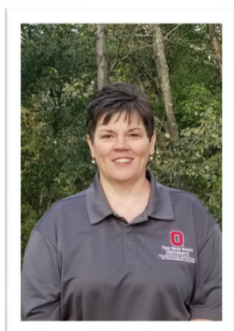
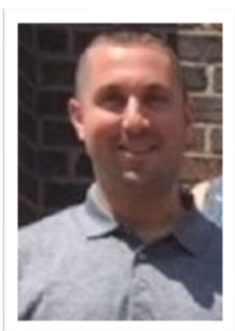


Impacts of Shale Development in Eastern Ohio

OSU Extension Energy Outreach Program



Dan Lima ~ Lima.19@osu.edu
Extension Educator, Agriculture & Natural
Resources – Belmont County

Gwynn Stewart ~ Stewart.1818@osu.edu
Extension Educator 3, Community
Development – Noble County

Impacts of Appalachian Basin Shale Play Development Eastern Ohio

OBJECTIVES:

- Share Details About The OSU Extension Energy Outreach Program & Energize Ohio Web Tool
- Provide Community & Economic Development Impacts to the Region
- Provide Agriculture & Natural Resources Considerations for Land Owners

Digital Session Evaluation

Teaching Assessment and Improvement

We will Share a Link in the Chat Today!
Please Complete the Digital Evaluation!

http://go.osu.edu/EEETdlGS_ShaleDevEastOH

OSU Extension Energy Outreach Program

- The OSU Extension Energy Outreach Program team meets monthly
- Discuss ongoing energy trends
- Learn from invited guest speakers on current energy issues impacting Ohio

CFAES



OSU Extension Energy Outreach Program

OSU Extension

- Christine Gelley
- Dan Lima
- Ken Martin, PhD
- Myra Moss
- Chris Penrose
- Eric Romich
- Gwynn Stewart
- Catelyn Turner

Other OSU Partners

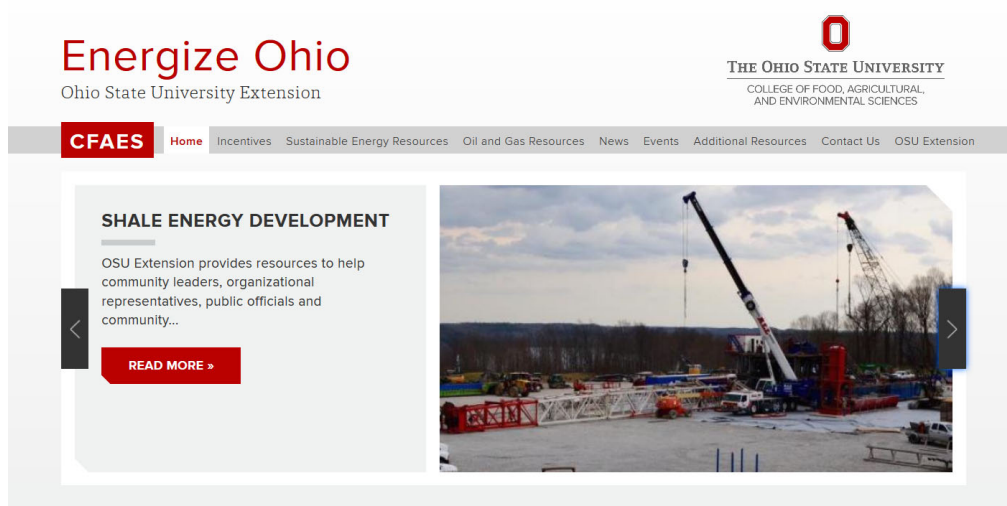
- School of Earth Sciences, Dave Cole, PhD
- School of Environment and Natural Resources, Jeffrey B. Jacquet, PhD

External Partners

- Farm Bureau, Dale Arnold
- ODNR, Mike McCormac
- Ohio Univ. Voinovich College of Public Affairs, Gilbert Michaud, PhD

OSU Extension Energy Outreach Program

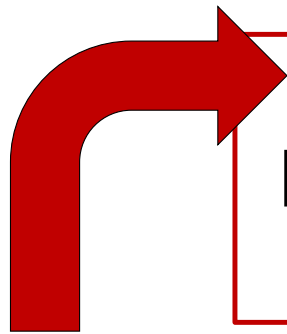
www.energizeohio.osu.edu



- The energy library at energizeohio.osu.edu has a wide variety of energy programs and resources including fact sheets, bulletins and videos.
- A searchable database of energy efficiency and renewable energy incentives can also be filtered to meet individual needs.

