

Pennsylvania's Shale Gas Industry

Presented to:

America's Rural Energy Coalition

**Dave Callahan, President
Marcellus Shale Coalition**

May 3, 2023

Our Membership

- Over 140 diverse members
- Upstream, midstream, downstream and industry partners

Our Focus

- Pennsylvania's leading advocate for long-term natural gas development
- Developing end-use opportunities
- Achieving environmental excellence
- Addressing stakeholder issues
- Fostering professional development opportunities
- Maximizing benefits to ensure the region's secure energy future

More than 95% of the natural gas in PA is produced, processed and transported by MSC member companies.

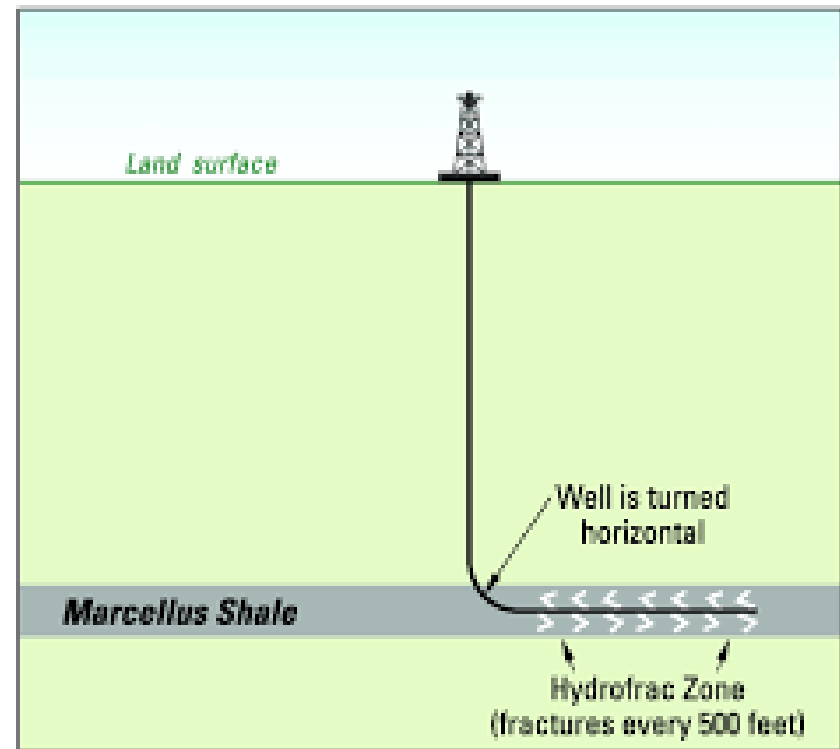
Associate Members are an integral part of the MSC and the industry's robust supply chain.

The MSC Board of Directors consists of major upstream, midstream and downstream companies in the Appalachian Basin.

What is the Marcellus Shale?

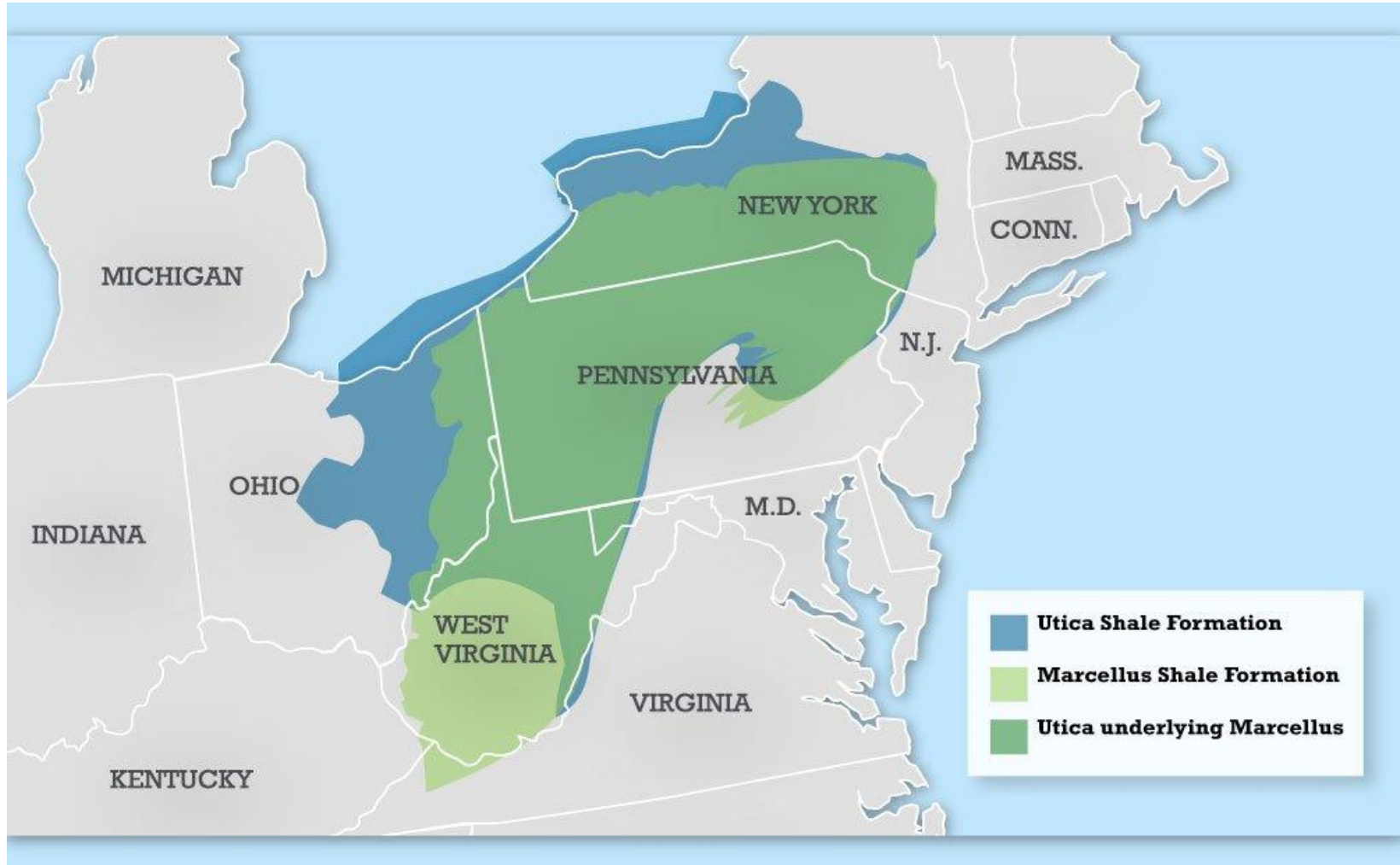
What is the Marcellus Shale?

