

RESOLUTION ON MARCELLUS
SHALE DRILLING

Linda Nicholson and Colleagues
November 11, 2009

Marcellus Shale Gas Drilling Resolution

Brought by Faculty Senators:

Linda Nicholson, Molecular Biology & Genetics

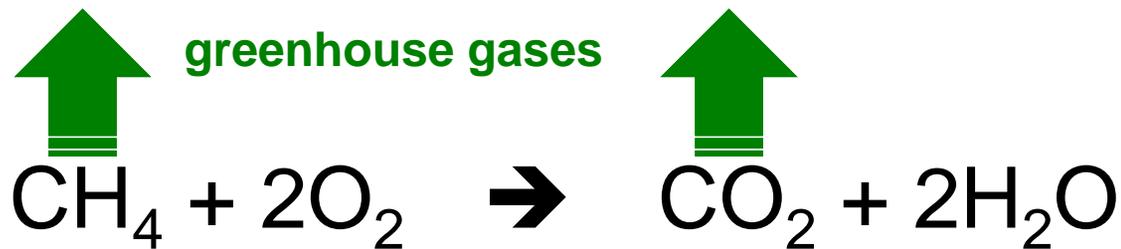
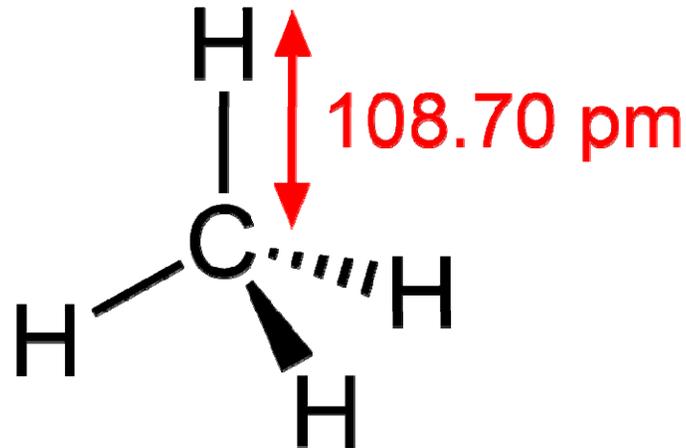
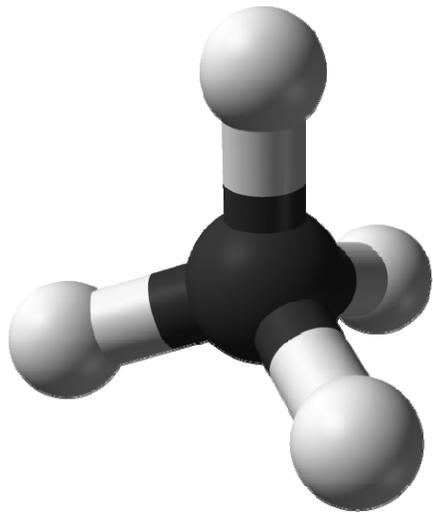
Peter Hinkle, Molecular Biology & Genetics