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OSU Extension Energy Outreach Program



Statewide Impact: Since 2010, there have been 300 programs provided to 21,490 attendees.



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Community & Economic Development Impacts

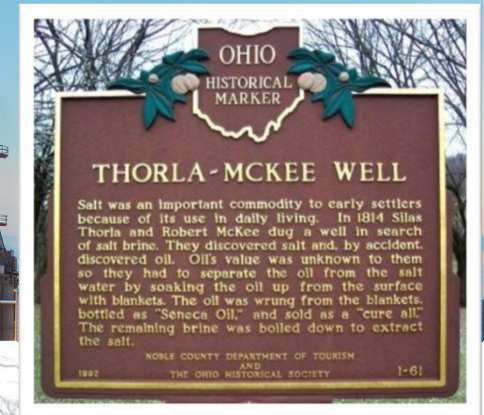


<https://youtu.be/xQcPKo6qlAE>

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The Gas industry has expanded in Noble County with the major Seneca energy gas processing facility.

Oil was first discovered in Ohio in 1814 in Noble County when settlers were digging for salt.



The Noble Co. Thorla / McKee Well
Near Caldwell



Utica East Ohio Harrison Plant,
Seco, Ohio

Ohio

The New Home
of American Energy

**Over \$74 Billion Has
Been Invested since
2011 In Ohio's Utica
Shale Play**



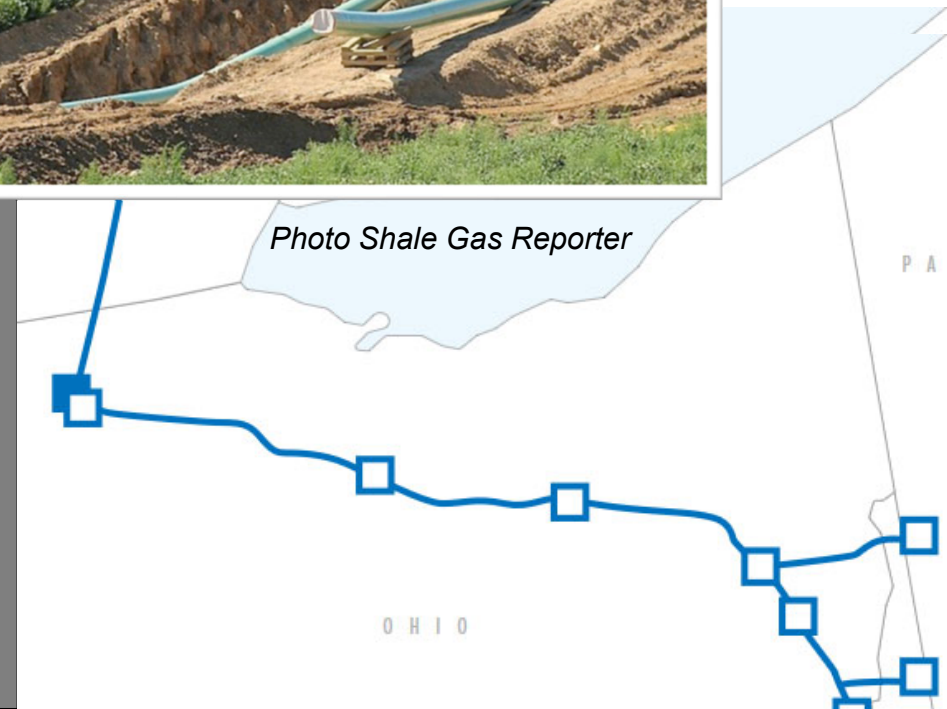
- \$57.1B in Upstream
- \$20B in Midstream
- \$6.2B in Downstream