- Layer of sedimentary rock situated a mile or more below the surface
- Generally, 50 feet – 300 feet thick
- “Source” rock from which gas pockets or reservoirs above originate
- Marcellus is most common formation, but there are others (Utica)
- Name derived from locations where there are outcroppings:
 - Marcellus, New York
 - Utica, New York

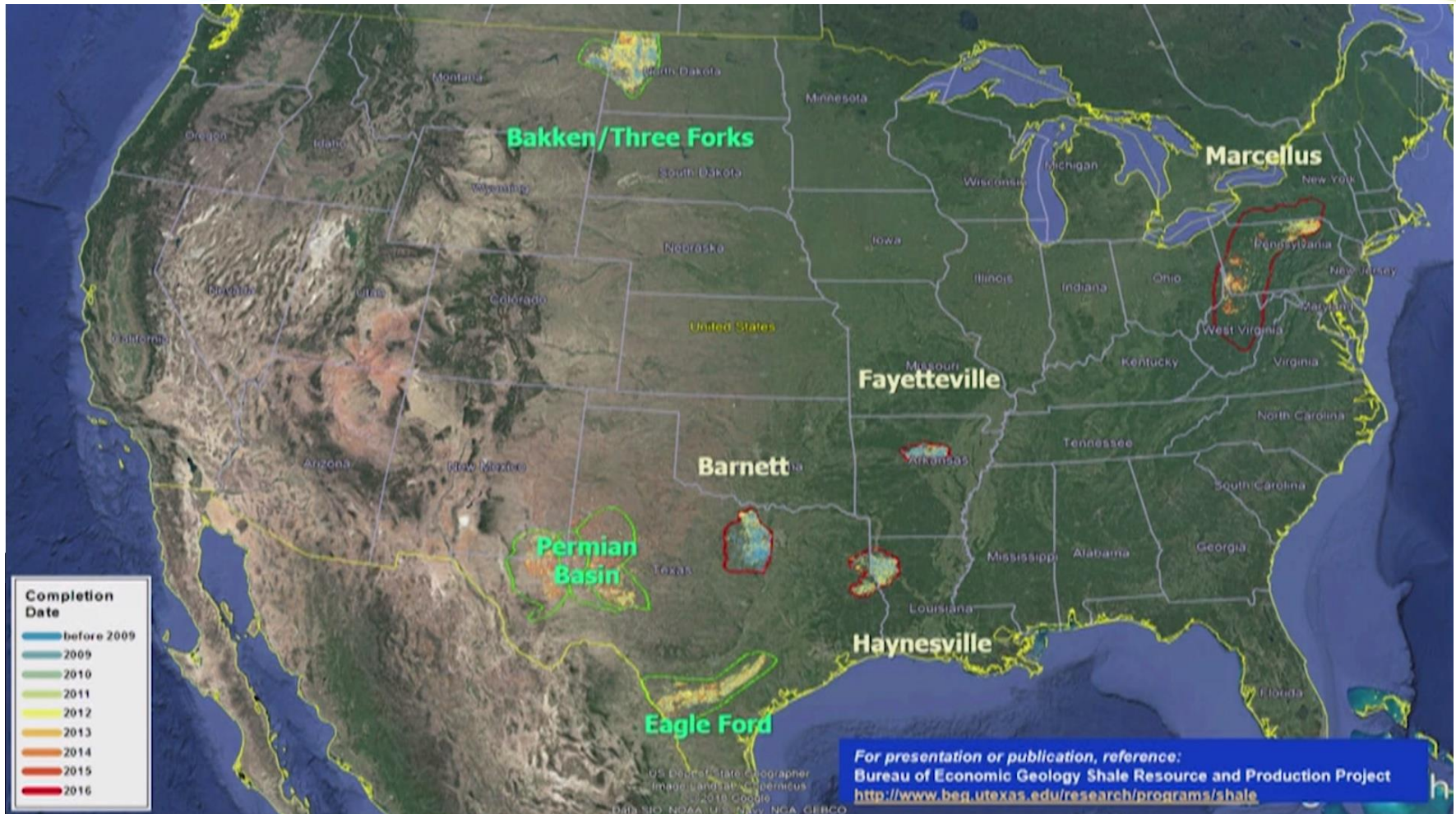


Source: Researchgate.net

Shale Gas in PA

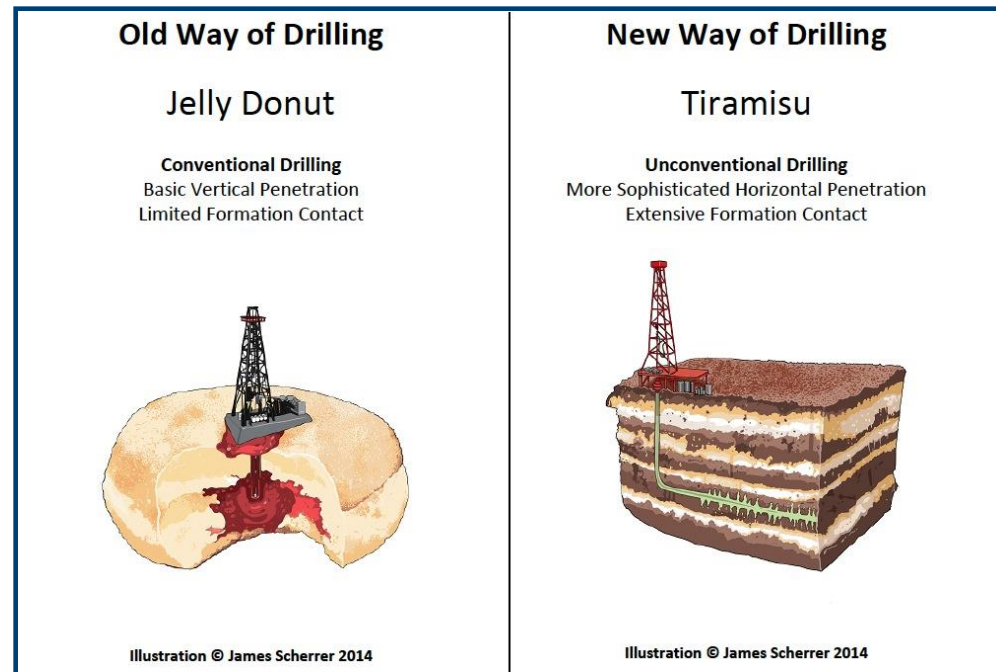


Major U.S. Shale Basins



“Unconventional” Development: An Overview

- **‘Conventional’** oil & gas development goes back to 1859 (Col. Edwin Drake)
- **‘Unconventional’**: Tapping the Source Rock (Shale) that feeds shallow, conventional reservoirs
- Innovations in hydraulic fracturing & horizontal drilling
- First shale well in PA: Range Resources (2004) Washington County
- Large-scale leasing and ramp up of activity: 2007-2008