Clare Fewtrell, Department of Molecular Medicine

Ted Clark, Department of Microbiology and Immunology

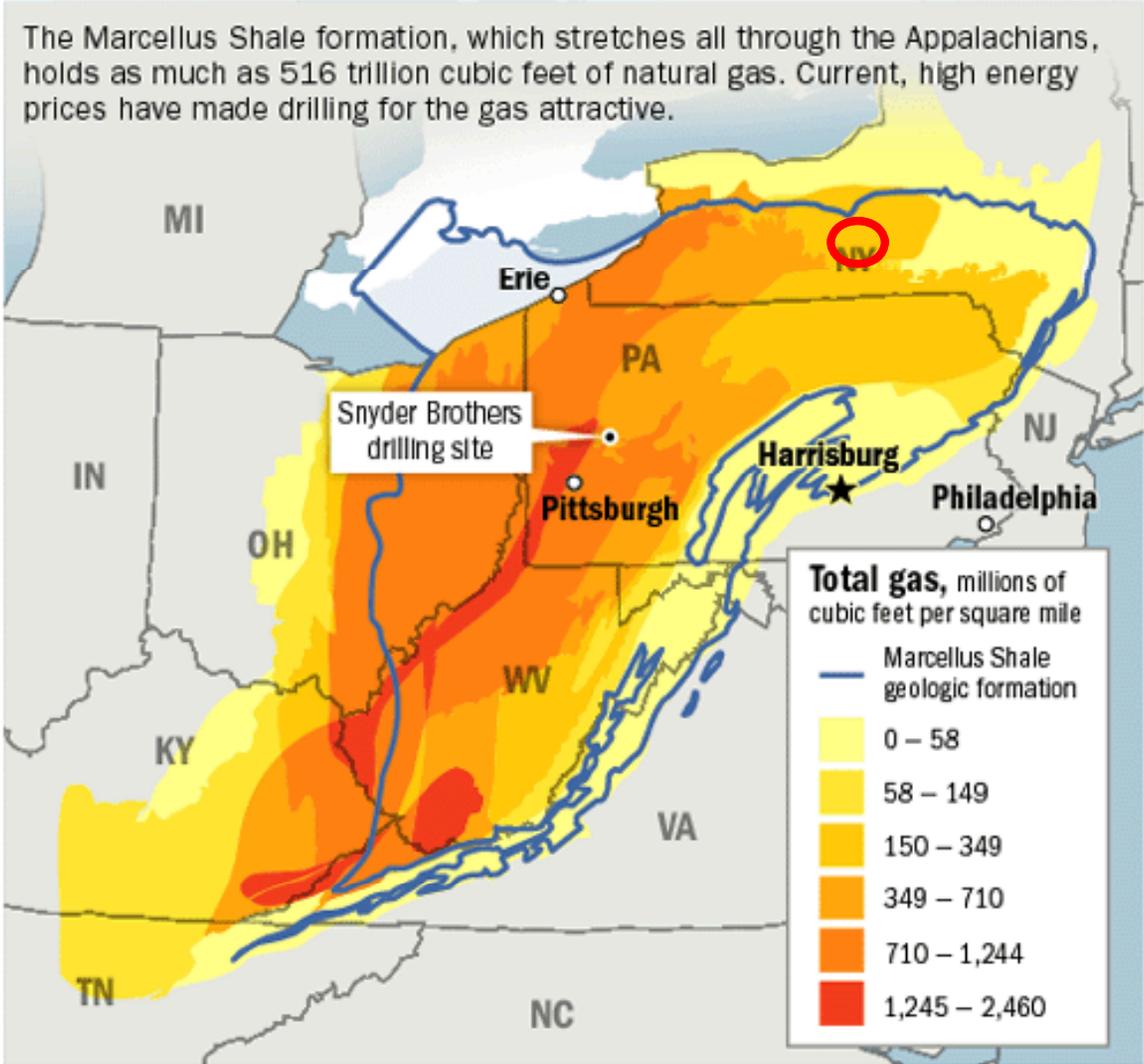
Ron Booker, Department of Neurobiology and Behavior

natural gas (methane)



Untapped riches

The Marcellus Shale formation, which stretches all through the Appalachians, holds as much as 516 trillion cubic feet of natural gas. Current, high energy prices have made drilling for the gas attractive.