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JobsOhio

More than \$32 Billion invested in Appalachian Basin Pipelines

- 3,500 miles
- 124,000 jobs
- 27 pipelines





Shale Well Status Over Time

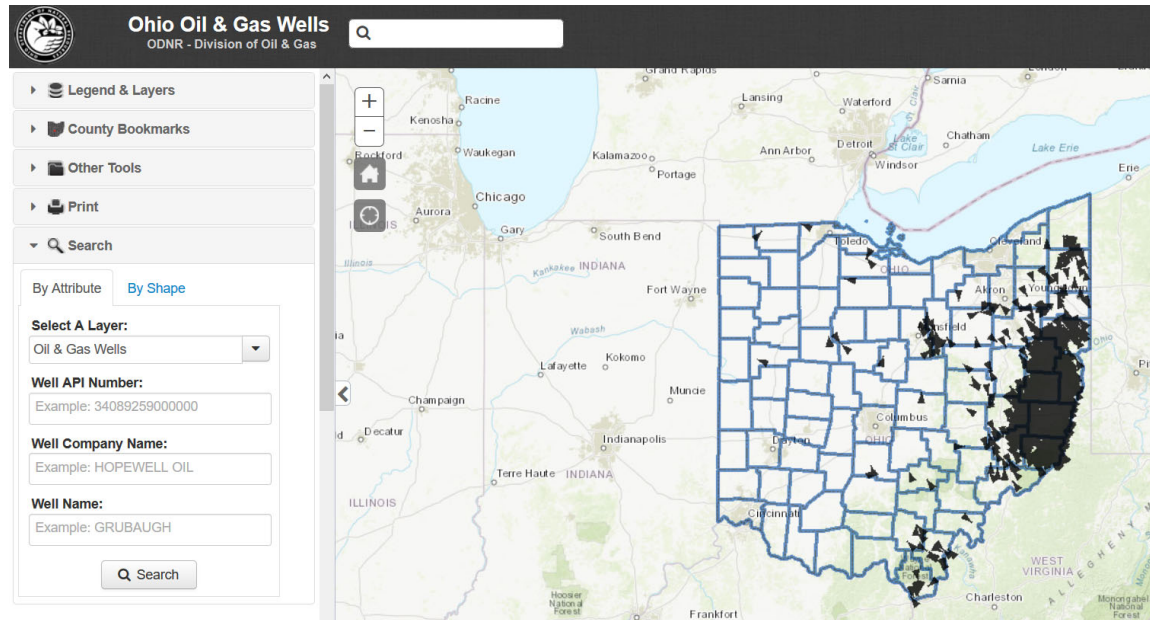
2009-2018



[https://buckeyehills.maps.arcgis.com/apps/Ti
meAware/index.html?appid=ec286108e3c843
cdaee56e7953bd4539](https://buckeyehills.maps.arcgis.com/apps/Ti
meAware/index.html?appid=ec286108e3c843
cdaee56e7953bd4539)

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Shale Well Status Real Time ODNR Well Viewer



<https://gis.ohiodnr.gov/MapView/?config=oilgaswells>

An aerial photograph of a town, likely in the Midwest, showing a mix of residential and commercial areas. In the foreground, there's a large brick building with a white portico, possibly a bank or government office. To its right is a building with a large mural on its side. The middle ground is filled with various commercial buildings, including a large white warehouse-like structure. The background is dominated by a dense residential area with many small houses and trees. The text is overlaid on the lower half of the image.

Oil and gas companies paid more than
\$141 million in property taxes
from 2011 to 2019.