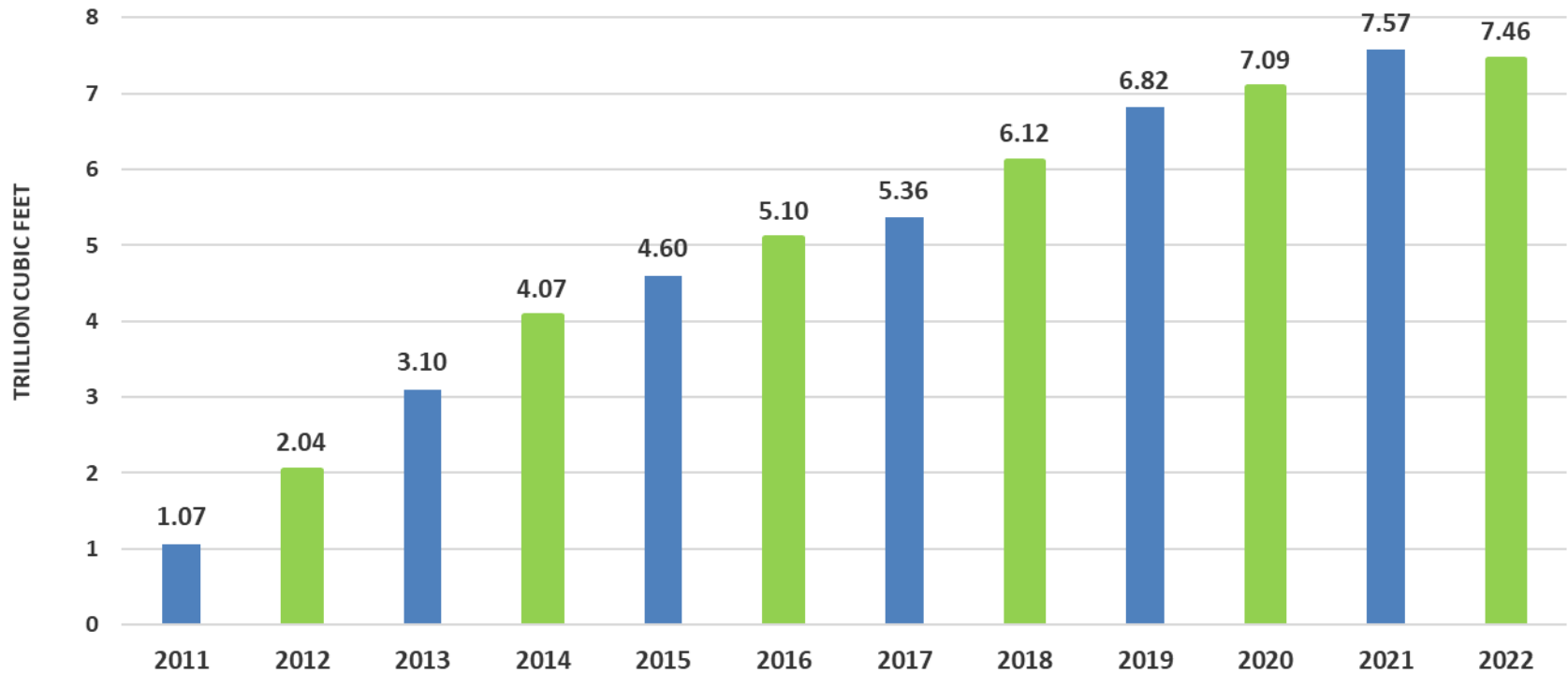


2023: Development Activity in PA

Pennsylvania: A World-Class Player in Shale Gas Production

- 💧 2nd largest natural gas producer in U.S. (TX)
- 💧 19.15% of total U.S. natural gas production (2022)
- 💧 Number of wells*:
 - 12,678 active
 - 488 increase year over year
 - 11,189 in production
 - 566 increase year over year
- 💧 33 of 67 counties with at least 1 producing well
- 💧 25 active rigs (May '23)

PA Unconventional Shale Gas Production 2011 - 2022



Source: Marcellus Shale Coalition & PA DEP

Top Ten Producing Counties by Volume (2022)

County	Production (MCF)	% of PA Production	# of Producing Wells
Susquehanna	1,557,148,711.42	20.6%	1827
Washington	1,322,565,554.02	17.5%	1842
Bradford	1,116,904,466.48	14.8%	1414
Greene	1,084,676,878.68	14.3%	1334
Lycoming	429,376,623.98	5.7%	925
Tioga	345,581,866.54	4.6%	781
Wyoming	338,924,455.91	4.5%	315
Butler	254,418,779.89	3.4%	587
Sullivan	167,779,752.24	2.2%	113
Allegheny	153,700,001.81	2.0%	166

PA's Severance Tax: The Impact Fee

PA Impact Fee

-  Created by Act 13 of 2012
-  Imposed by counties; collected & disbursed by PA PUC
 - April 1st – fee due to PA PUC
 - July 1st – distributed to counties, municipalities and state agencies
-  Paid by unconventional gas producers
 - Fee imposed per well, for 15+ years
 - 5 different fee schedules, based upon natural price index (not PA prices)
-  Distributed by formula
 - Counties & municipalities where drilling activity occurs (40+ counties)
 - Statewide Environmental & Conservation Programs
 - Growing Greener, H2O, Pennvest, Marcellus Legacy Fund
 - All counties - bridge repair & recreation/conservation
-  **\$2.5 Billion to date**

Pa.'s Natural Gas Impact Fee (Tax) Over \$2.5 Billion Generated Since 2012

More than 1.6 Billion Supports Community Initiatives:

- | | |
|---|--|
|  Roads & Bridges |  Social Services |
|  Storm Water & Sewer |  Judicial Services |
|  Emergency Preparedness |  Records Management |
|  Environmental Programs |  Capital Reserve Fund |
|  Preservation & Wetland Reclamation |  Workforce Training |
|  Tax Reduction |  Local, Regional Planning |
|  Affordable Housing | |

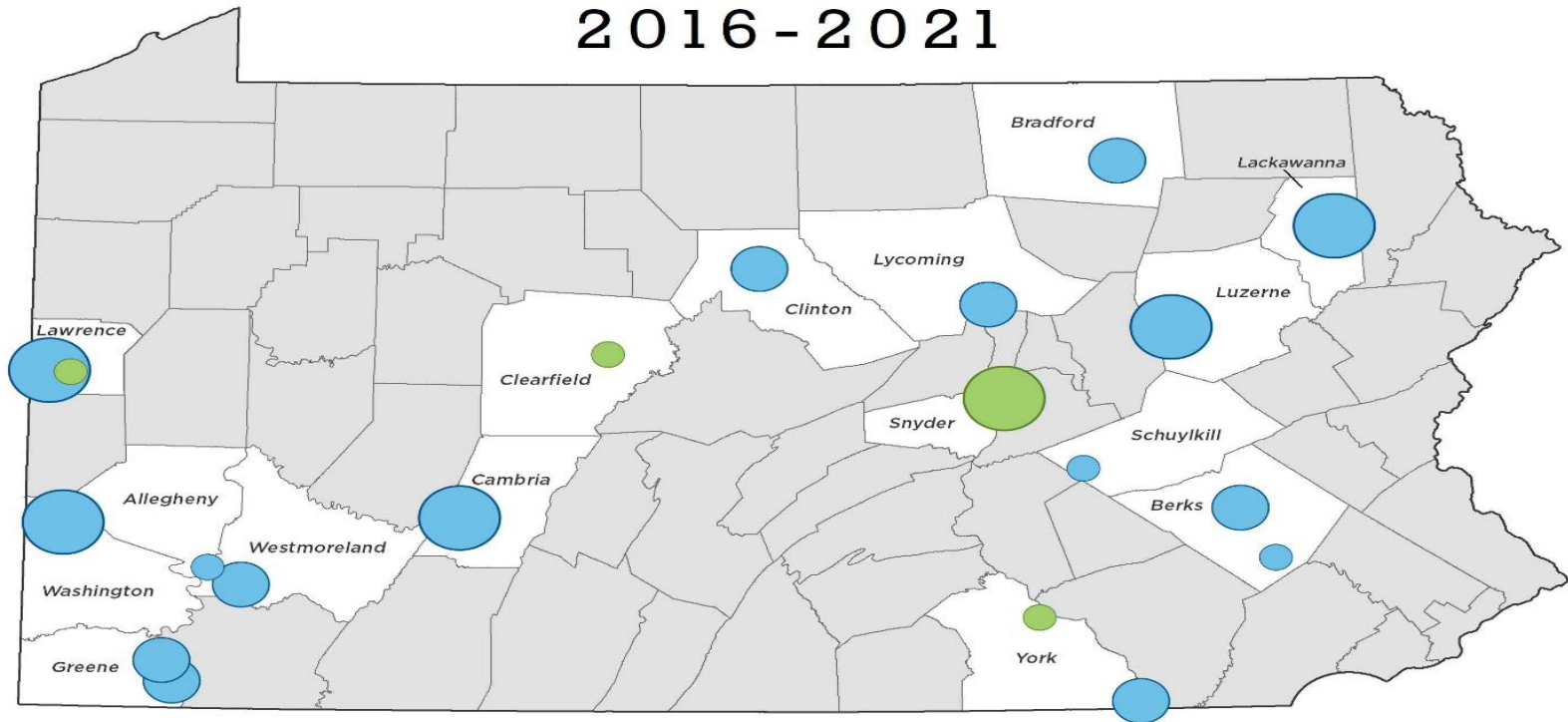
\$600+ Million Supports Statewide Projects

- | | |
|---------------|---|
| <u>\$82M</u> | Growing Greener |
| <u>\$164M</u> | Marcellus Legacy Grants |
| <u>\$204M</u> | Water & Sewer Infrastructure |
| <u>\$85M</u> | County Conservation Districts |
| <u>\$72M</u> | Pennsylvania Department of Environmental Protection |

Pennsylvania's Natural Gas Impact Tax Works

Powering the Northeast

NEW PA NATURAL GAS GENERATION 2016-2021



Total Amount
Invested: \$13 Billion

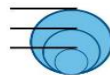
Total New Generating
Capacity: 17,000 MW

