development happens. For more on water and fracking, see page 27.

Above: If oil and gas companies increase drilling in the Rogersville Shale, our area will face the kind of onslaught seen here, at a Marcellus Shale well pad in northern WV.



In an online report from 2015, Marathon’s CEO told employees, “The Rogersville Shale happens to sit right underneath the Catlettsburg refinery. So just think about the synergy long-term to get those liquids and, we think, condensate. Unlike Utica and Marcellus Shales that are in maybe the 5- to 7-thousand-foot level, this is 12 to 14 thousand feet that you’re going to go down with horizontal wells. Much more expensive to build and develop, but the Rogersville sits right underneath the Catlettsburg refinery. So we think [that’s] a lot of opportunity down the road.”

A January 2016 Marathon presentation



# PA Complaints Over Fracking Staggering

On January 31, 2017, *State Impact* Pennsylvania reporters Jon Hurdle and Susan Phillips ran an article titled, "Data trove offers new details on complaints to PA DEP during shale boom." They noted:

*Pennsylvania's Department of Environmental Protection received 9,442 public complaints about environmental problems in areas where unconventional gas development occurred from 2004 to the end of November 2016.*

*4,108 of the complaints were prompted by water-quality problems, while others were driven by concerns including air-quality, spills of drilling materials, property damage, and leaking gas.*

*The data show that complaints rose as gas activity across the state increased.*

That same day, in *Nation of Change*, Laurel Peltier's article, "9,442 citizen-reported fracking complaints reveal 12 years of suppressed data," noted:

**1. The volume of citizen complaints is alarming, shocking even.** For every fracking well drilled, one homeowner, business, or gas operator called in an issue.

**2. Water-well complaints make up 44 percent of DEP complaints.**

**3. Water contamination is indeed widespread and systemic:** Total complaints and water complaints are scattered throughout Pennsylvania's fracking fields and aren't concentrated in one area.

**4. Complaint ratios worsen over time:** As fracking grew in Pennsylvania, gas operators should have reduced the negative impacts to land, air, and water over time. This data suggests that as fracking continues, complaint ratios increase.

As older conventional drilling was replaced by fracking in 2010, the ratio of complaints to wells drilled grew at an increasing rate. Fracking is different and worse than conventional drilling.



## Known Existing Rogersville Wells (as of April 2016)

*Some of the wells have been drilled but shut in (temporarily closed) due to low prices; prices are rising now. All of the modern wells are permitted to 14,000 or 15,000 feet deep, **almost three MILES deep.***

### West Virginia, Wayne County:

Exxon test well near Pritchard, WV, drilled in the 1970s. Recently analyzed results from this test well generated the current interest in the Rogersville.

### West Virginia, Putnam County:

Cabot Oil & Gas vertical well, permitted to 14,000 feet, has already produced dry gas (methane). The Hardrock Exploration #1 well is also permitted.

### Kentucky, Lawrence County:

(Adjacent to Wayne County, WV) Chesapeake Energy has two vertical oil and gas wells permitted. One, the Northrup well, is also permitted for a 5,200-foot horizontal well. Cimirex's Bruin Young well is already fracked; its Walbridge test well is permitted.

### Kentucky, Johnson County:

Horizontal Tech. Energy (EQT) has one horizontal well.

In addition, possibly in other counties, permits have been granted for at least three more Kentucky horizontal wells.



## Fracking Earthquakes

Much fracking waste is injected deep underground to "dispose" of it. Evidence strongly links such deep injection of fracking wastes with increased earthquakes. Some newer evidence shows that the fracking process itself could stimulate earthquakes.

A January 2015 article in the *Bulletin of the Seismological Society of America* found that, "A hydraulic fracturing, or fracking, well in Ohio triggered scores of small earthquakes in March 2014, including one large enough to be felt in nearby towns, a new study confirms... State officials shut down the well two days after the earthquake hit... Fracking triggered earthquakes on a hidden fault in ancient crystalline rock beneath a fracked gas well in the Utica Shale."

The article adds, "No earthquakes were ever recorded in this region of Ohio before fracking started, and the shaking stopped after the well was shut down."

Closer to home, maps of the Huntington area's portion of the Ohio River valley show many geological faults. In fact, **the Rogersville test well in Wayne County has a "basement fault" running directly on either side of it!**

Some people fear that fracking near faults alongside the Ohio River could result in damages to the river, the source of drinking water for millions of people.

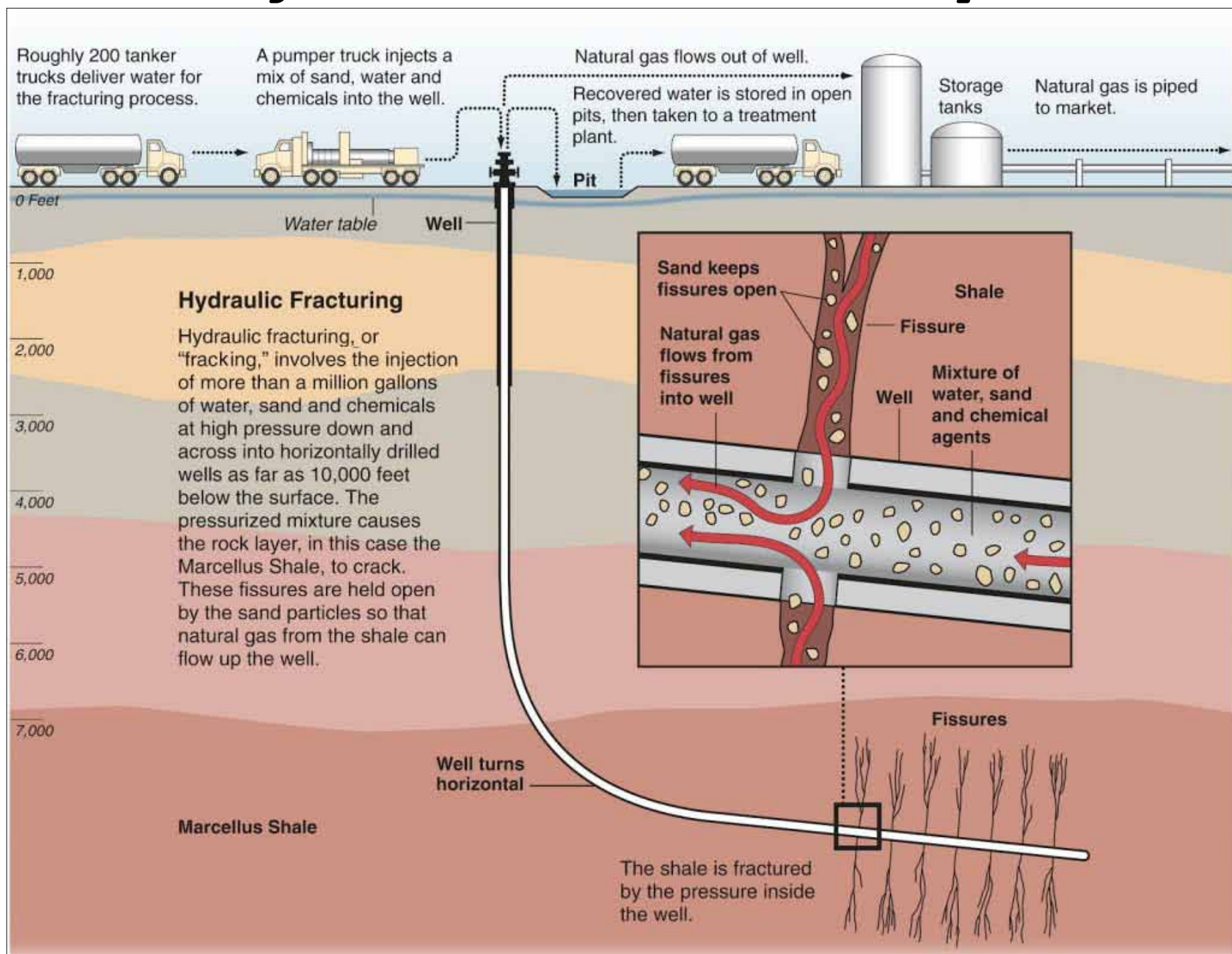
### PA Confirms First Fracking-Related Earthquakes

According to Allegheny Front and other news outlets, in February 2017, Pennsylvania officials confirmed that state's first fracking-related earthquakes. They took place in April of 2016, in Lawrence County, northwest of Pittsburgh, as Texas-based Hilcorp Energy Company was fracking a pair of wells in the Utica Shale. The wells are about 8,000 feet deep.

More than 10,000 unconventional deep wells (fracking) have been drilled in the Marcellus and Utica Shales in Pennsylvania.

# Diagram: Typical Marcellus Shale Frack

## *Rogersville Shale is Much Deeper*



Source of graphic above: ProPublica; used with permission. Use does not imply ProPublica's endorsement of any content in this newspaper.

Numerous well pads already exist in northcentral West Virginia, such as the one below, in Wetzel County. It's likely even more equipment would be used on Rogersville Shale well pads. This particular well pad, like others, presents some serious problems for its neighbors and will continue to do so for decades. Learn more: [ohvec.org/fracked-gas-well-pad](http://ohvec.org/fracked-gas-well-pad).





# Near, Even Under The Ohio River: *Nine Big Pipelines Proposed!*

People nationwide know about how Native Americans and many allies opposed the Dakota Access pipeline, their major concern being that a big pipeline crossing the Missouri River would contaminate this source of their drinking water.

Fewer people know that there are **nine large-diameter pipelines proposed to go near or under the Ohio River in the greater Huntington area**. The Ohio River is the source of drinking water for three million people!

The proposed pipeline buildout could harm communities in our area in numerous ways, many of which are detailed in this publication. More pipelines would mean more deep-shale fracking and related activities, on a scale we've never seen before.

But, even more is at stake here than the threats to our immediate region. According to a research report released by 12 citizens' organizations, "**The planned gas production expansion in Appalachia would make meeting U.S. climate goals impossible**" (see: [bit.ly/2k5sf1N](http://bit.ly/2k5sf1N)).

The pipeline that is closest to construction is Columbia's 36-inch-diameter **Leach Xpress Pipeline**. The Federal Energy Regulatory Commission (FERC) issued their approval in January 2017. Permits from West Virginia and the Army Corps of Engineers are still needed.