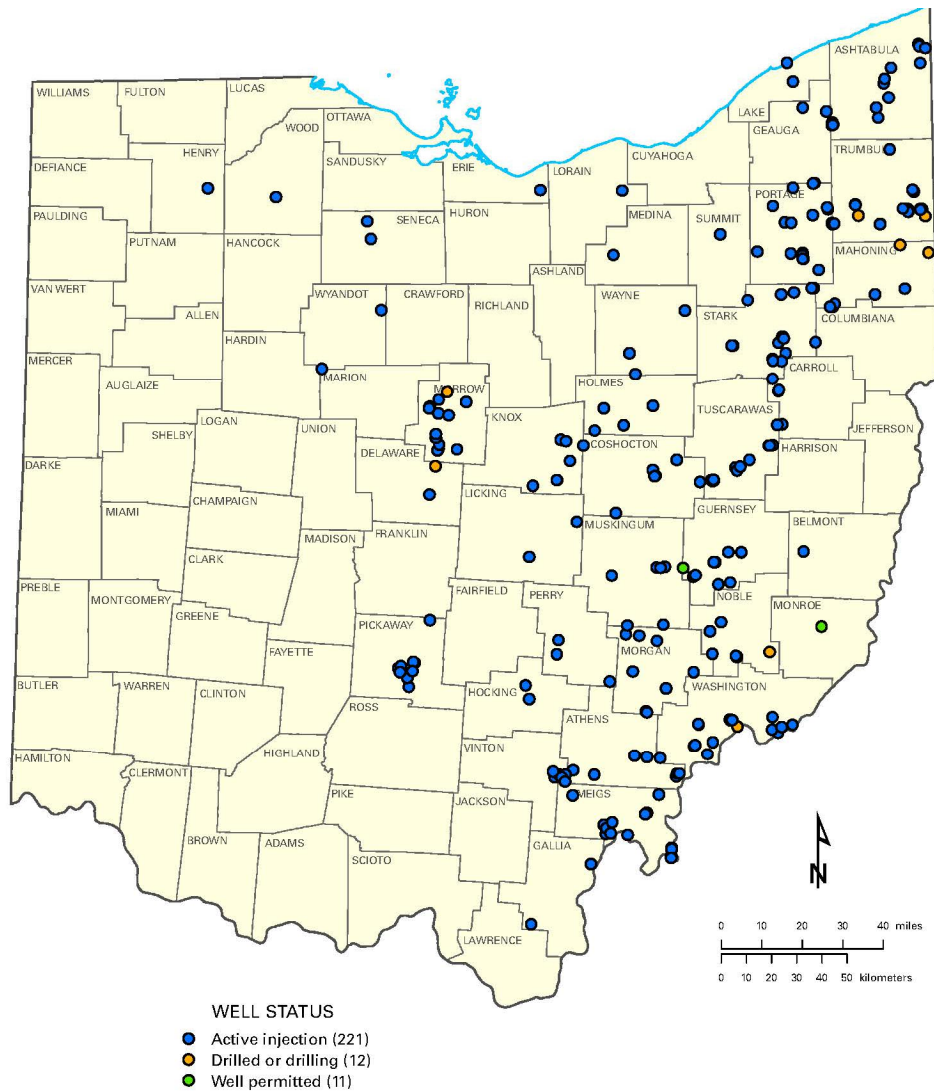
Oil and gas companies invested
\$300 million in road repairs
in shale counties from 2011 to 2018.





Road Use Maintenance Agreement

County	Road Improvement Costs	Miles Improved
Belmont	\$ 62,355,737.70	93
Carroll	\$ 44,715,692.48	99.33
Columbiana	\$ 32,634,228.51	89.77
Guernsey	\$ 53,146,414.20	137
Jefferson	\$ 24,056,901.00	78.52
Harrison	\$ 31,409,026.56	54.75
Noble	\$ 12,587,467.00	14.92
Monroe	\$ 41,757,761.45	72
Totals	\$ 302,663,228.92	639.29



Class II Brine Injection Wells

- Active Injection – 221
- Drilled or Drilling – 121
- Wells Permitted – 11



\$6 Billion Dollar Shell Ethane Cracker Plant Monaca, PA



Located just off I-376 in Potter Township

- Announced 2016
(4 states competing)
- Ready for Production
early 2020s



- Shell indicates the plant would employ as many as 6,000 construction workers. Once open, it would bring 600 new jobs to the region.

Ethane Cracker

Processing plant that takes ethane and breaks it down by heat to create ethylene, which is a base chemical for plastics.



➤ Natural gas liquids (NGLs) are “cracked” or separated – Ethane breaks into smaller molecules to create ethylene

➤ Ethylene – a feedstock used in plastics manufacturing

➤ Polyethylene is used in many products, from food packaging and containers to automotive components

UNDER
CONSTRUCTION —
Royal Dutch Shell’s
cracker plant is
under construction in
Potter Township,
Beaver County. --
Celeste Van Kirk
Herald Star