Source: U.S. Bureau of Land Management, Geology.com, Catskillmountainkeeper.org

Ed Yozwick, Keith McCafferty/Post-Gazette

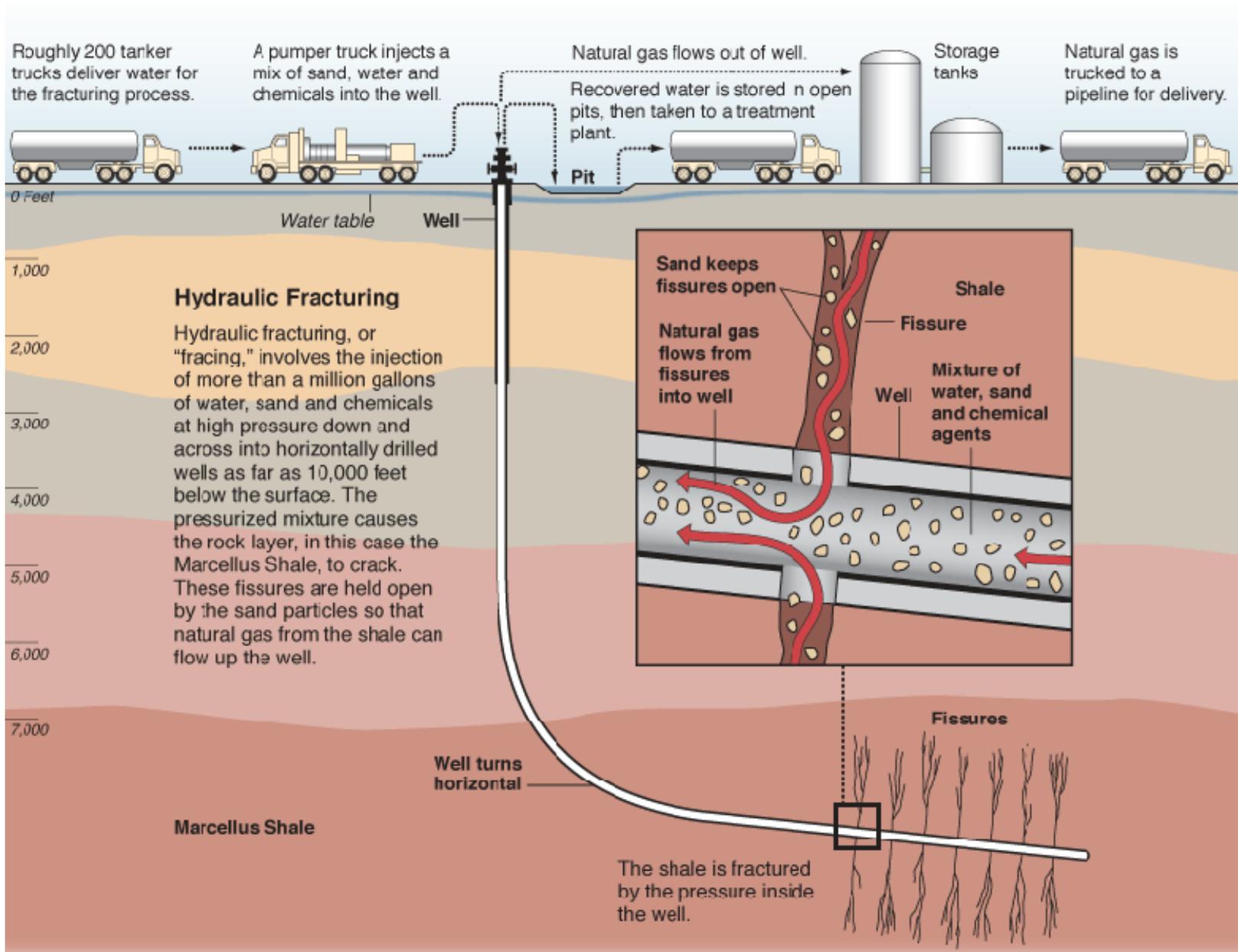
http://www.post-gazette.com/images4/20080720Marcellus_Shale_map.gif

Why Now?



Source: WVSORO Drill Rig in West Virginia

- Increase in reserve estimates
- Economics
- Technology to access
- Wall Street acceptance of unconventional plays (sources)



Source: Cornell Cooperative Extension

Graphic by Al Granberg

Aerial View of Well Pad

- 3-5 acres
- cleared industrial area
- drill rig(s)
- trucks
- holding pits
- pipelines
- storage tanks



Hydraulic Fracturing



Source: Chesapeake Energy 2008
Hydrofrac'ing a Marcellus Well, West Virginia

***PROPRIETARY** formulation, including known carcinogens, endocrine disrupters, arsenic, hydrogen sulfide, mercury, benzene, toluene, xylene and formaldehyde

- fracturing with large volumes of high pressure water = hydrofracturing
- To suspend sand in water, chemicals* are added (~1% of total vol.)
- 364+ water trips per well (3 – 5 million gal)

(Estimate Denton TX Oil & Gas Task Force)

Water Impacts



- Flowback water has high levels of:**
- Brine (salt), Total Dissolved Solids (TDS)
 - Heavy Metals, Radioactivity
(radium 226 and 228 brought to surface)
 - Drilling & frac'ing chemicals

Source: J. Henry Fair Dimock PA

Disposal Options

- Municipal Wastewater Treatment Plants
 - Questions about capacity, cost, down-stream effects
 - Specifically-designed Treatment Plants
 - Construction of several plants being planned/discussed
(Towanda, PA; Waverly, NY)
- Injection Wells
 - Are rock formations here suitable?
 - Long-term science/safety impacts are less known
 - Test well planned for Chemung Co.

Walter Hang, Toxics Targeting

“For example, the **Village of Cayuga Heights** disclosed last March that it received more than ***3.0 million gallons of contaminated drilling wastewater***. Without undertaking a state-required "headworks analysis" or enforcing local pretreatment requirements, the wastewater was accepted at a sanitary treatment plant that ***discharged into an impaired section of Southern Cayuga Lake, where approximately 30,000 local residents obtain their drinking water downstream of the facility's***

New
Spacing
– 40
acres



- Source: Skytruth.org

Jonah Basin, Wyoming

More Pipelines



Source: Fortuna Energy

Local Impacts

- Water Consumption
- Waste Disposal
- Groundwater Well and Surface Water Contamination
- Surface Disturbance
- Noise
trucks/drilling/frac'ing/compressors
- Air Quality truck exhaust, flaring, emissions from pipelines