The Leach Pipeline would transport methane (the main component of "natural"

Although pipeline companies emphasize the supposed benefits of fracked gas to American energy independence, Appalachian gas is already being exported, and the plans are to ship more fracked gas and fracked gas liquids out of the U.S.

gas). It would originate in Marshall County, WV, cross under the Ohio River for the first time in Marshall County, and then pass through areas in Ohio where fracking of the Utica Shale is rapidly expanding.

It would then pass through Lawrence County, Ohio, go under the Ohio River near Camden Amusement Park near Huntington, and continue on to a greatly expanded compressor station near the Huntington Tri-State airport. From there, the gas would go to Leach, KY, near Marathon Petroleum's Catlettsburg refinery and would link with the recently approved Rayne Xpress pipeline to carry fracked gas to the Gulf Coast. (Marathon's big oil refinery sits on the border of Kentucky and West Virginia, about nine miles west of Huntington.)

Columbia's proposed **Mountaineer Xpress Pipeline** is moving through the FERC approval process but is not yet approved. It would also originate in Marshall County, WV, and would move fracked gas through north-central West Virginia's fracking regions, go under the Kanawha River in Putnam County, connect with the existing SM 80 Columbia

pipeline near Milton in Cabell County, and go from there to a proposed new SM 80 Pipeline in Wayne County, and on to a greatly expanded Ceredo Compressor Station near the Huntington Tri-State airport. It looks like the gas then would pass into Leach, KY, and would also head to the Gulf Coast.

Columbia's newly proposed **Buckeye Xpress Pipeline** is planned to travel through our area carrying fracked gas from Pennsylvania, West Virginia, and Ohio. We don't know all of the route details yet, but it looks like it also would go to the Leach, KY, pipeline connection area, and on to the Gulf Coast.

The **Appalachian Storage Hub** would bring six more pipelines through the greater Huntington region. This would originate at Shell Chemical Company's massive, planned and approved ethane cracker in southeast Pennsylvania. It would consist of underground gas and liquids storage units in or near northern West Virginia, with the six pipelines moving fracked gas liquids to Leach, KY, near the Marathon refinery. Plans are to **move Rogersville Shale fracked gas liquids through the Appalachian Storage Hub pipelines**, or possibly to move Rogersville Shale liquids north to storage or petrochemical facilities.

The Appalachian Storage Hub and its six pipelines are still in the design and planning phases; the proposed pipelines may be above-ground lines. Plans indicate that all six

## Resist! Pipelines Far From a Done Deal Here!

The national campaigns to stop construction of the Keystone XL and the Dakota Access oil pipelines have some major differences from our situation here in West Virginia.

Both the Keystone XL and the Dakota Access pipelines are already largely completed, and the recently publicized massive opposition is to stop the final portions from being built.

Here, there may be some preliminary construction efforts on pipeline segments needed for the Columbia methane pipelines, but major building of the pipelines proposed to come through the Huntington region is yet to begin.

For one thing, the pipeline companies do not have all the landowner approvals they need to pass through private land, and if some landowners choose to deny access to their land, legal battles could make it more difficult for pipelines to be built.

All three of the Columbia pipelines proposed for our area would need permits from the state of West Virginia and the U.S. Army Corps of Engineers, as well as approval from the Federal Energy Regulatory Commission (FERC). Only the Leach XL Pipeline has been granted the FERC Certificate of Public Convenience and Necessity, which serves as FERC approval. Contact us to get involved.



pipelines would run along the entire length of West Virginia's Ohio River border. Maps show the proposed pipelines running along the Ohio side of the river. The hub would also include a **new pipeline connecting Charleston-area petrochemical plants to Appalachian Storage Hub** pipelines near Point Pleasant, WV.

### Major Safety Concerns

Large-diameter oil and gas pipelines are so highly pressurized that a tiny fissure could cause a deadly explosion. Methane (dry gas) is explosive, but gas liquids are even more explosive.

Major leaks from any of these pipelines could contaminate the Ohio River or nearby tributaries. Every year, nationwide, there are some pipeline leaks and explosions.

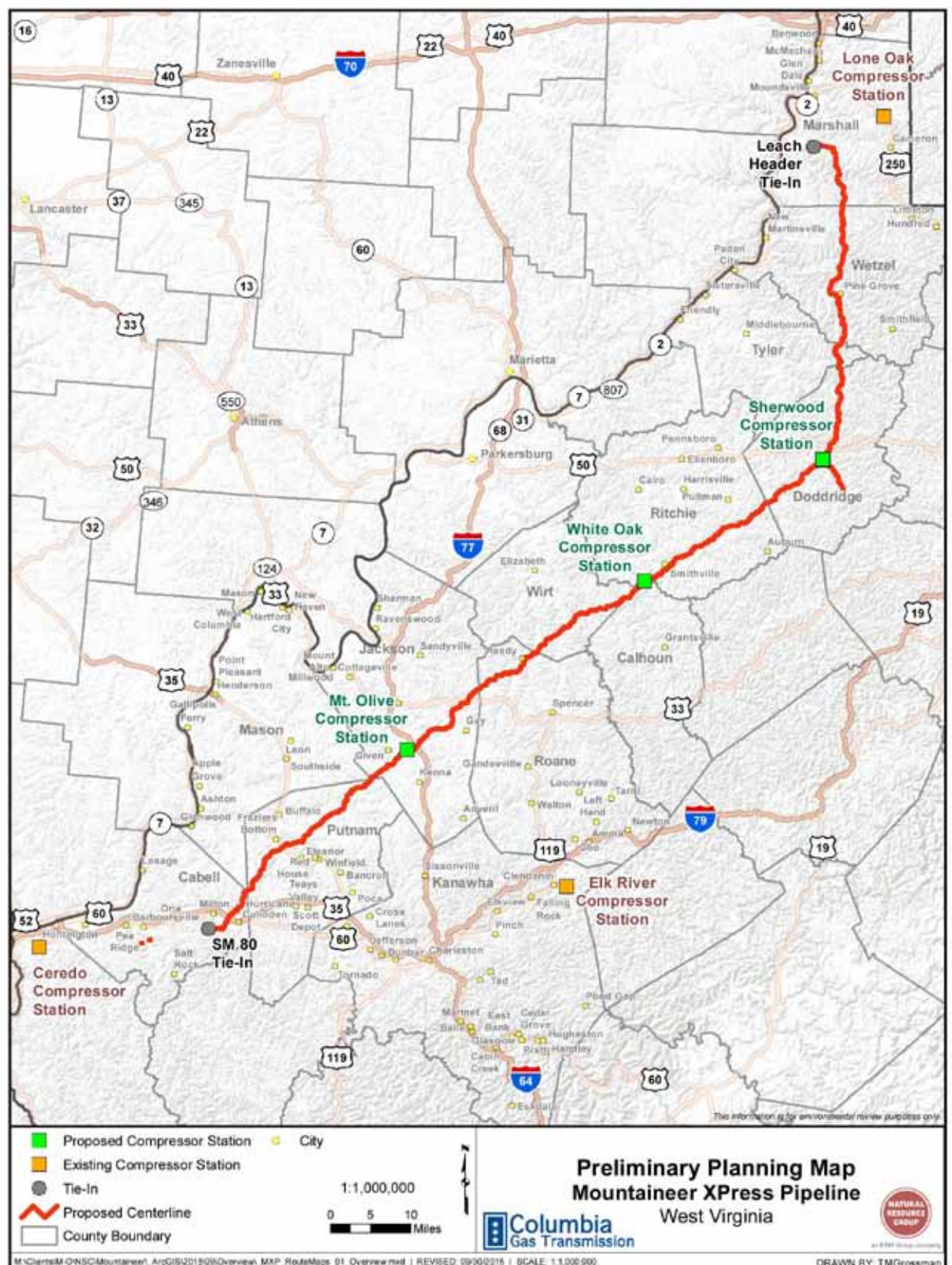
### Eminent Domain Threats in the Huntington Area

Now that the Leach Xpress Pipeline construction has been approved by FERC, Columbia Gas Transmission may be able to use eminent domain powers to obtain the "right" to run the pipeline under unwilling landowners' land. None of the other pipelines mentioned here are able to honestly threaten eminent domain, because they have not received the necessary approvals and permits.

We do know from FERC's approval certificate that Columbia has not secured all the rights over land it would need to build the Leach Xpress. Across the United States, **landowners are resisting pipelines. If you choose to join those who are resisting, please contact us. There is strength in numbers!**

All these proposed pipelines would travel through populated areas here in the Huntington Tri-State area. We doubt whether every landowner along the paths would be willing to grant pipeline companies the right to build across their land, especially if they know that **all nine of these proposed pipelines would carry either explosive fracked gas (methane) or even more highly explosive fracked gas liquids**, such as ethane.

**Folks in West Virginia living along the paths of these proposed pipelines are advised: If pipeline land men come looking for you, know your rights!** OVEC can suggest knowledgeable and trustworthy lawyers. We're at [info@ohvec.org](mailto:info@ohvec.org) or 304-522-0246.



Above: Proposed route for the Mountaineer Express Pipeline, which joins with Columbia's existing SM 80 pipeline near Milton, WV (Cabell County). A new pipeline segment would be built from Milton to the Ceredo Compressor Station. The SM 80 segments are not shown on the map above.



Many articles in oil and gas industry news outlets quote experts who say that prices are rising and the fracked gas industry is picking up again. We know from our friends in Wetzel County, WV, that giant fracking-related trucks are clogging their winding, hilly roads once again. The director of the WV Oil and Gas Association says that one reason new pipelines are "needed" is so more fracked gas from West Virginia can be exported.



# Pipelines Cost You in the Short- and Long-Term

Pipelines for fracked gas result in tremendous “external” **costs to local communities**, including lost property values and tax revenue and diminished economic development opportunities, as well as the danger of pipeline explosions and other leaks.

The rush to build pipelines results in **serious safety risks**. A partial list of pipeline explosions and other accidents is daunting to see: **bit.ly/2bJUQ6h**.

Pipelines built in the 2010s are failing at a rate similar to that of pipelines built in the pre-safety-regulated 1940s.

At least 16 large fracked gas pipelines are proposed across West Virginia. The potential for **dramatic overbuilding** of pipelines is a serious concern, and is largely due to two factors:

1) The U.S. has **no national or regional planning process** for interstate gas pipelines that would check such an overbuild, and

2) FERC provides up to 14% guaranteed return on equity for companies building pipelines— a huge profit! Ratepayers and communities bear all the risk and could be left

footing the bill for unused pipeline infrastructure.