Source: Shell & Preferred Plastics.com



First of its kind OUTSIDE of the Gulf Coast Region in 20 Years

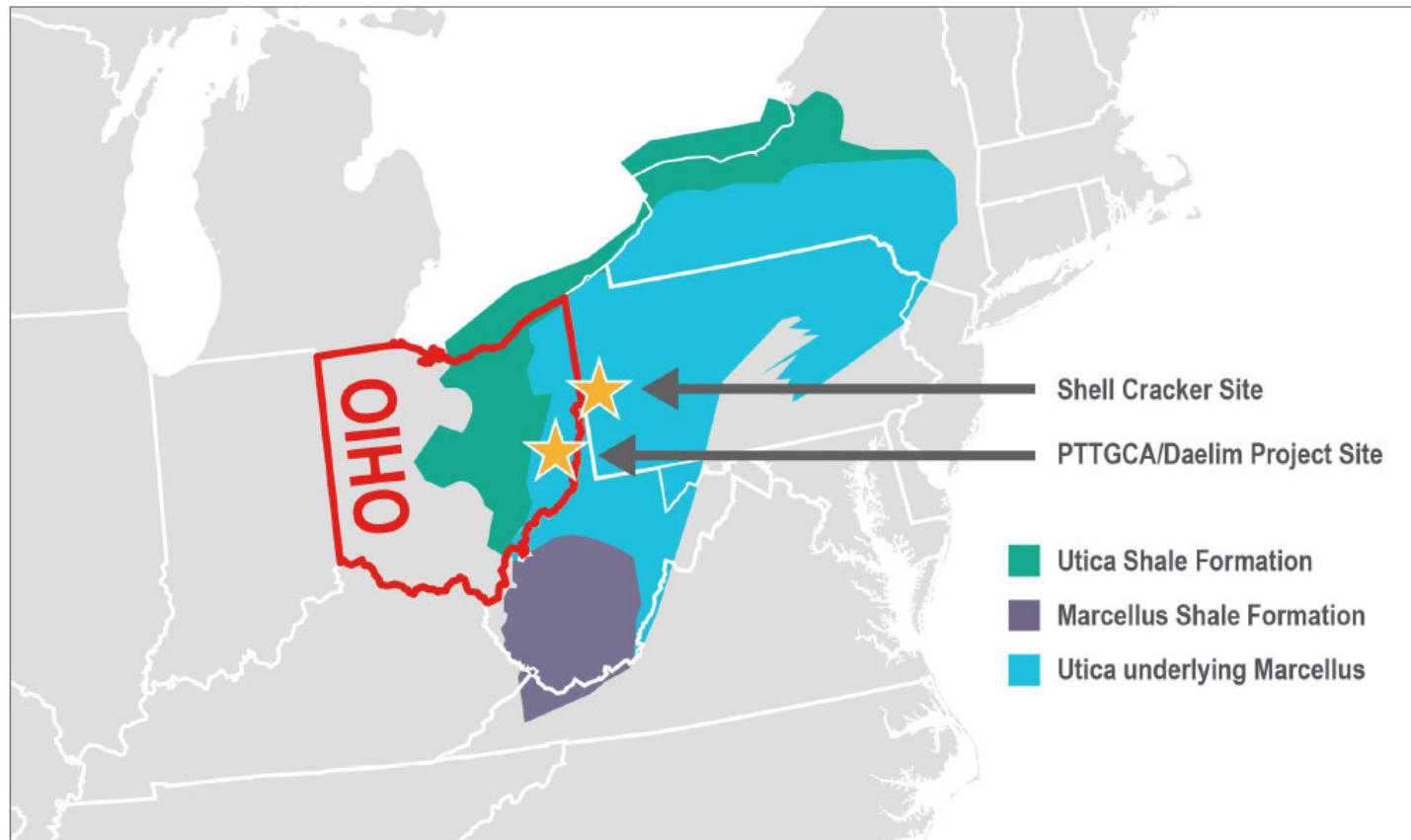
Five factors support this:

- Abundant Natural Gas Supply
- Access to Water
- Proximity to Market Demand
- Skilled Labor Force
- Cost Advantage



Source: Shale Crescent USA

Project Site Location in Relation to Shale



*Courtesy of:
JobsOhio*

PTT Global Potential Site in Belmont County



Proposed Site along
Ohio River in Belmont County



Map By David Benbennick

Why Ohio?