Generating Facility Capital Investment



Coal to Natural Gas
Conversion

\$850 Mil +
\$400 Mil - \$850 Mil
< \$399 Mil

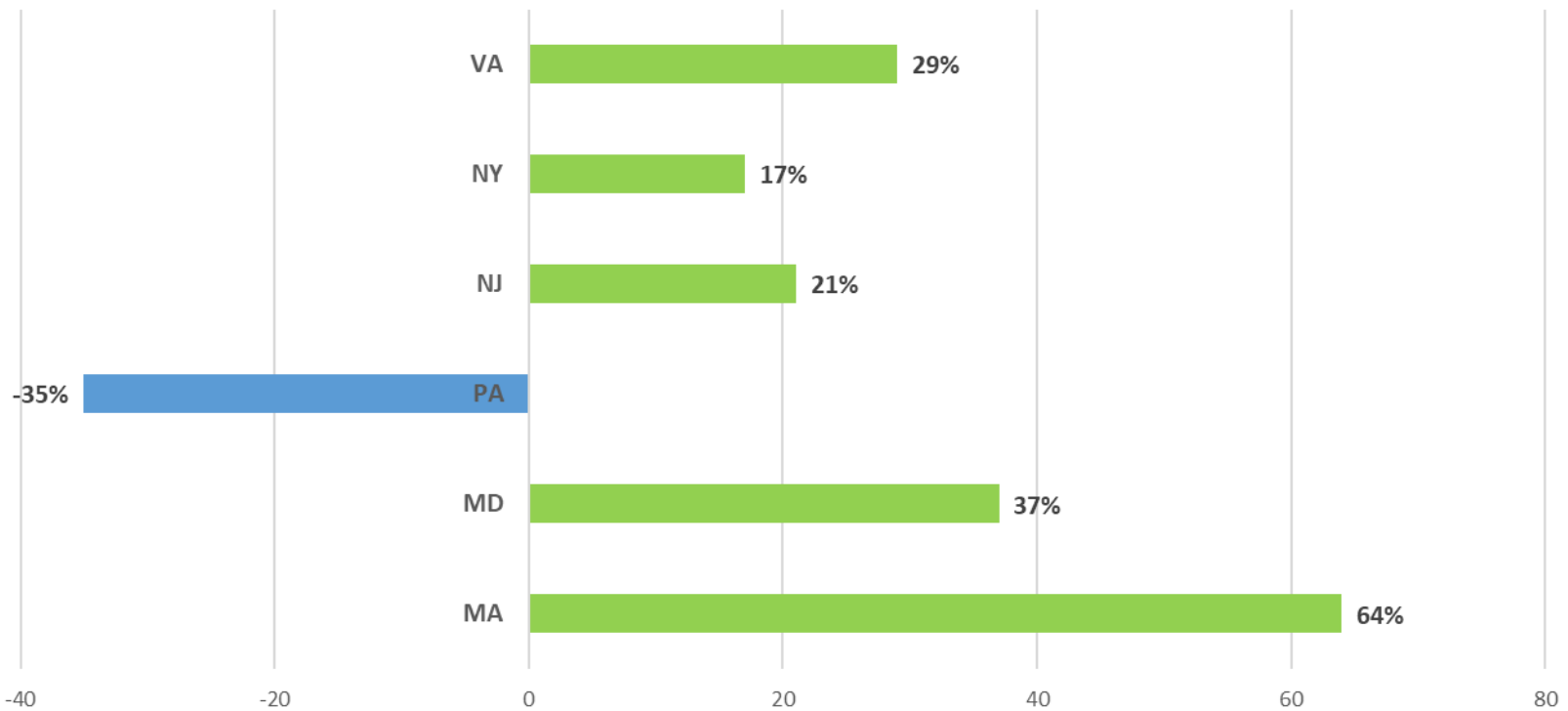


New
Natural Gas

This product is for illustrative purposes only. Original data has been provided by public sources. Neither Bertison-George nor the Marcellus Shale Coalition can be held liable for any errors or omissions. This map is not to be used in any legal capacity.

PA: Powering the Northeast

Percent of Electricity Imported - 2021



PA: Largest Net Exporter of Electricity in the U.S.

Enhancing the Environment



Minimal Footprint

- Multiple wells from one well pad
- Long laterals – up to 4 miles – from one well pad



Conserving fresh water

- 95% of wastewater reused/recycled
- SRBC found no discernable impact on water quality or quantity



Enhanced Air Quality

- Appalachia - lowest methane intensity of top hydrocarbon basins in US
- US – one of the lowest methane intensities in the world
 - 65% cleaner than Russian gas
- Voluntary actions

Unconventional Upstream Natural Gas Environmental Compliance Rate

 2017	16,296 inspections	97.7%
 2018	18,830 inspections	98.3%
 2019	18,975 inspections	98.0%
 2020	12,512 inspections	96.3%
 2021	18,838 inspections	96.4%
 2022	22,653 inspections	96.6%