The extent of the current new pipeline rush is not matched by a corresponding increase in U.S. demand for gas. After all, excess amounts of U.S. gas caused the price drop of the past few years. Much of the fracked gas planned to be transported from West Virginia is **intended for export**.

Desire for greater profits by the fracking and pipeline industries is also driving the rush to build such a large number of new pipelines.

In terms of climate change, the claim that gas is substantially cleaner than coal is false. Methane is **84 times worse than carbon dioxide as a greenhouse gas**. While gas can burn cleaner than coal, the major leaks of methane during the fracking, waste disposal and pipeline processes are generally not included when officials tout “clean” gas.

*Info from Fracked-gas Pipelines: Fast Facts, compiled by groups opposed to the Atlantic Coast and Mountain Valley pipelines, including: several groups from WV and VA.*



Above: Assorted pipeline-related activity in Wetzel County, WV. The pipeline in the top and bottom photos is 30 inches in diameter. Photos by Bill Hughes.



## A PHOTO ESSAY

On the construction of the **Ohio Valley Connector Pipeline** in Wetzel County, West Virginia

What is it like to have a pipeline constructed near you?

Get a first-hand look: go to **ohvec.org/pipeline-at-my-mailbox**.

This photo essay will tell you only what construction is like.

It won't tell you what it's like to live with the constant worry of plunging property values, or leaks, or explosions.





## Compressor Stations Harm Human Health



Large-diameter, high-pressure pipelines require compressor stations at points along their routes. These large, noisy industrial compressor stations don't just drown out the regular sounds of your neighborhood and don't just glare into your window all night long. They harm your health.

Compressor station emissions include Methyl tert-butyl ether (MTBE), carbon monoxide, iso-Butane, methyl mercaptan, n-Butane, n-hexane, n-octane, nitrogen dioxide, nitrous acid, styrene, 2-methyl butane, 2 methyl pentane, 3 methyl pentane, ethyl benzene, benzene, propane, methanol, naphthalene, toluene, and more.

Compressor stations can emit ultrafine particulate matter, which increases human health risks for cardiovascular and respiratory disease, as well as damage to the nervous system. Noise pollution also harms human health.

**People living near compressor stations have reported asthma and other respiratory problems, nosebleeds, headaches, and rashes.** (See middle column for more details from one study.)

**Research shows that compressor stations can double the risk of newborn autism.**

Wilma Subra, a well-known expert on fracking, published a report on human health impacts from gas compressor stations. See her PowerPoint here: [bit.ly/1qUyJk4](http://bit.ly/1qUyJk4)



### Compressor Stations Health Study

Above: This child was a participant in a health study of air contaminants from the Millennium Pipeline gas compressor near rural Minisink, NY. Dozens of Minisink residents found they were beset by similar ailments immediately after the compressor station was built in 2013. A two-month study found that spikes in air toxins around the compressor coincided with residents' adverse health symptoms. Asthma, nosebleeds, headaches, and rashes were common among the thirty-five participants in eight families living within one mile of the compressor. Those symptoms are also frequently reported around gas fracking sites. Learn more: [bit.ly/2juybB1](http://bit.ly/2juybB1)

### Fracking and Health

Fracking sites are associated with chronic and acute health problems, including asthma exacerbation, skin rashes, headaches, sleep disturbances, and mental health issues. Learn more: [bit.ly/2kHDqvP](http://bit.ly/2kHDqvP)

Dive deep! Read the *Compendium of Scientific, Medical, And Media Findings Demonstrating Risks and Harms of Fracking (Unconventional Gas And Oil Extraction)*. See: [bit.ly/2kk7GyQ](http://bit.ly/2kk7GyQ)

### Study Links Childhood Leukemia with Living Near Oil and Gas Development

The drilling process, of course, has the potential to emit toxic substances, including the carcinogen benzene, polycyclic aromatic hydrocarbons and diesel exhaust, into the surrounding air and waterways.

New research suggests that children living in areas of high-density oil and gas development may face increased risk of acute lymphocytic leukemia.

See: [bit.ly/2IVpqSE](http://bit.ly/2IVpqSE)

## PA Doctors Want Fracking Halted

The Pennsylvania Medical Society has called for a moratorium on new shale gas drilling and hydraulic fracturing and is urging the state to establish an independent health registry and start studying fracking's public health impacts.

Dr. Walter Tsou says "**growing evidence has shown [fracking's] increasing deleterious effects outweigh any economic benefit.**"

Protect Pennsylvania, an alliance of physicians' and nurses' organizations supports the medical society's resolution, and faults the state legislature for failing to establish a health registry or to fund research into the health impacts of the decade-old shale gas drilling and fracking industry.

**According to the group, many communities that benefited economically from the initial shale gas boom are now experiencing environmental and human health consequences.**

They say, "Pennsylvania has invested heavily in shale gas drilling, but in-state health studies have demonstrated worsening asthma, premature births, neurological and mental symptoms, and other adverse effects." They cite bans or moratoriums on shale gas development in New York, Maryland, and Vermont as appropriate precautionary steps.

- Excerpt from "Doctors call for state ban on drilling and fracking" in the October 28, 2016 edition of the Pittsburgh Post-Gazette.

Read the full article:  
[bit.ly/2fbwwjD](http://bit.ly/2fbwwjD)

# What Would a Rogersville Rush and a Pipeline Push Mean for Our Area?

What would happen to our area if there's a rush to drill the very deep Rogersville Shale, and if the pipelines and compressor stations are built? Our communities would be forever altered, and not in a good way.

Over the next few pages, let's take a look at what has gone on in Wetzel County, WV, and surrounding counties over the past decade as the Marcellus Shale has been fracked.

## Typical Production Sequence for Marcellus Shale Gas Operations

1. Site preparation: clearing, road grading, gravel, drainage
2. Drilling: rig move, setup, drilling operations, remove rig
3. Hydraulic fracturing: sand kings, frac pumps, sand cans
4. Completions, condensate, and brine tanks
5. Gas processing on well pads
6. Pipelines and compressors
7. Compressor stations and gas-processing plants
8. Liquid and solid waste disposal

This sequence, for each well pad, involves dozens of pieces of equipment and many hundreds of large trucks, running 24/7. Each sequence creates problems for people living nearby.

## Typical Problems Experienced by the Community

### Travel and Traffic

- Damaged roads, bridges, signs, and guardrails
- Broken electric and phone lines
- Dusty or muddy roads
- Blocked roads and delays due to large-truck traffic caravans and accidents
- Dangerous big trucks left of center and escorts left of center that can run local drivers off roads
- Increased demand on all emergency services
- Tax monies that could have been used elsewhere may need to go to repair big-truck-damaged roads



### Land

- Decreased property values
- Permanent loss of pasture, timber, and farmland
- Habitat fracturing by well pads, access roads, and pipeline right-of-ways

### Air and Other Pollution Issues

- Diesel fumes
- Silica dust
- Large releases of raw gas
- Large-scale burning of brush
- Dusty roads
- Fugitive gas emissions
- Rock dust from drilling
- Condensate tank fumes
- Fumes from flaring
- Ozone formation
- Compressor station fumes
- Pipeline discharges
- Light and noise pollution

### Water Issues

- Muddy streams from gas operation runoff
- Spilled brine (produced water), flowback, and fracturing fluids
- Streams and rivers contaminated with drill waste
- Erosion and sedimentation of streams
- Slips from ponds, well pads and pipelines
- Contaminated springs
- Spilled and dumped drill mud or cuttings
- Large consumption of fresh water sources and waste disposal problems





# A Closer Look at Some of the Typical Steps for Marcellus Shale Gas Operations

## Site Preparation

Years before any dirt is moved to construct a well pad, land men are in the county courthouses researching who owns the mineral rights and who are the surface owners, so that leases and easements for surface damages can be obtained. Surveyors survey for well pads and access roads. The well pads typically disturb anywhere from 4 to 25 acres.

Large earth-moving equipment is brought in to fell trees and remove stumps. Once the site is leveled, hundreds of dump trucks will bring in the rocks that will provide the foundation for each well pad. As you can imagine, the actual site preparation brings the first changes to the neighborhood: a huge increase in traffic, with multiple big trucks navigating our winding rural roads. This is only the beginning.



Top-most photo: A well pad under preparation in Wetzel County, WV.  
Above: The big earth moving equipment used in well pad prep sometimes has trouble making its way to the well pad.



Above: A drill rig in action in Wetzel County, WV.

## Vertical and Horizontal Drilling

Oil and gas companies have a number of options for drilling on a shale gas well pad. These include:

- Drill and fracture just one well, produce some royalty payments which will be enough to lock in the lease, and then move on to the next well pad.
- Drill just the vertical portions of all proposed wells first with a smaller drill rig, drilling down vertically to the KOP (kick-off point) where the turn will begin. Then, follow up with a much larger drill rig, capable of drilling the

turn to horizontal, and the full length of the horizontal bore.

- Bring in a big drill rig to begin with and drill every well complete, vertically and horizontally.
- With every strategy, there is always the option to come back on the well pad later and drill more wells, if the lease-hold (acreage) is large enough, either into the same formation or drill into shallower or deeper shale formations—all from the same well pad. Noise, fumes, and light transform the area, day and night. (continued)





# A Closer Look . . .

## Hydraulic Fracturing Process and Equipment



After the drilling is done, the well pad is cleared off, although some fluid storage tanks might be left on the pad. The wellheads are prepared to accept frack hardware, massive “sand kings” are put in place to store sand. These will be filled by “sand cans,” large trucks that deliver the sand used in the fracturing process. Typically, 12 to 18 fracturing pumps are moved onto the pad, as is much more equipment including mixers, a crane, a wireline control truck, a control center, and more. Tanker trucks deliver the chemicals used in the fracking process, which can include hydrochloric acid and numerous other

chemicals.

On well pads, companies need the most water on hand during the actual hydraulic fracturing stage. **For the typical Marcellus Shale frack, the process uses 4 to 6 million gallons per well. The deeper Rogersville Shale would require more water, as well as more equipment.**

There are at least three ways for drillers to get the required amount of water:

- Pipe it in from a large, high-volume nearby source
- Construct a freshwater holding pond near the well pad
- Use temporary or semi-permanent

storage tanks. The tanks might be “frac tanks” (also called “500-barrel wheelies”) or round “shark” tanks.

To fill storage ponds or tanks, companies will use temporary transfer pumps to withdraw any water possible from any small stream or creek. The companies lay miles of plastic piping to move water from these sources to multiple holding ponds and tanks.