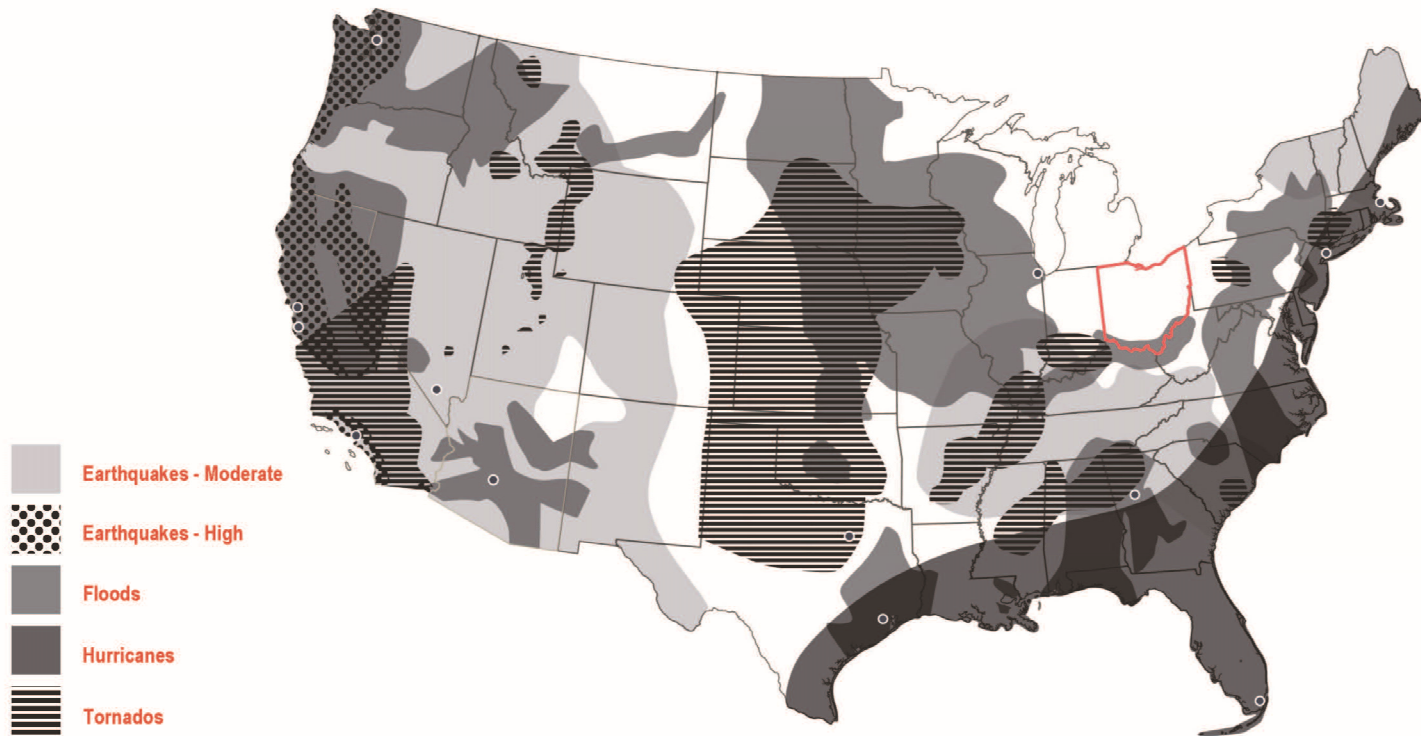
- Better Cost Advantages than National Averages
- Access to Markets
- Lower Natural Disaster Risks



Sources: Shale Gas Reporter & Jobs Ohio

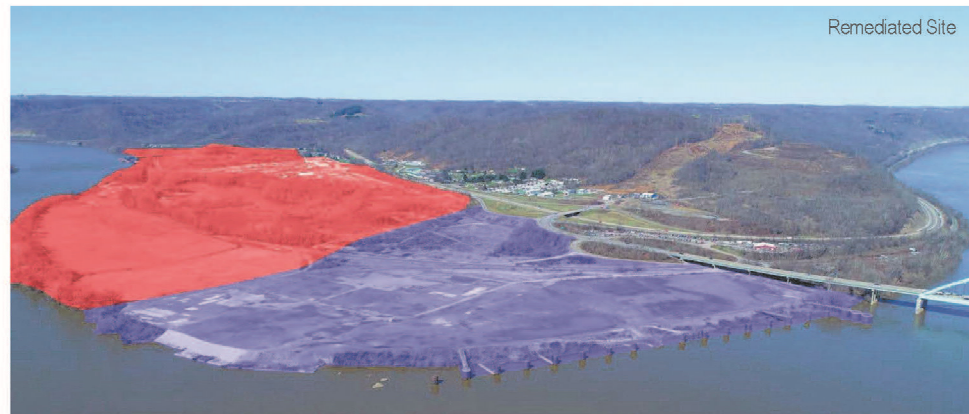
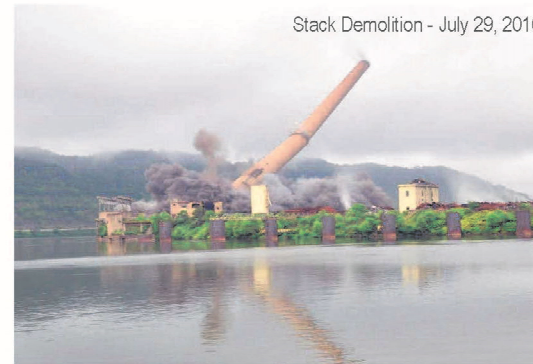
Low Natural Disaster Risk

“At the request of Congress, we’ve spent a significant amount of time studying the matter ... and there is an incredible opportunity, the potential for establishing an ethane storage and distribution hub in the Appalachian region and for building a robust petrochemical industry in Appalachia,” US Energy Secretary Rick Perry (December 4, 2018)



The map above overlays Earthquake (both moderate and high risk), Flood, Tornado and Hurricane risks in the continental United States. Data for this map was provided by Redcross.org and NOAA.gov.