Source: All Consulting 2008 Lined Pit in Pennsylvania from a Marcellus Well

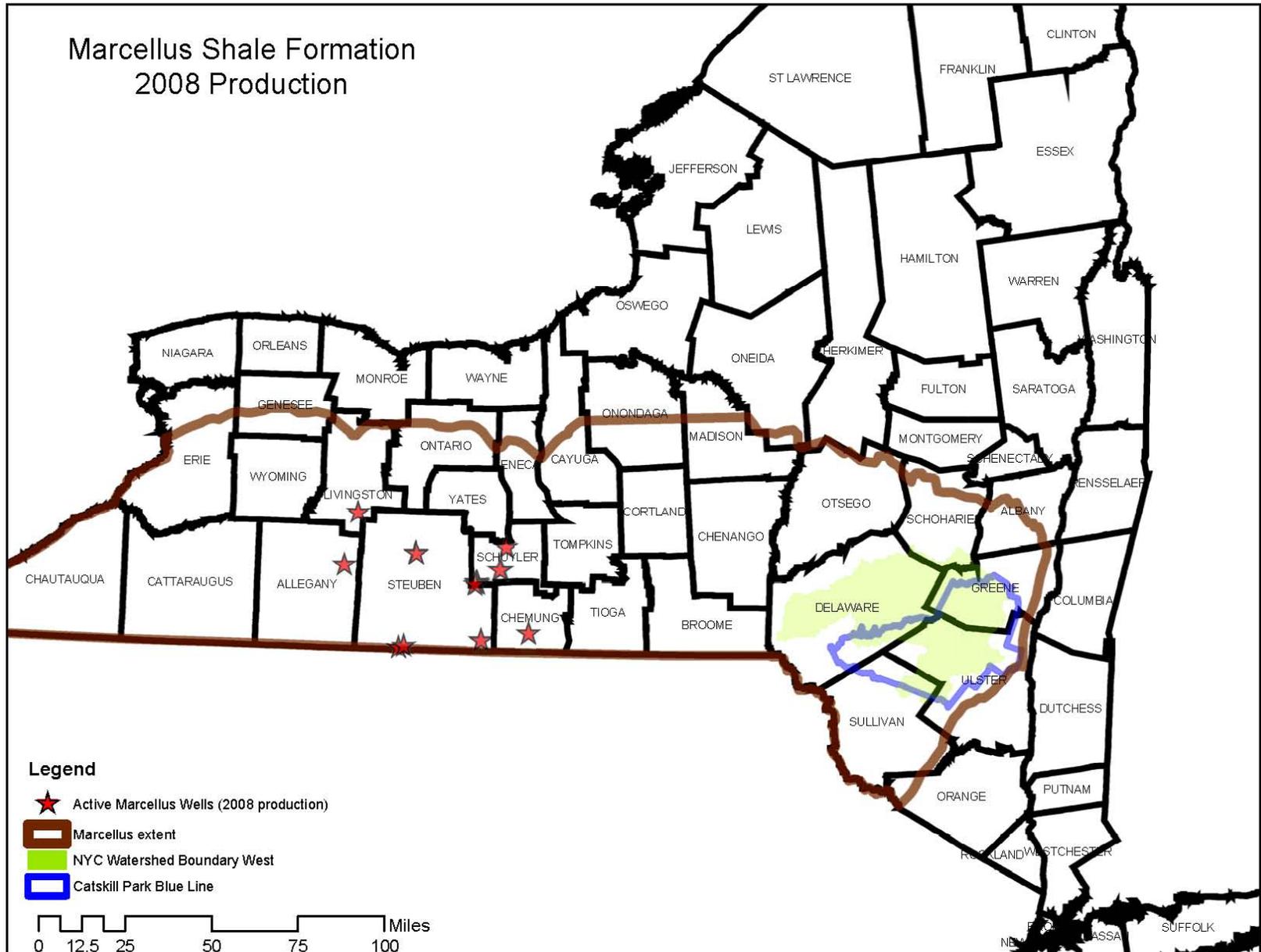
Current Drilling Activity



Source: Sky Truth

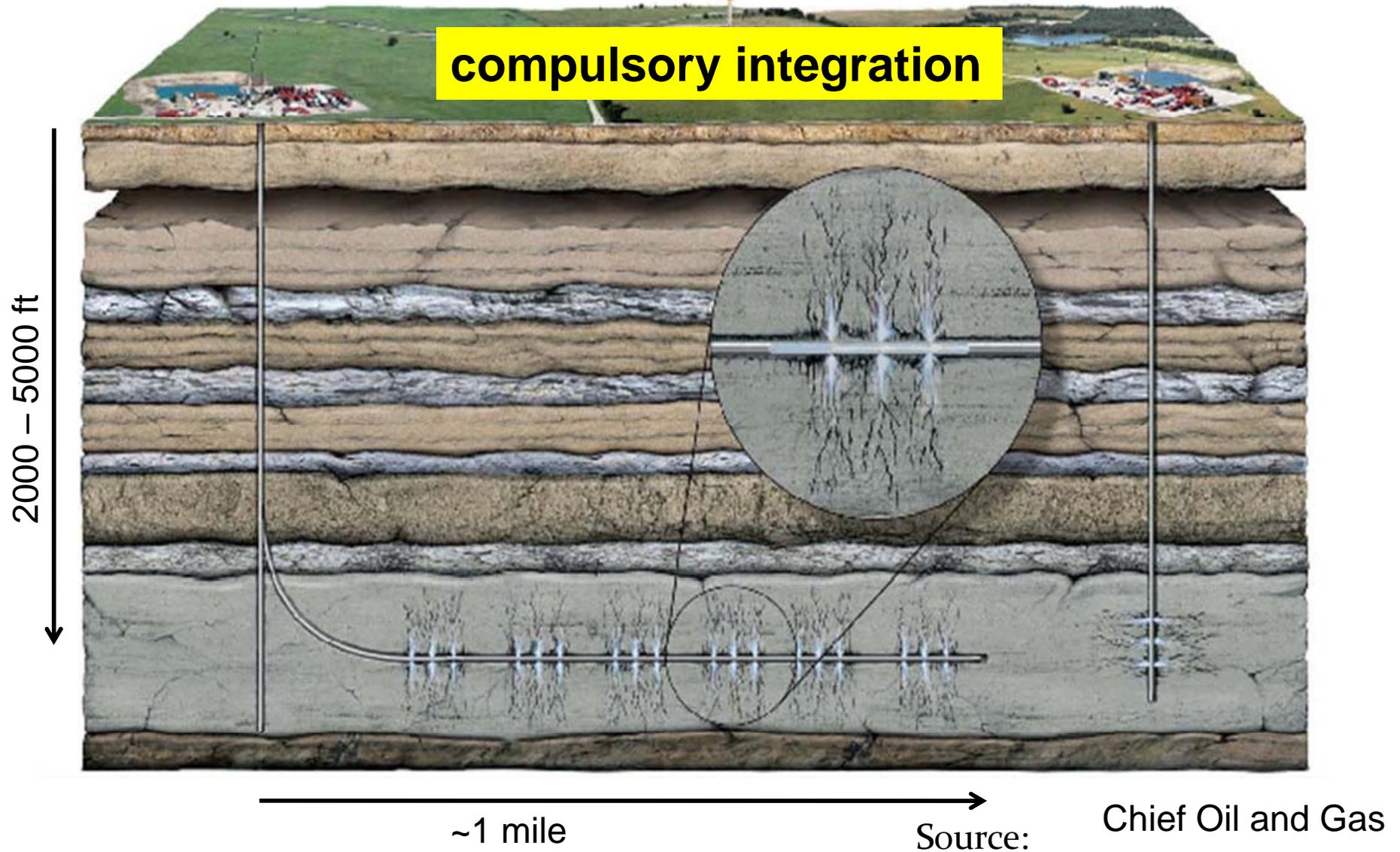
- Active drilling in Marcellus Shale in PA
- **Well information is posted on DEC's website**
<http://www.dec.ny.gov/energy/46288.html>
- Active drilling in other rock formations in NY
- Active vertical wells in Marcellus formation in NY
- Permits for horizontal Marcellus drilling in NY
on hold during DEC's SGEIS review