Note that “frack tanks” can be used for fresh water, brine, condensate, flowback, drill mud, fracturing fluids, or a witch’s brew combo.

Above: Fracking in Wetzel County, WV.



## Completed Well Pad, Ready for Production

After flowback and flaring is complete, the well pad is cleaned off. Storage tanks are moved in for condensate, also called NGL or natural (fracked) gas liquids. This is a very explosive, volatile liquid. Tanks for brine, also called produced water, are placed on the well pad, too. The wellheads are finished, and connected to the separators, gas processing units, and storage tanks. Sometimes wireless sensors and telemetry are used to monitor pressure at the wellhead and on tanks.

## Gas Processing on Well Pads

The gas processing units separate the raw gas into brine, condensate, and the somewhat dryer natural (fracked) gas which is mostly methane.

## Pipelines, Compressors and Gas Processing Plants

Pipelines and smaller compressors are needed to move the gas and gas liquids to larger pipelines (see pages 8 and 9), larger compressor stations (see page 11), and gas processing plants. When pipelines do not cross state lines, the FERC (Federal Energy Regulatory Commission) does not have to be involved in the process. Miles and miles of these pipelines can cross mountains and streams, fragmenting habitat and always presenting the potential of leaks and explosions.



Gas processing plant in Wetzel County, WV.



## Liquid and Solid Waste Disposal

Waste products from shale gas operations include liquid waste such as brine (produced water) and flowback, sludges, and semi-solids from tank bottoms, along with concentrated TENORM (technologically enhanced naturally occurring radioactive materials) such as filter cake, filter socks, and media. Solid waste, such as drill cuttings, must also be disposed of.

For decades, geologists have known of and routinely referred to the relatively high radioactive content of the Marcellus Shale formation. Such radioactivity did not present a threat to us where it had been safely stored away for millions of years. We are now challenged to dispose of this waste material because we have intentionally brought it to the surface. It is now our problem.

Tanker trucks haul the liquids off site. Dump trucks or roll-off boxes haul the solid waste. No waste products, whether liquid or solid, from *any* shale gas operations, are ever required to be labeled. These wastes are hauled along our public roadways without any labels marking the trucks' loads as toxic or hazardous or dangerous or harmful.

These wastes are heading to our landfills. Moisture can leach out of landfills. Leachate from landfills accepting fracking waste shows concerning levels of radioactivity. See page 18 for more on fracking waste and page 19 for info on a huge landfill under construction for some of this waste.

Above: Flaring during drilling at a Monroe County, OH deep shale drill pad.



# Fracking and Large Diameter Pipelines Have Pummeled North Central WV; *Do We Want This Here?*



The photographs on these pages illustrate some of the problems communities experience when fracking-related activities move into the neighborhood. See [ohvec.org/deep-shale](http://ohvec.org/deep-shale) for more information. Be sure to view the PowerPoint on that web page (scroll down). And do contact OVEC to check in about upcoming community meetings on the topics covered in this publication. We can also help you set up a meeting in your community. We're at 304-522-0246 or [renew@ohvec.org](mailto:renew@ohvec.org).







# Fracking Well Waste and Radioactivity

In December 2016, the journal *Environmental Science & Technology Letters* reported on a study that found some well waste from the Marcellus Shale in Pennsylvania contained radioactive material not previously reported, with the potential for leaching from landfills into the environment.

Drilling horizontal wells for hydraulic fracturing operations results in a large amount of gooey solid waste, or drill cuttings. In 2011, gas exploration and extraction in the Marcellus Shale formation produced an estimated 2.37 million tons of cuttings in Pennsylvania alone, with almost all of it ending up in landfills, according to the study.

Researchers found that the waste contained uranium-238, radium-226, uranium-234, thorium-230, lead-210, and polonium-210.

On October 1, 2015, WV Public Radio journalist Glynis Board reported on fracking waste:

*There are lots of federal regulations governing what businesses can legally dump into water, on the ground, or release into the air. But the gas industry is getting around a lot of those regulations. The oil and gas industry enjoys exemptions from seven federal laws, including one that is supposed to protect human*

*health from the hazards of waste disposal. Other states have passed their own laws regulating this waste to compensate. But it's a looser system in West Virginia.*

When the shale gas boom first began, drillers were allowed to bury

drill cuttings on site. In 2014, DEP allowed municipal landfills to accept gas industry waste.

*Today, that's what happens to drill cuttings and other solid wastes. They're separated from household waste but buried in the same city and county dumps. Any liquid that seeps out of those landfills is sent to municipal wastewater treatment facilities.*

The Associated Press had earlier reported that DEP had quietly released a memo allowing the state's landfills to accept unlimited amounts of fracking waste:

The memo will create an exception for the state's gas industry to longstanding laws on landfill waste, which stipulate that landfills can only take 10,000 or 30,000 tons of solid waste each month, depending on their classification. Now, fracking operations can send unlimited amounts of their solid waste — known as “drill

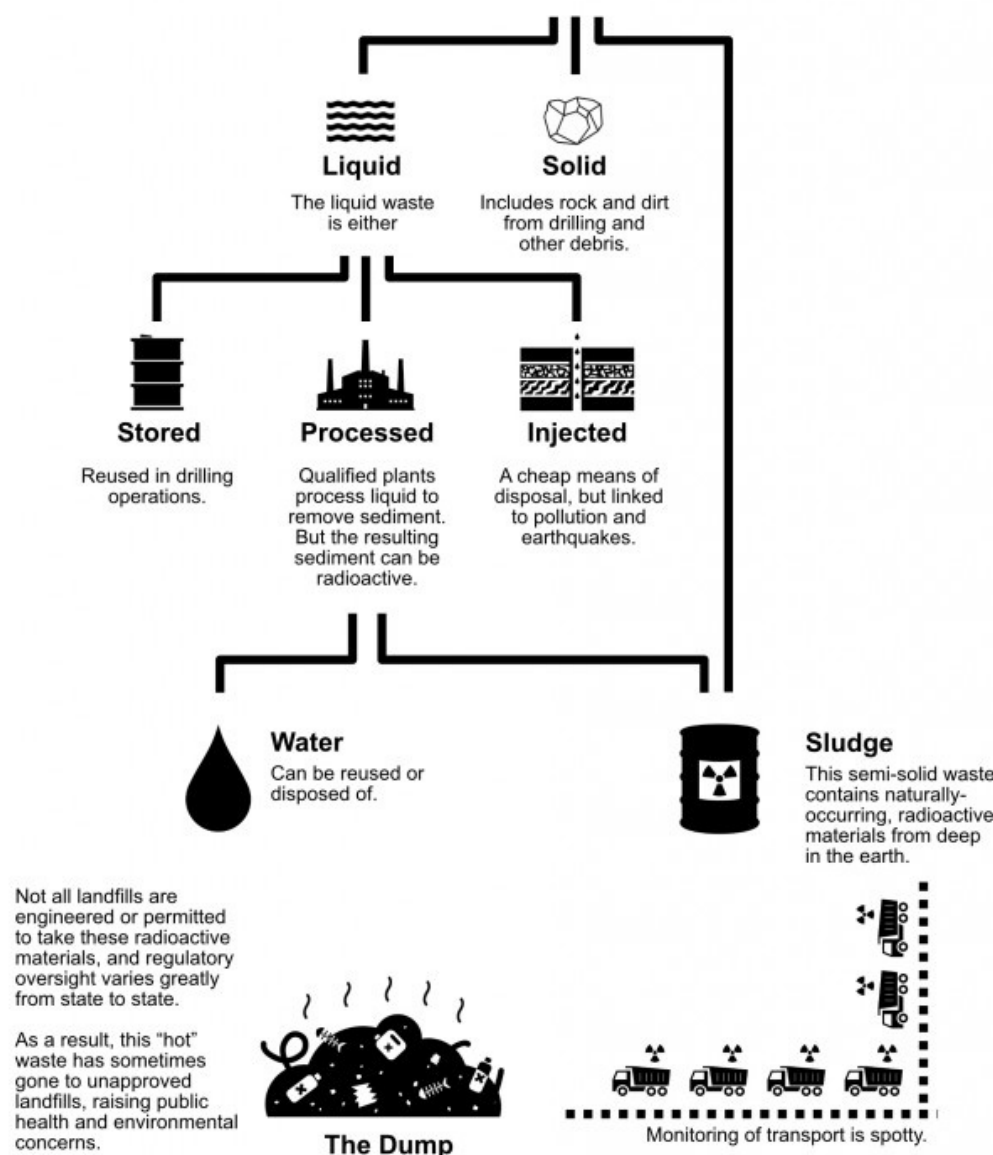
cuttings” and composed of dirt, water, sand, and chemicals — to landfills each month.

On August 3, 2016, Public News Service reported that 50 containers of low-level radioactive West Virginia fracking waste was dumped into a



## Fracking creates radioactive waste.

That waste is either



Sources: Review of public records and company interviews by Ohio Valley ReSource and Center for Public Integrity.  
Graphic by Alexandra Kanik

Icons by Edward Boatman, Mari du Plessis, Evgeniy Artsebasov, Lil Squid, TNS, Martin Vanco, Nicole Kathryn Griffing, Marie Van den Broeck, Evgeniy Tarasenko, Artem Kovyazin from the Noun Project



Kentucky landfill, “amid regulatory confusion and questionable business practices.” The waste was TENORM—technologically enhanced, naturally occurring radioactive materials.

*Mike Manypenny, a former Taylor County delegate to the West Virginia Legislature, said dust from TENORM can lodge in the lungs and cause cancer. He worked in the Legislature to keep hot frack waste from creating problems in West Virginia landfills. West Virginia isn't coordinating the frack-waste disposal with the federal Nuclear Regulatory Commission, let alone other states, he said.*

*"We need to have a cradle-to-grave monitoring system to make sure that we know where these materials have come from and where they end up when disposed of," he said.*

Be sure to see the 2016 Ohio Valley Resources report *Hot Mess: How Radioactive Fracking Waste Wound Up Near Homes and Schools* ([bit.ly/2k4LYfw](#)). That's where the graphic here originated.

The report explains that brine, or produced water, is one form of drilling waste. It's salty water laced with chemicals, metals, and naturally occurring radioactive elements that come up thousands of feet along with the gas and oil.

The easiest way to get rid of wastewater is to inject it back into the ground, but that can lead to pollution and even earthquakes. Another method for “disposal” of the liquid waste is separating it into salt, sludge, and water.