PTT Proposed Cracker Plant: Former Berger Power Plant Site



PTT Proposed Cracker Plant Site



- Proposed Site along Ohio River in Belmont County
- JobOhio has invested nearly \$30 million in site demolition, remediation & preparation
- Air & Water Permits have been approved

Tax Agreements for Schools & Township Set

- *\$47.5m over 15 yrs. for education*
- *\$20m in sales tax revenue during construction*

Natural Gas Power Plants



Company	Project	Investment	Megawatts	Households	Jobs	Status
Advanced Power Services	Carroll County Energy	\$900 million	740	750,000	730	Operating
South Field Energy LLC.	Columbiana County Energy	\$1.1 billion	1,100	900,000	900	Under Construction
Oregon Clean Energy LLC	Oregon Clean Energy	\$860 million	960	500,000	475	Operating
Oregon Clean Energy LLC	Oregon Clean Energy 2	\$860 million	960	500,000	475	Permitted
NTE Energy	Middletown Energy Center	\$600 million	513	600,000	430	Operating
NTE Energy	Pickaway Energy Center	\$900 million	1,000	1,000,000	500	Proposed
Rolling Hills	Rolling Hills Generating Station	\$700 million	1,414	1,400,000	400	Operating
Clean Energy Future	Lordstown Energy Center	\$850 million	940	700,000	700	Operating
Clean Energy Future Trumbull	Trumbull Energy Center	\$850 million	940	850,000	700	Permitted
APEX Power Group LLC.	Guernsey Power Station	\$1 billion	1,650	1,000,000	525	Under Construction
EmberClear	Harrison Power Project	\$900 Million	1,000	1,000,000	530	Permitted
Ohio River Partners Shareholder LLC	Hannibal Port Power Project	\$500 Million	485	600,000	400	Under Construction
TOTAL	12	\$10.02 Billion	11,702 Megawatts	9.8 Million	6,765 Thousand	

- 12 Projects
- \$10.02 Billion in Investments
- 11,702 Megawatts
- Serving 9.8 Million Households
- 6,765 Jobs