Marcellus Shale Formation 2008 Production



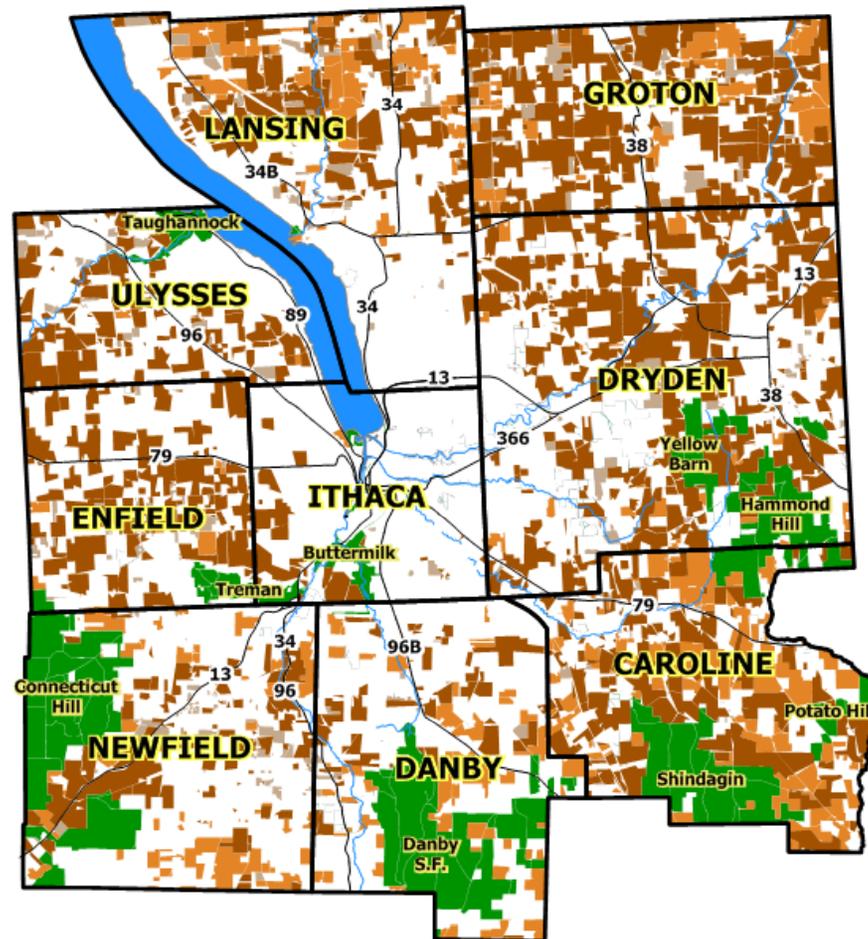
Vertical vs. Horizontal Drilling

compulsory integration



Tompkins County Lands Leased for Gas Drilling

www.tcgasmap.org



More Information

<http://gasleasing.cce.cornell.edu>

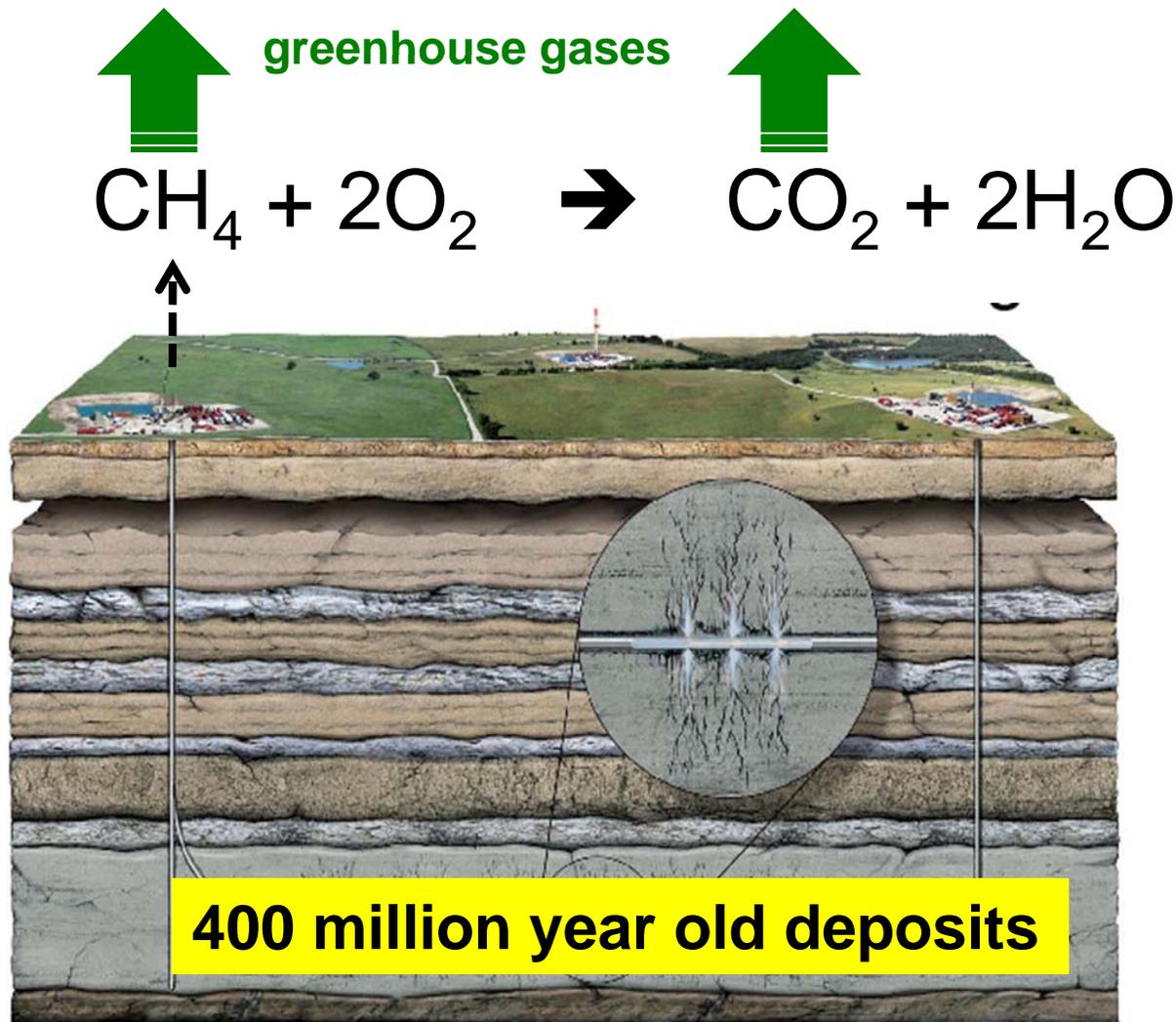
www.tcgasmap.org

www.propublica.org

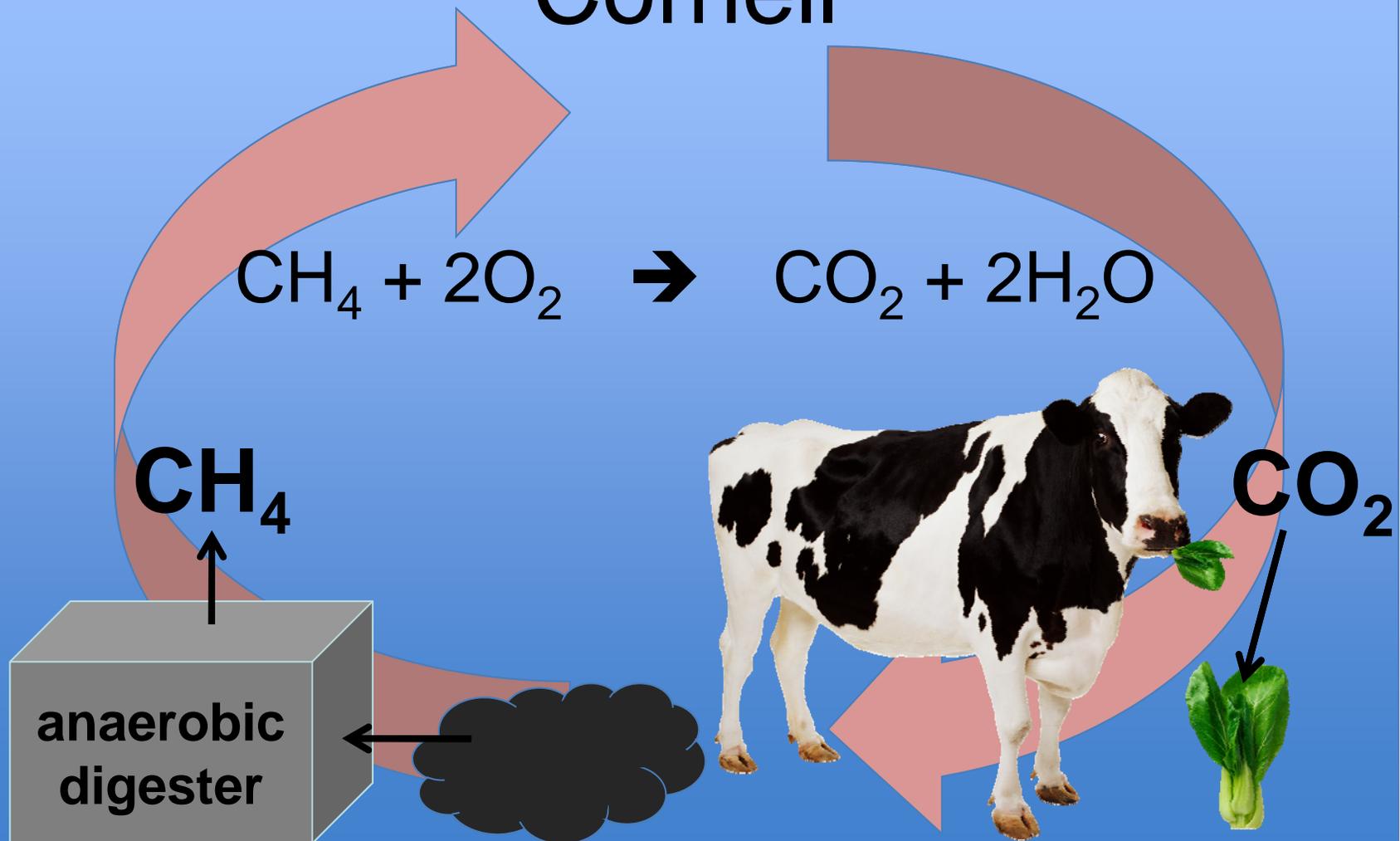
www.shaleshock.org

www.endocrinedisruption.org

Non-Sustainable Energy Use



Sustainable alternatives for Cornell



Cash Cows: Vermont Dairy Farm Converts Cattle Manure into Electricity



By [Jace Shoemaker-Galloway](#) | October 30th, 2009 [6 Comments](#)



A Vermont dairy farm is producing something other than milk. Earlier this month, state officials were on hand to visit Vermont's newest methane facility. Westminster Farms Inc., along with [Green Mountain Power](#) (GMP), have been working together in an on-site plant that converts methane gas released from cow manure into electricity.

Cow manure is one of the largest contributors to greenhouse gasses and the runoff from manure pollutes water. Taking a liability and converting it into an asset, just made environmental and economic sense to the farm's Shawn Goodell. An anaerobic digester is used to mix, heat and break down the manure. The raw manure and ag substrates produce methane biogas, which is captured and then generates electricity. And with an estimated 1,200 cows on the Westminster-based dairy farm, finding a supply of manure is not a problem! Sure gives new meaning to the term "natural gas"

doesn't it?