*Antero is spending \$275 million to construct a wastewater facility in*



A semi-truck dumps drill cuttings at a West Virginia landfill.

*West Virginia that is scheduled to begin operation in September, 2017. At its peak, the facility could see up to 600 trucks a day, processing 60,000 barrels of wastewater.*

*A filtering system would recover about two-thirds of the water, which could be reused in drilling. But that filtration system leaves behind thousands of tons of salt and hundreds of tons of sludge from the sediment, which concentrates the radioactive materials. [An Antero representative] said that sludge—as much as 200 tons a day—will be disposed of elsewhere...*

*This low-level radioactive waste is not as hazardous as the wastes from nuclear power. But according to the Environmental Protection Agency, the radioactive materials in drilling waste do present risks. Radioactive dust is potentially harmful, and it would be bad if the radioactive leachate, or liquid that oozes out from the landfill, were to contaminate groundwater over time. Radioactive waste can last centuries—far longer than the engineered lifespan of the liners in many landfills.*

#### **What to Do With the Waste?**

To attempt to deal with some of the extreme amounts of fracking waste,

Antero Resources is planning to build a treatment plant and landfill complex, euphemistically dubbed “Clearwater.” The monster complex would engulf 486 acres in Doddridge and Ritchie Counties.

According to West Virginia Rivers Coalition, the facility would treat and dispose of fracking wastewater, also known as flowback or produced water. The treated water will be reused in Antero's drilling operations. The landfill will be placed adjacent to the water treatment plant to

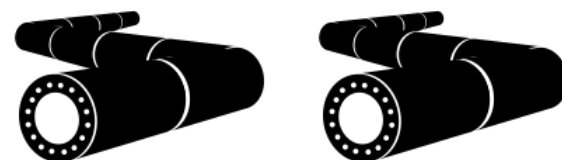
dispose of 2000 tons/day of salt, a byproduct of the wastewater treatment process. The other byproduct, 200 tons/day of sludge, will be disposed of offsite.

The facility has the potential to impact 11 wetlands and 89 streams and is located within the Hughes River Water Board drinking water protection area.

At a public hearing about the facility, one Doddridge County resident said, **“I think there's going to be a lot of sick people; there's going to be a lot of sick children. Our way of life is done. I live on (Route) 50; the truck traffic is unbelievable. That's just the beginning, that's just the beginning.”**

A Ritchie County resident said, “You're asking us to take the risk. It's a matter of privatizing the profits and socializing the risk. They are concentrating that risk on top of us.”

A rush for the Rogersville Shale in our area would mean more waste, which would mean more radioactive drill cuttings in landfills, and which could mean another huge facility like “Clearwater,” with its 600 trucks a day.





# No Eminent Domain for Private Gain

Why should for-profit corporations be able to seize private land for their own enrichment?

That's the question asked by a growing number of people nationwide who don't want their land ripped apart for huge pipelines.

In West Virginia, the Supreme Court of Appeals took up one aspect of that question and ruled in the people's favor, handing West Virginians a huge victory for private property rights.

The case began in 2015, when landowners in Monroe County wanted to prevent EQT from surveying their property for the proposed Mountain Valley Pipeline (MVP), which would pass through southeast WV. The landowners went to court to try to preserve their rights over their own land.

The MVP would transport, under high pressure, fracked gas over 300 miles from northwestern WV to southern Virginia to connect to the Transco Pipeline, a mega-pipeline that ships gas to the Southeast. The pipeline would be 42 inches in diameter (by comparison, Keystone XL would have been 36 inches).

Monroe County Judge Robert A. Irons ruled that the landowners *did* have the right to prevent pipeline surveyors from coming on to their property. The judge ruled that there was no evidence of public need for this fracked gas pipeline. Under state requirements, a pipeline company wanting to use eminent domain must first show that its pipeline would be for public use. MVP wants this pipeline to transport gas *out* of our state. No West Virginians would use the gas transported through the pipeline.



EQT challenged this ruling, hoping that pipeline surveyors would be able to come on to anyone's land, even when the owners forbid this access.

The WV Supreme Court heard arguments in the case on October 11, 2016, and ruled just over a month later, on November 15. The court said that MVP cannot survey for its proposed fracked gas pipeline without landowner permission. The court held that if landowners did not give permission, then MVP's survey would constitute an illegal "private taking for private use," because the proposed pipeline would not benefit West Virginians.

"This is a great ruling for private property rights in West Virginia," said Appalachian Mountain Advocates Senior Attorney Derek Teaney, who argued the case on behalf of the Monroe County landowners. **"This ruling vindicates the rights of landowners in the path of this ill-advised pipeline and shows that private companies cannot bully West Virginians into allowing them onto their property without their permission."**

Heartfelt comments from a Ritchie County, WV, resident to FERC about a proposed pipeline: "I shouldn't have to regard with fear every sound of heavy equipment I can hear on a neighboring ridge, worried to distraction that my property is going to be invaded by the resource extraction industry. Private companies do not have any inherent right to profit from someone else's property, nor to destroy its value in order to make extra money by taking a shortcut through a mountain. They don't have a right to destroy everything downstream; they don't have a right to pollute whole aquifers."

# Stop! Don't Sign!

What should you do if a pipeline company wants to survey your land?

Here's some good advice from our friends at Appalachian Mountain Advocates.

**A pipeline company's right to survey must be backed by a legal document. If the surveyor cannot produce a document, you do not have to let him or her onto your property.**

There is a statute in West Virginia that addresses surveying by corporations that are seeking the power of eminent domain. That statute, contrary to what you may hear from pipeline representatives, allows surveying *only for projects determined to be "for public use,"* a determination that has not been made by a West Virginia court for these proposed pipelines.

If a pipeline rep asks you to sign a document allowing him or her onto your property, do not do so until you obtain legal advice. **Do not sign anything before talking to a lawyer.**

For more info, see [appalmad.org/our-work/natural-gas-pipelines](http://appalmad.org/our-work/natural-gas-pipelines).

It's not just surveying. We've heard of gas company land men pressuring landowners to lease their land *now*, even using mildly threatening language about how it is better to sign now, because things will be more difficult later.

Don't be fooled! There is no rush. Folks in West Virginia living along the paths of proposed pipelines: Know your rights! Contact OVEC at 304-522-0246 or [renew@ohvec.org](mailto:renew@ohvec.org).



# The People vs. Big Pipelines: Wins in OH and PA

Eminent domain powers have been denied to a company planning to build a 12-inch-diameter pipeline in Ohio, to connect the state's Utica Shale with the Ontario Access (Utopia) pipeline.

In October, 2016, a judge in northwest Ohio ruled that the pipeline, planned by Kinder Morgan Inc., would not provide benefits to Ohioans. Judge Robert Pollex said the pipeline would benefit only a private company.

Land in 14 Ohio counties has been targeted by Kinder Morgan. Landowners in several of these counties have refused to grant an easement to allow the pipeline to be built on their land. Kinder Morgan is planning to appeal the judge's refusal



to allow the company to use eminent domain.

In Pennsylvania, where fracking of the Marcellus Shale

has been going on longer than in northern WV, a new coalition of landowners has been formed to fight the use of eminent domain by fracked gas companies. Protect Our Pennsylvania is being formed at a time when oil and gas pipelines associated with fracking wells are facing growing opposition across the country.

Protect Our Pennsylvania's mission is **"individual rights to private property and public safety over statewide abuse of eminent domain."**

In June, 2016, a common pleas court in western PA dismissed a lawsuit against two environmental groups and local residents who were opposing oil and gas development. The Butler County court ruled that the Delaware Riverkeeper Network and the Clean Air Council's activities were constitutionally protected citizen rights.

The groups and citizens are especially concerned about plans to drill fracking wells near a school attended by thousands of students. The school is less than a mile from the proposed fracking wells.

## Grassroots Pipeline Resistance Victories Abound!

*Note: FERC is the Federal Energy Regulatory Commission. The agency's duties include reviewing proposals to build interstate gas pipelines, gas storage projects, and liquefied natural gas (LNG) terminals.*

**Central Kentucky** landowners successfully organized to prevent the **Kinder Morgan Bluegrass Pipeline** from using eminent domain to gain control over their land. The victory came after large groups of people protested, showed up at the state legislature, and worked together with lawyers. (OVEC has an inspiring documentary on this citizen victory that we can help you show in your community. Contact us for details.)

A Franklin circuit judge ruled that in order for a pipeline company to use eminent domain to force property owners to allow pipelines to cross their land, the pipeline company must be regulated by the state's Public Service Commission as a public utility. Kinder Morgan is a for-profit company with no public-utility status. The KY Supreme Court refused to hear an appeal.

The day the KY Supreme Court decided not to hear the company's appeal, Louisville attorney Tom FitzGerald said, "Today is a good day for Kentucky landowners and for freedom."

The proposed Bluegrass Pipeline would have crossed more than 200 miles in Kentucky and delivered fracked gas liquids to ports and facilities on the Gulf Coast.

Thanks to Beyond Extreme Energy, here's a list of fracked-gas infrastructure projects canceled or delayed from late 2015 to spring 2016:

**November 2015:** The Port Ambrose liquefied natural gas (LNG) project was vetoed by New York Gov. Andrew Cuomo.

**March 2016:** The Jordan Cove LNG export terminal and 223-mile Pacific Connector pipeline in Oregon were rejected by FERC—*FERC's first gas-infrastructure rejection in 30 years.*

**March 2016:** The Republican-dominated Georgia legislature voted overwhelmingly for a one-year moratorium on any new pipelines, setting back efforts to build the Palmetto Pipeline.

**March 2016:** FERC announced a seven-month delay on making a decision about the Penn East Pipeline in Pennsylvania and New Jersey, and a ten-month delay for the

Atlantic Sunrise Pipeline in Pennsylvania and Maryland.

**April 2016:** The Oregon LNG company announced that it was ending its years-long effort to build an export terminal and pipeline.

**April 2016:** Kinder Morgan announced it was suspending its efforts to build the Northeast Energy Direct Pipeline, which would have run from Pennsylvania through New York into Massachusetts and New Hampshire.

**April 2016:** Dominion Resources announced that the start time for beginning construction on the Atlantic Coast Pipeline, going from West Virginia through Virginia into North Carolina, was being moved back from fall 2016 to summer 2017.

**April 2016:** New York Gov. Andrew Cuomo announced that the New York Department of Environmental Conservation rejected the application of the Constitution Pipeline Company for a water quality permit, which was required in order to begin construction.