Source

PA Department of Environmental Protection
MSC Analysis (Duplicate NOV's Removed)

Challenges to Shale Development

Permit delays

- Inconsistent & ever-changing criteria
- PA DEP Regional Office inconsistency

Regulatory uncertainty

- Death by a thousand cuts
- Regulations exceeding statutory authority or intent

Infrastructure

- Pipelines. Pipelines. Pipelines.
- Gas development & production constrained in PA by lack of takeaway capacity
- 50% of Pennsylvanians don't have access to natural gas service

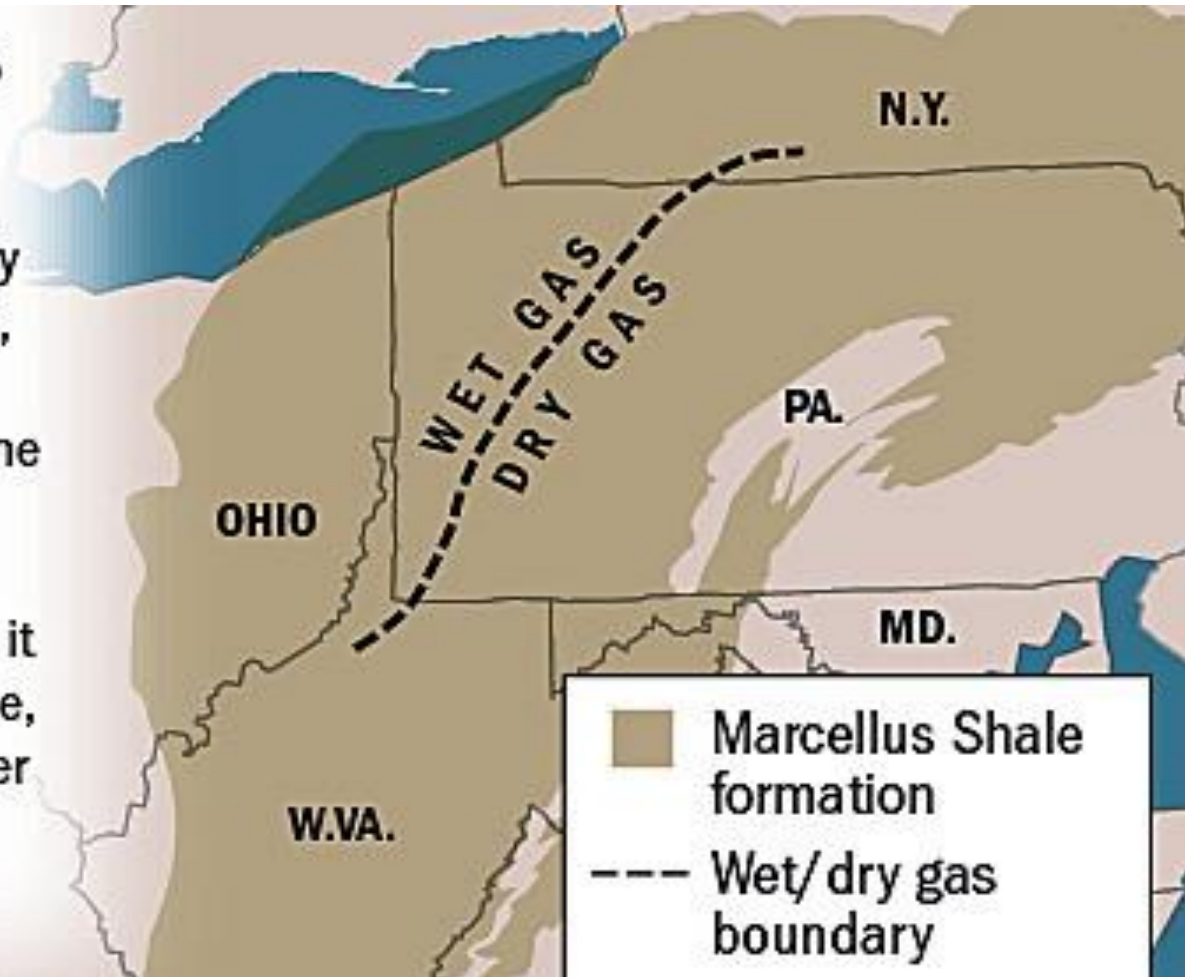
Poor policy choices on the horizon

- Increased setbacks (= ban on development)
- Bans on new gas connections, appliances