Liquid waste will be used as fertilizer. Leftover solids will be used as cattle bedding, saving the farm about \$80,000 on the cost of sawdust. And that is good news, especially considering the state of the economy. Like other businesses and industries, the dairy industry is also feeling the pinch. It is estimated that less than 1,100 dairy farms remain in Vermont. That's about 300 less than five years ago.

While the technology is not new to Vermont, Westminster Farms is the latest dairy farm in Vermont to convert methane into energy. Westminster Farms will receive a fixed price per kilowatt hour generated. Since July, the project has been producing about 225 kilowatts of electricity, enough to power about 250 homes on a daily basis. GMC customers will be given the option of purchasing the renewable energy.

The project took about three years to bring to fruition. Funding for the \$1.5 million project was a collaborative effort between both state and federal agencies. According to the [GMP press release](#), Westminster Farms invested about \$700,000 and Vermont-based Green Mountain Power committed \$175,000. Other agencies involved in funding the endeavor include the U.S. Department of Agriculture (USDA), Vermont Department of Agriculture, Vermont Agricultural Credit Corporation (VACC) and Vermont Clean Energy Development Fund.

WHEREAS, It is estimated that the geologic rock bed known as Marcellus Shale may contain up to several trillion cubic feet of natural gas, and dramatic increases in the price of crude oil and the corresponding need to reduce our nation's dependence on foreign oil have resulted in a tremendous increase in interest and activity relating to natural gas exploration and hydraulic fracturing;

WHEREAS, Cornell University is committed to environmental leadership exemplified by the signing of the American University and College Presidents Climate Commitment by President Skorton;