"FERC's procedures and its track record show a blatant disregard for established economic principles, as well as clear evidence that **pipelines reduce property values, discourage business development, and diminish the capacity of the natural environment to provide clean water, beautiful scenery, and other valuable services to people,**" according to a study on the Mountain Valley Pipeline. See [bit.ly/1TetOrc](http://bit.ly/1TetOrc)



# Renewable? It's Doable! Right Here, Right Now in WV

With all the challenges West Virginia faces, where can we look for truly good news and a hopeful model for future economic development? Right in our backyard!

ReWire Appalachia, an initiative of the Wayne County-based Coalfield Development Corporation, trains displaced coal and manufacturing sector workers in solar roof installation. Some of its work takes place at the West Edge Factory in Huntington's Westmoreland neighborhood.

This initiative, the Solar Training Institute, is part of the Huntington Innovation Project, the city's revitalization plan.

Of the effort, Huntington Mayor Steve Williams says, "We can create a new future for those who live within our community and beyond."

Robert Adkins, a crew chief with ReWire Appalachia, says, "Right now there are so many good, intelligent men that have been laid off and are being overlooked. Just because you are dirty or you've got scars on your hands doesn't mean that you are not

able to learn and adapt to new things. For me, solar is an opportunity to change the area."

Solar Holler, based in Shepherdstown, West Virginia, works with businesses, nonprofits and homeowners to design, finance, engineer, and manage solar installations. For installation of the solar panels, Solar Holler relies on Rewire Appalachia.

The two groups worked together to install 51 solar panels on the Edward Tucker Architects building on 6th Avenue in Huntington.

In 2016, OVEC partnered with them on an initiative that helped fund an 18-panel solar system for Coalfield Development's headquarters in Wayne.

OVEC also partners with Coalfield Development on the Quality Environmental Jobs Initiative, an environmental remediation certificate program, which gives trainees paid, on-the-job training in assorted fields. OVEC has given trainings

on environmental justice issues, and, most recently, developed curriculum and training for an air, water, and soil-testing certificate. Some of the graduates from the first rounds of trainings have found employment in construction, solar panel installation, sustainable agriculture, and more.

Efforts like those of Coalfield Development and Solar Holler can offer models for increasing the diversification of our economy and the ways we generate energy.

Help speed the transition! Let your elected officials and energy providers know that our state has a critical need to transition away from dependence on fossil fuels. Contact them, write letters to the editor (LTEs), or dive deeper—install your own solar panels! Several OVEC members have done so themselves; see [spectrumz.com](http://spectrumz.com) for examples.

For tips on writing LTEs, see [ohvec.org/letter-to-the-editor-tips](http://ohvec.org/letter-to-the-editor-tips). Contact us to get involved in OVEC's transition work.

## DIVERSIFYING ENERGY IN WEST VIRGINIA: A GLIMPSE INTO SOLAR ENERGY AND ENERGY EFFICIENCY IN THE MOUNTAIN STATE

In 2014, OVEC and Mountain View Solar, working as partners, were accepted into the Appalachian Transition Fellowship Program, a project of the nonprofit Highlander Center, based in Eastern Tennessee.

Be sure to review this booklet of renewable energy and energy efficiency success stories—replete with energy savings and job creation—right here in West Virginia. Find it online at [ohvec.org/renewable-energy](http://ohvec.org/renewable-energy).





appalachian  
transition  
fellowship



## Local Cooperative Spirit Part of Renewing WV

In November 2016, the *Huntington Herald Dispatch* ran an article titled, "Wayne County Farmer's Co-Op Largest in State"

"From its inception, the organization has devoted itself to making agriculture a viable economic opportunity for the people of Wayne County in response to the financial hardship and unemployment facing the region," member Ron Thompson told reporter Fred Pace, who reported:

*Cooperatives are businesses owned and controlled by the people who use them; agricultural co-ops*

*allow farmers to pool their resources in certain areas of activity.*

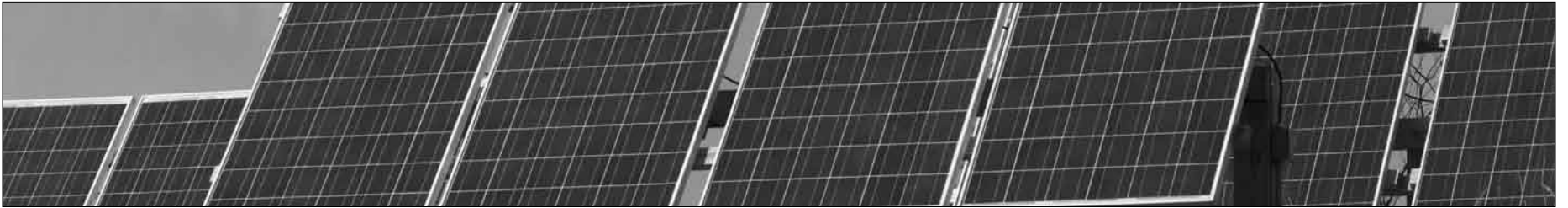
Effective June 11, 2015, the West Virginia Legislature expanded the state's producer cooperative statute to include all food- and farm-related businesses, not just producers, to form as cooperative businesses. SB352 expanded the agriculture code that pertains to producer cooperatives to include all businesses that relate to foods and beverages, arts and crafts, woodworking and recycling, composting and repurposing of materials.

Brandon Nida, of the WV Food & Farm Coalition in Fayetteville, said "Co-ops help to spur activity and value in local economies (and are) a good way of keeping and building wealth in a community."

Refresh Appalachia, the agricultural arm of Coalfield Development, is working with the co-op, as is Huntington's Wild Ramp.

The co-op is part of ever-growing efforts of West Virginians to shape a healthier economy that is not based on the harmful extraction of fossil fuels.





# Report: The Clean Energy Economy Employs 4 Million Americans

excerpt from a January 26, 2017, article by Gina-Marie Cheeseman; read the entire article: [bit.ly/2jtU5Ed](http://bit.ly/2jtU5Ed)

Sustainable energy and energy efficiency employs 4 million to 4.5 million Americans, and those numbers are poised to increase, according to a report released by the Environmental Defense Fund’s Climate Corps.

Solar employment opportunities are growing 12 times faster than the rest of the U.S. economy, and wind-turbine technician is the fastest-growing profession in the United States.

Additionally, the renewable-energy economy creates more jobs than the fossil-fuel industry per dollar invested, says Climate Corps. Investments in renewable energy generate about three times more

direct and indirect jobs than comparable investments in fossil fuels. Many jobs in the solar and energy-efficiency space are in installation, maintenance, and construction, making these jobs inherently local and contributing to the growth of local economies.

Of course, all of this job growth stems from the rapid deployment of wind and solar energy in the United States. This will only continue as costs fall ever lower: Solar PV panel production costs decreased by 72 percent between 2010 and 2015, which makes solar PV cost-competitive with fossil-fuel generated power in many markets. So it’s no surprise that solar deployment

expanded tenfold since 2010. America also more than doubled its installed wind capacity from 2009 to 2015.

Bloomberg New Energy Finance predicts solar and wind will account for 64 percent of new power generating capacity added globally between now and 2040.

Other sectors in the clean-energy economy are also experiencing significant growth, including energy efficiency.

Increasing investments in building energy efficiency, partly fueled by state and local policies, means the sector now employs about 2.2 million people across the country, a 7 percent increase from 2015.

## Study: Fossil Fuel Industry Underestimates Impact of Solar

In February 2017, the Carbon Tracker Initiative and the Grantham Institute at Imperial College, both based in London, released a report about the future of energy.

The report shows that major energy companies are greatly underestimating the advances of solar and low-carbon energy sources. The stranding of fossil fuel assets is likely as cleaner energy continues to expand.

“Electric vehicles and solar power are game-changers that the fossil fuel industry consistently underestimates,” Carbon Tracker senior researcher Luke Sussams says.

“There is no more business as usual in the energy sector, so it is time that scenario is discarded. There are a number of low-carbon technologies about to achieve critical mass decades before some companies expect,” James Leaton, head of research at Carbon Tracker, says.



## Electricity Generation: Solar Employs More People Than Oil, Coal, and Gas Combined

In 2016, across the United States, more people were employed in solar power than in generating electricity via coal, gas, and oil energy combined. That’s according to a U.S. Department of Energy report released in January 2017.

The report says solar power employed 43 percent of the electric power generation sector’s workforce. All fossil fuels combined accounted for just 22 percent. That means clean energy projects are great news for America’s economy.

Solar energy added 73,615 new jobs to the U.S. economy in 2016, and wind added 24,650 jobs.



Solar panels on Coalfield Development’s building in Wayne, WV.

# Highlights from Solar Jobs Census 2016

See [thesolarfoundation.org](http://thesolarfoundation.org)

One out of every 50 new jobs added in the United States in 2016 was created by the solar industry, representing 2 percent of all new jobs.

- Solar jobs in the United States have increased at least 20 percent per year for the past four years, and jobs have nearly tripled since the first Solar Jobs Census was released in 2010.
- Employers surveyed expect to see total solar-industry employment increase by 10 percent, to 286,335 solar workers, over the next 12 months.

Solar is an important part of our ever expanding clean energy economy in Massachusetts, supporting thousands of high-skilled careers across the Commonwealth. Through the continued development of solar incentive programs, Massachusetts is positioned to double the amount of solar for half the cost to ratepayers and maintain our position as one of the best states in the country for energy diversity.

— Massachusetts Governor  
Charlie Baker

It’s really a wide range of people that get hired into this industry, everybody from certified and licensed engineers to those who first learned about a solar project when we were building one in their area. A great aspect of this business is that it isn’t an exclusionary trade. It’s a teachable job that can create opportunity for people and give them a skill.