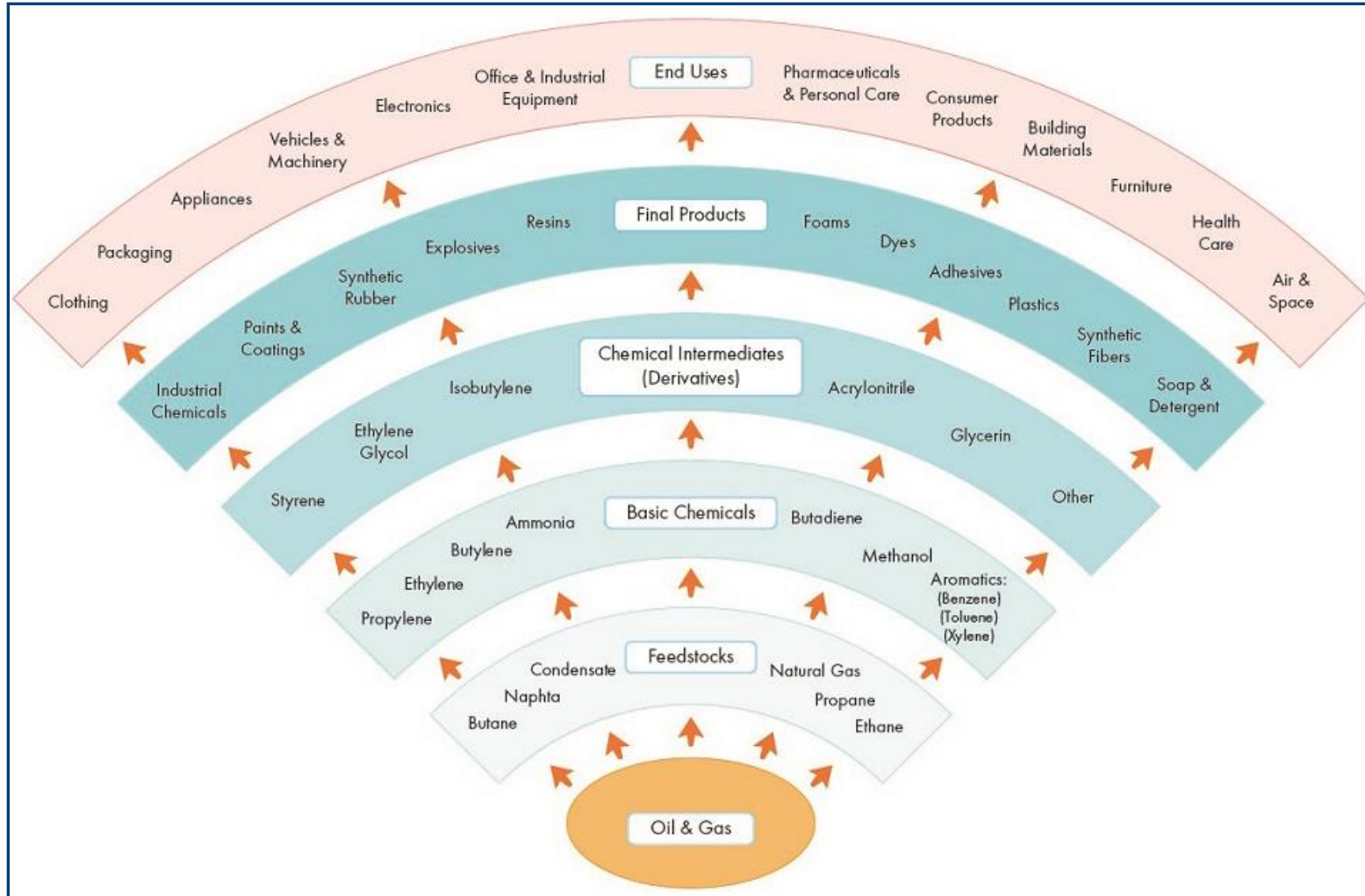
Closer to Home: PA Natural Gas Liquids

Wet/dry gas boundary

Natural gas is primarily composed of methane, and can also include ethane, propane, butane and pentane ("wet" gas). Natural gas is considered "dry" when it is almost pure methane, minus most of the other commonly associated hydrocarbons.



Natural Gas Liquids: Feedstock of Our Economy



Benefits of Shale Development

Enhanced air quality – since 2005:

- SOx down 93%
- NOx down 81%
- CO2 down 44%
- VOCs down 40%

Lower energy costs

- Gas commodity costs down 61% - 76% since 2008
 - 8.8 million Pennsylvanians depend on natural gas and propane to stay warm
- Wholesale electricity prices down 40% since 2008
- Average retail energy prices 81% less than New England states

Economic security

- 300,000+ Pennsylvania jobs (direct, indirect, induced)
- \$2.5 Billion Impact Fee tax revenue
 - That's on top of corporate and personal income taxes paid
- \$10 Billion+ royalty payments to leaseholders
- Billions in other business taxes

American energy security

- Reduced dependence on foreign sources of energy
- In 2019, U.S. became a net energy exporter for first time since 1952

Thank you!

David Callahan, President
Marcellus Shale Coalition
dcallahan@marcelluscoalition.org