WHEREAS, Cornell University has a great responsibility to preserve and protect its natural resources, water resources, and quality of life for current and future Cornell faculty, staff and students;

WHEREAS, Cornell University is positioned to take a leadership role in the issue of hydraulic fracturing of the Marcellus Shale, sustainability education and research on water management, soil health as well as animal and human health and medicine;

THEREFORE, BE IT RESOLVED, that the Cornell Faculty Senate urges President David J. Skorton:

- 1. To **establish a committee** of faculty, staff, students and alumni **empowered with the decision** of whether to lease any university-owned lands to natural gas drilling companies.*
- 2. To urge the New York State Department of Environmental Conservation to **delay the issuance of permits for gas drilling** until such time as New York State has completed all necessary and appropriate studies and has in place an adequately funded as well as staffed inspection and enforcement program.*
- 3. To urge New York State to **enact a severance tax and adequate permit fees on gas drilling companies** to pay the costs of regulation and oversight of drilling, and to mitigate the cost of repairing roadways and resolving environmental impacts due to drilling.*
- 4. To urge New York State to require that **all chemicals** (and specific formulations of those chemicals) **intended to be introduced into wells be identified and the information be made public**, with special notification to local emergency response personnel and health care providers, before use of such chemicals is permitted.*

Resolution on Marcellus Shale Drilling

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