— George Hershman, senior vice president and general manager at Swinerton Renewable Energy

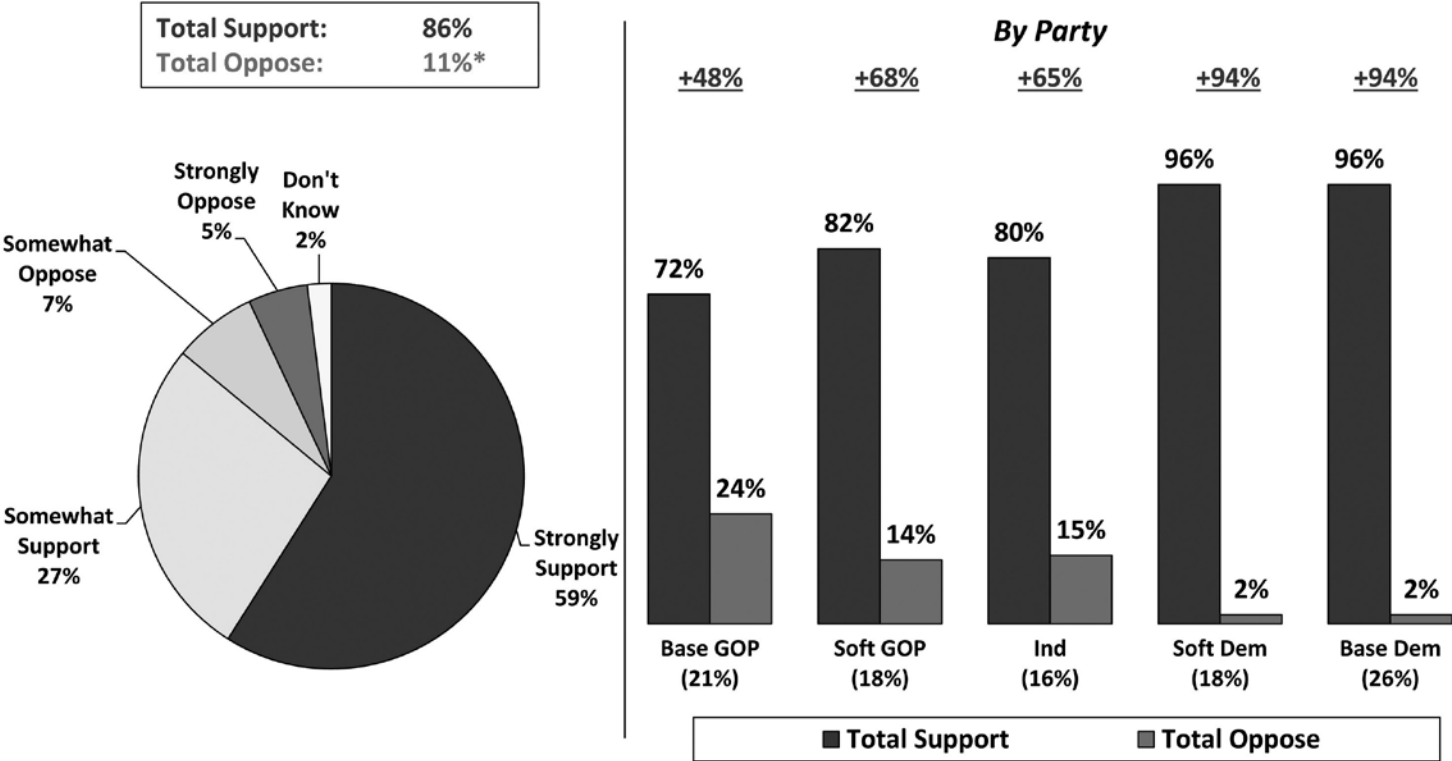
➡

Public Opinion Strategies conducted a post-election national clean-energy survey of 1,000 actual voters. Conduct an Internet search to find a PowerPoint presentation of the survey’s key findings, including the slide at right. If you have any trouble finding the presentation, e-mail [renew@ohvec.org](mailto:renew@ohvec.org).

➡

## 86% of voters support taking action to accelerate the development and use of clean energy.

“And, would you say you support or oppose taking action to accelerate the development and use of clean energy in the United States?”



Post-Election Clean Energy Survey – November 10-13, 2016

20

Renewable energy use translates to bottom-line benefits, such as lower and more stable energy costs for GM in the long-term. With more than 67 megawatts of solar housed at 24 facilities across the globe, we see the power of sunshine as an integral part of becoming a more sustainable company.

— Rob Threlkeld, global manager of renewable energy at General Motors





# WV SUN

West Virginia Solar United Neighborhoods

## Greater Huntington Area Folks Can Join Solar Co-Op for Discounts, Support

People living in the greater Huntington area have formed a solar co-op to save money and make going solar easier, while also building a network of solar supporters. OVEC, the Marshall University Sustainability Department, the League of Women Voters, WV SUN, and OH SUN sponsor the co-op. The group is open to folks on both sides of the Ohio River.

Those interested in joining the co-op can sign up here: [wvsun.org/huntington](http://wvsun.org/huntington).

Joining the co-op is not a commitment to purchase panels. WV SUN will help the co-op solicit competitive bids from area solar installers.

Co-op members will select a single company to complete all the installations.

They will then have the option to purchase panels individually based on the installer's group rate. By going solar as a group and choosing a single installer, participants generally save up to 20 percent off the cost of their system.

"A local solar co-op is an exciting venture, and we are proud to be a part of it," says Natalie Thompson, OVEC's executive director. "Interested residents will have the opportunity to become knowledgeable and informed about solar generation and how they can invest in solar energy."

"The co-op is a great opportunity to demonstrate how solar energy can help our communities be more self-sufficient," says Autumn Long, with WV SUN solar co-op.

Ben Delman, the communications manager for Community Power Network, says that solar co-ops also are being organized in Charleston, Wheeling, Lewisburg and Beckley. A group in Morgantown recently completed its second round of solar installations.

"The price has dropped significantly in the past several years," Delman says. "For a lot of people who were looking at solar a few years ago, the numbers didn't pencil in, but today they would. The idea of the co-op is that it is a great chance to not only get a better price but to also have the peace of mind of making a solid and informed decision with an installer that has gone through a vetting process."

## Solar Solutions for WV's Degraded Land

*In February 2017, the Morgantown-based consulting group Downstream Strategies released a report titled, "Prospects for Large-scale Solar on Degraded Land in West Virginia." Here are some excerpts:*

Investment in renewable energy is at an all-time high. In the United States, despite low wholesale electricity rates, uncertainty about policy and incentives, and low natural gas prices, growth in the renewable energy sector continues to outpace projections.

Worldwide, as nations adopt ambitious goals to fight climate change, solar photovoltaic (PV) projects have emerged as frontrunners in the new low-carbon economy, and despite political uncertainty, solar stocks are expected to have a bright future. In 2015, investment in renewable power capacity was more than double that of new coal and natural gas generation.

Drastically increasing electricity

production from solar PV does not require covering West Virginia's cherished greenspaces and valuable agricultural land in solar panels. In addition to post-mined land, West Virginia is dotted with other types of degraded lands, including abandoned mine lands (AMLs), hazardous waste sites, landfills, and Superfund sites.

Large-scale solar development on these sites would honor West Virginia's rich energy production heritage, reduce state greenhouse gas emissions, and put West Virginians back to work. As utilities such as Kentucky Utilities Company and corporations like Amazon and Apple increase their investments in large-scale solar in the Appalachian region, it is important that West Virginia position itself to attract this business.

Former coal mines and other types of degraded lands once acted as the life-force for the mountain communities they

surround. But today they sit barren and empty.

There is no single silver bullet that West Virginia can deploy to create jobs and solve its financial woes. However, the strategic development of large-scale solar facilities on degraded lands can be one part of the solution. West Virginia must act now to capitalize on the growing 21st-century energy market and put our lands to valuable economic use once again.

In an article about Downstream Strategies' report, the *Beckley Register-Herald* noted, "The first large-scale solar project in West Virginia may be built soon by Appalachian Power, which recently released a 'request for proposals' for 25 megawatts of solar projects in West Virginia or Virginia."

Let's hope West Virginia lands the project. That would be a real boost to our renewable energy future.



# No Doubt: Renewable News Signals Cleaner Energy Future

## 2-22-17 *Clean Technica*: Why Pursue New Coal, When Solar Towers + Storage Better On All Counts?

Solar towers and storage can match and beat coal on capability—providing baseload and flexible generation—and match new coal on cost, and provide zero emissions output as a bonus.

Solar towers and storage provide baseload power, power on demand, bulk storage, and use steam turbines to provide supporting services normally delivered by fossil fuel generation.

SolarReserve has been operating the Crescent Dunes plant in Nevada—its first—for more than a year and the 100MW facility is delivering power to Las Vegas between the hours of noon and midnight.

## 2-15-17 *MarketWatch*: The Tipping Point For Renewable Energy is Nearly Here

Renewable power is taking off around the world and fast approaching a tipping point in its development, with costs falling quickly.

The fastest-growing job category in the U.S. is that of wind-turbine service engineer, with median pay around \$51,050 a year.

In January, China said it would shut 85 coal plants and invest \$350 billion in renewable sources of energy.

While government policy to diversify energy sources has driven much of this near-term growth, a sharp fall in technology costs has accelerated the deployment of renewables to the point where in some regions they now can compete with coal or gas without subsidies. The cost of solar modules worldwide has fallen 80 percent since 2008, and the levelized cost of energy for wind has fallen 50 percent since 2009.

## 2-14-17 *CNBC*: U.S. Solar Installations Nearly Doubled in 2016

Solar power installations doubled in 2016 over 2015, as more and more areas of the United States began pulling their power from the sun.

Nearly 40 percent of new power-generation projects added last year were solar, in terms of electrical production capacity. A record 22 states each added more than 100 megawatts, the report says.

It was also the first time since 2011 that the growth of nonresidential installations surpassed residential solar growth, and that was driven mostly by utility-scale projects.

There are now 1.3 million solar installations across the nation, with a cumulative capacity of over 40 gigawatts. The Solar Energy Industries Association estimates that 1 megawatt of electricity can power 164 homes, so 40 gigawatts is enough capacity to power 6,560,000 U.S. households.

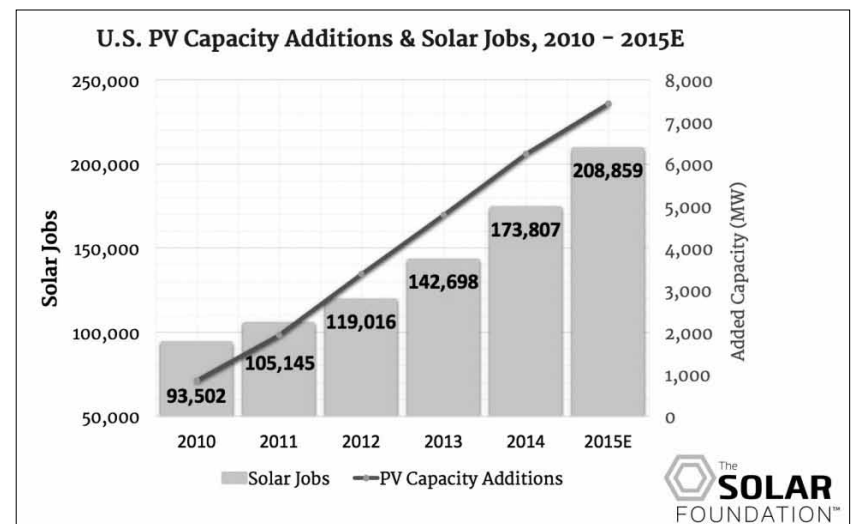
## 2-7-17 *Morning Energy*: Take a Glance! Solar Explosion Not Letting Up

Solar industry jobs grew 24 percent over the last year to more than 260,000 nationwide, according to a report today from The Solar Foundation. One out of every 50 new jobs created in the U.S. between November 2015 and November 2016 came in the solar field, the report finds, and employers expect overall solar jobs to exceed 286,000 by November 2017.