Natural Gas Power Plants



Monroe County Gas Power Plant

A new 485-megawatt natural gas power plant at former Ormet Plant site

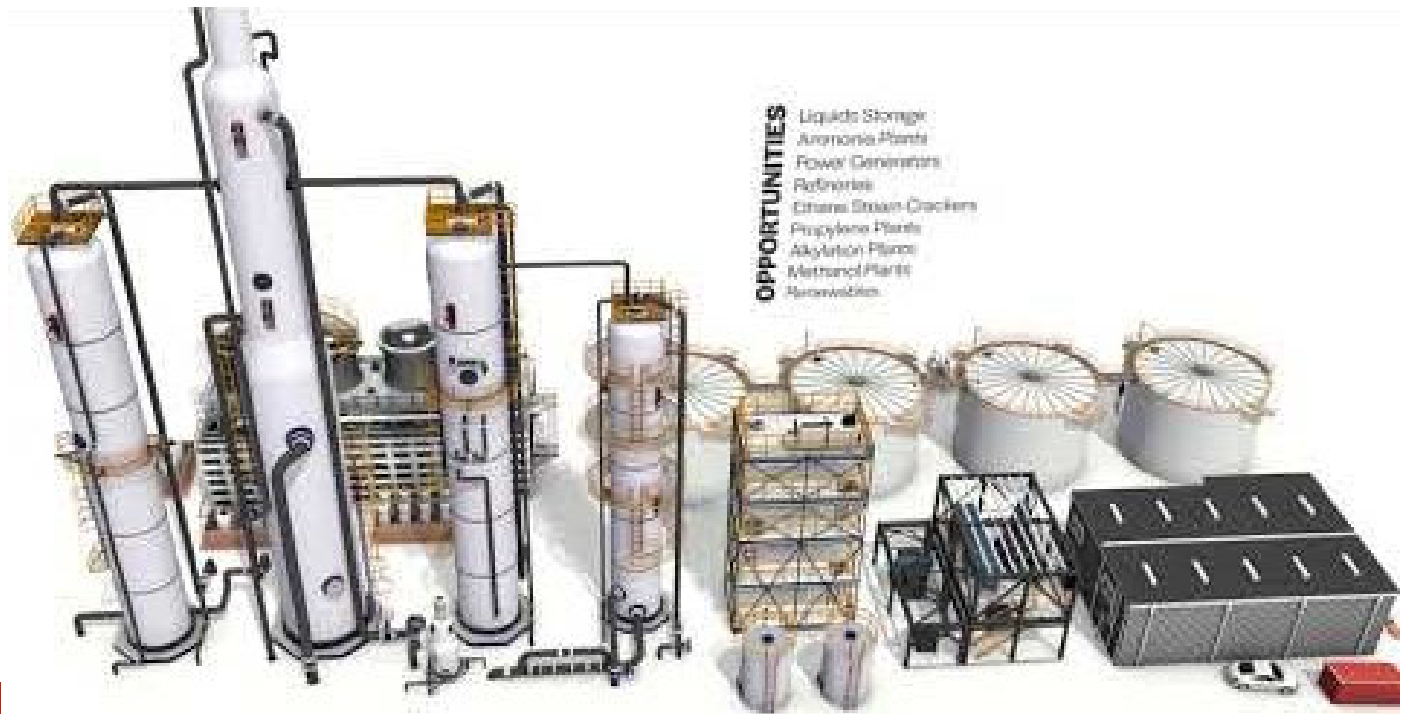
Site of Guernsey Co. Plant

Caithness Energy - \$1.6 billion in financing for the construction of a fully-permitted 1,875 megawatt combined-cycle natural gas electric generating facility along I-77



I-77 Photo The Daily Jeffersonian

Community & Economic Development Impacts



<https://youtu.be/ywbvW6vXJFU>

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United States Department of Agriculture

AND JUSTICE FOR ALL



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To file a program discrimination complaint, a complainant should complete a Form AD-3027, USDA Program Discrimination Complaint Form, which can be obtained online, at www.usda.gov/sites/default/files/documents/usda-program-discrimination-complaint-form.pdf, from any USDA office, by calling (866) 632-9992, or by writing a letter addressed to USDA. The letter must contain the complainant's name, address, telephone number, and a written description of the alleged discriminatory action in sufficient detail to inform the Assistant Secretary for Civil Rights (ASCR) about the nature and date of an alleged civil rights violation. The completed AD-3027 form or letter must be submitted to USDA by:

mail:

U.S. Department of Agriculture
Office of the Assistant Secretary for Civil Rights
1400 Independence Avenue, SW
Washington, D.C. 20250-9410; or

fax:

(833) 256-1665 or (202) 690-7442;

email:

program.intake@usda.gov.

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Para presentar una queja por discriminación en el programa, el reclamante debe completar un formulario AD-3027, Formulario de queja por discriminación del programa del USDA, que se puede obtener en línea, en www.usda.gov/sites/default/files/documents/usda-program-discrimination-complaint-form.pdf, en cualquier oficina del USDA, llamando al (866) 632-9992, o escribiendo una carta dirigida al USDA. La carta debe contener el nombre, la dirección y el número de teléfono del reclamante, y una descripción escrita de la supuesta acción discriminatoria con suficiente detalle para informar al Subsecretario de Derechos Civiles (ASCR, por sus siglas en inglés) sobre la naturaleza y la fecha de la presunta violación de los derechos civiles. La carta o el formulario AD-3027 completado debe enviarse al USDA por medio de:

correo postal:

U.S. Department of Agriculture
Office of the Assistant Secretary for Civil Rights
1400 Independence Avenue, SW
Washington, D.C. 20250-9410; o

fax:

(833) 256-1665 o (202) 690-7442;

correo electrónico:

program.intake@usda.gov.

Esta institución ofrece igualdad de oportunidades.

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Energizeohio.osu.edu

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Matt Cybulski, Jobs Ohio, Energy Sector

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ODNR Update, Mike McCormac

Shale & Gas Reporter – Sept. 25, 2019

Shale Crescent USA

Sustainable Institute, Josh Knights, Director of Partnerships, Sustainability Institute

TransCanada Buckeye Express

Updates from JobsOhio Appalachian Partnership for Economic Growth LEDO partner meetings

www.ooga.org/page/our-industry

www.roverpipelinefacts.com/

Shell Site Image by Ruben Campos