## 2-7-17 *Planet Ark*: Solar, Wind Energy Now Cheaper Than Fossil Fuels in More Than 30 Countries

A recent World Economic Forum report reveals that in 2016 solar power became the same price or cheaper than fossil fuels for the first time.

The report charts how much the cost of renewable technologies has plummeted. A decade ago, generating electricity through solar cost \$600 per megawatt-hour. Five years later it was down to \$300, and now



the cost has fallen to around \$100, about the same or less than the cost for coal and fracked gas. For wind, the cost is around \$50.

With renewable energy now an undeniable contender for development, this could result in a wholesale shift in the way energy is generated.

## 2-4-17 *Sunday Gazette-Mail*: Price of Solar Coming Down

Finally, harnessing the sun is a workable reality, thanks to rapid technology advances. Bloomberg News recently reported: “Solar power, for the first time, is becoming the cheapest form of new electricity.”

Chile signed a contract for a solar facility that will generate power for \$29 per megawatt hour. “That’s record-cheap electricity—roughly half the price of competing coal power,” Bloomberg says.

## 1-25-17 *NOAA*: Rapid, affordable energy transformation possible

The U.S. could slash greenhouse gas emissions from power production by up to 78 percent below 1990 levels within 15 years while meeting increased demand, according to a new study by NOAA and University of Colorado Boulder researchers.

Their research shows a transition to a reliable, low-carbon, electrical generation and transmission system can be accomplished with commercially available technology and within 15 years.

The good news on the renewable energy revolution does not stop.  
OVEC updates our website frequently with interesting and important news.  
Check [ohvec.org/renewable-energy](http://ohvec.org/renewable-energy) often.



# Fracking and Water

Fracking uses huge quantities of water for each well fracked. The typical Marcellus Shale process uses four to six million gallons per well. The deeper Rogersville Shale would require more water.

Although the quantity of water used presents ever-growing problems, questions of what happens to water quality are also deeply troubling. In fracking areas all over the country, citizens have raised alarms about the contamination of drinking and household water from fracking-related activities.

In Pennsylvania, where fracking of the Marcellus Shale has been going on several years longer than it has in northern West Virginia, landowners and the Pennsylvania Department of Environmental Protection (PA DEP) disagree on exactly how many private wells are contaminated. But even the PA DEP has said that 245 sites are potentially contaminated by fracking.

In some fracked areas of northern West Virginia, people who used to have good well water are now forced to use trucked-in water, stored in “water buffalos,” for drinking, cooking, bathing, laundry, and other household uses.

In some cases, the replacement water for their contaminated well water is paid for by the fracking company that polluted it, after an agency or a lawsuit forced the company to pay.

We’ve heard of several instances of residents not trusting the water that is delivered as replacement water. They may use the replacement water for assorted cleaning-related tasks, but those who can afford to buy jugs of water for drinking and cooking do so.

Clean water is essential to human health and economic development.



Water is life, pure and simple. Before birth, we float in amniotic fluid that is primarily water. The average infant’s body is 75 to 78 percent water. The average adult’s body is typically 65 percent water. Our brain is 70 percent water, and our blood is 80 percent water. Our bodies can’t survive more than a week without water, but only 3 percent of the water on earth is freshwater.

Given that so little freshwater on our planet is available for our use, common sense begs that we protect it from pollution. But, almost daily, we hear about threats to this life-giving natural resource, nationwide and here at home. If we choose renewable energy, we have a better chance to safeguard clean water. It takes clean water to renew West Virginia!

## Join a WINNING TEAM! Get ACTIVE with OVEC!

☒ **OVEC** promotes renewable energy jobs and sustainable development in West Virginia.

☒ **OVEC** is changing the face of “politics as usual” with our Clean Elections work.

☒ **OVEC** has a history of successes. Since 1987, we’ve helped protect human health, reduce pollution, save forests, and make West Virginia a better place.

☒ **OVEC** is committed to working with West Virginians who share our values.

\*If joining OVEC presents a financial burden, we do have a no-fee, “sweat-equity” membership option. Call us at 304-522-0246 for details.

**OVEC is headquartered in Huntington, WV. We work primarily in the Mountain State. Help grow our power: Volunteer! Join OVEC!**

Learn more at [ohvec.org](http://ohvec.org).

**Mail this form today, with a check made payable to OVEC:**

**P.O. Box 6753, Huntington, WV 25773-6753**

\_\_\_ Join OVEC or renew your membership:  
\_\_\_ \$20/year \_\_\_ \$60/year (Sustainer) \_\_\_ \$250 or more/year (Major Donor)  
\_\_\_ Join via sweat equity\* \_\_\_ Make an additional donation: \$ \_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

City/State/Zip \_\_\_\_\_

Phone \_\_\_\_\_

E-mail \_\_\_\_\_

\_\_\_ I’d like information about supporting OVEC with my Kroger Plus Card

\_\_\_ I want to receive the printed newsletter - *Winds of Change*

\_\_\_ yes \_\_\_ no (I read it online at [ohvec.org](http://ohvec.org))

**or join online at [www.ohvec.org](http://www.ohvec.org)**

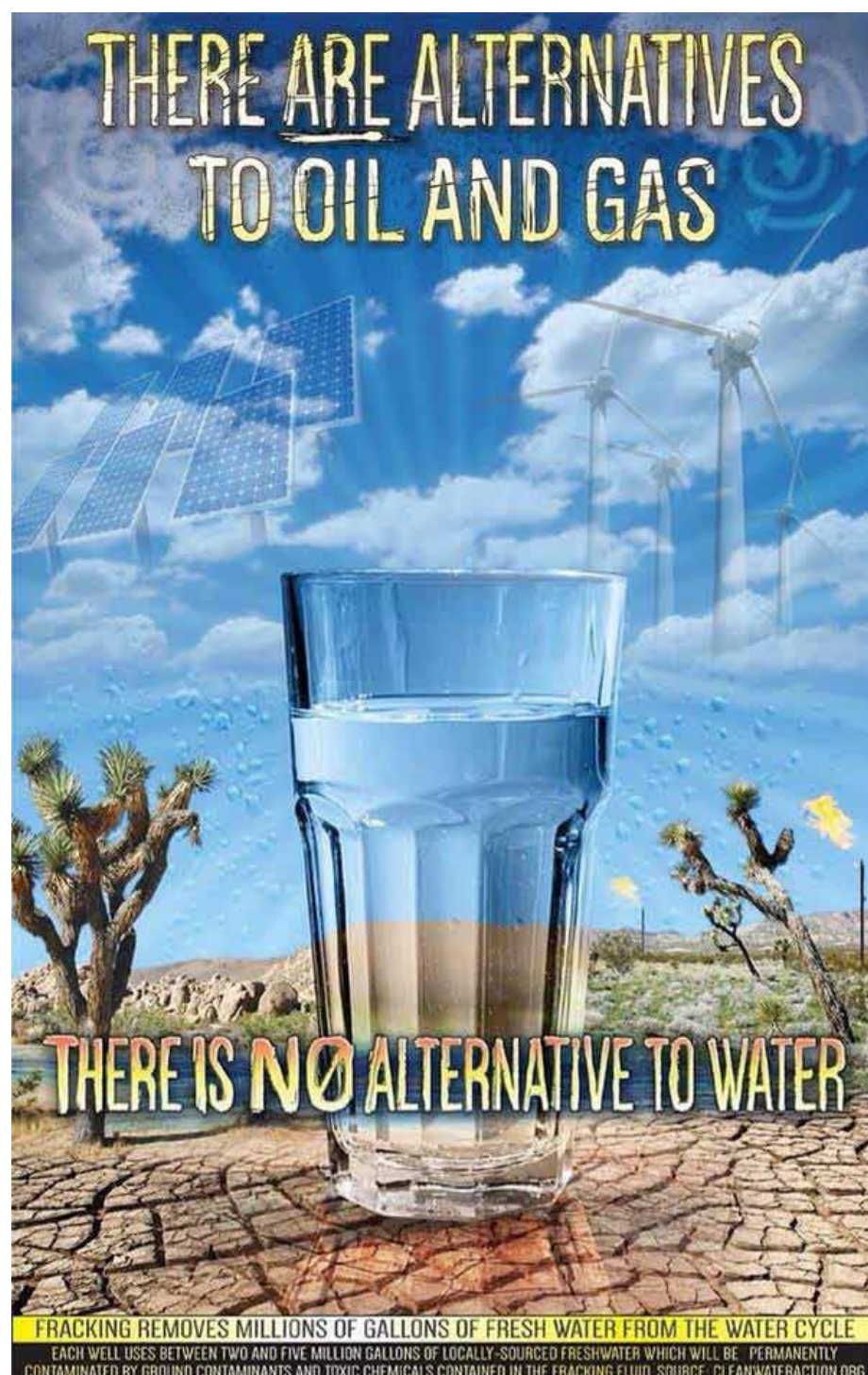
OVEC is a 501(c)3 non-profit organization. Contributions are tax deductible. WV residents may obtain a summary of our registration and financial documents from the Secretary of State, State Capitol, Charleston, WV 25303. Registration does not imply endorsement.

Renew West Virginia  
is a publication of OVEC, the  
Ohio Valley Environmental Coalition  
P O Box 6753  
Huntington WV 25773-6753

NON-PROFIT ORG  
U.S. POSTAGE  
PAID  
HUNTINGTON WV  
PERMIT NO 370

\*\*\*\*ECRWSS\*EDDM\*\*\*\*

Postal Customer



Above: Actual headlines from news reports. Use a search engine to find complete reports online.