

Petrochemical Development and Plastics: Community and Health Impacts

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Carnegie Mellon University*

Lunch With Books, Wheeling Public Library

July 16, 2019

BREATHE PROJECT

The Air We Share

A large, handcrafted sunflower-shaped sign is the central focus. The sign's center is a dark brown circle with the words "RIGHT to BREATHE" written in white, hand-painted letters. The petals are made of yellow cardboard. Two hands are visible at the bottom, holding the sign. In the background, a woman with dark hair is smiling. The text "your voice matters" is overlaid in white on the left side of the sign.

your voice matters

**We still have a serious air quality
problem**

**Adding to our airshed burden will
only make things worse.**

West Virginia: Ohio

Ohio County

Wheeling, WV-OH

If you live in Ohio County, the air you breathe needs your support.

Ozone



Particle Pollution 24-hour



Source: ALA SOTA 2018

Particle Pollution Annual

West Virginia: Ohio

Ohio County

Wheeling, WV-OH

The air you breathe needs your support.

You can make a difference in the air that you breathe.

[Help us fight for air](#)

[Share your story](#)

- Ranked 88 for high ozone days out of 227 metropolitan areas
- Ranked 83 for 24-hour particle pollution out of 201 metropolitan areas
- Ranked 26 for annual particle pollution out of 187 metropolitan areas

**Air quality in the Weirton-
Steubenville Region was
considered**

NOT GOOD

**181 days
(1/2 of the time)**

in 2017

2017 AQI

Weirton-Steubenville Region

	<u>2017</u>
Red	0
Orange	1
Yellow	180
Green	184

(Number of Days)

Breathe Meter

Our Air Ranks in the Dirtiest 7.2% of U.S. Cities

Wheeling, WV-OH

Select a city from the dropdown on the right to compare our air.

PITTSBURGH

7.2%

CLEANEST
(100%)

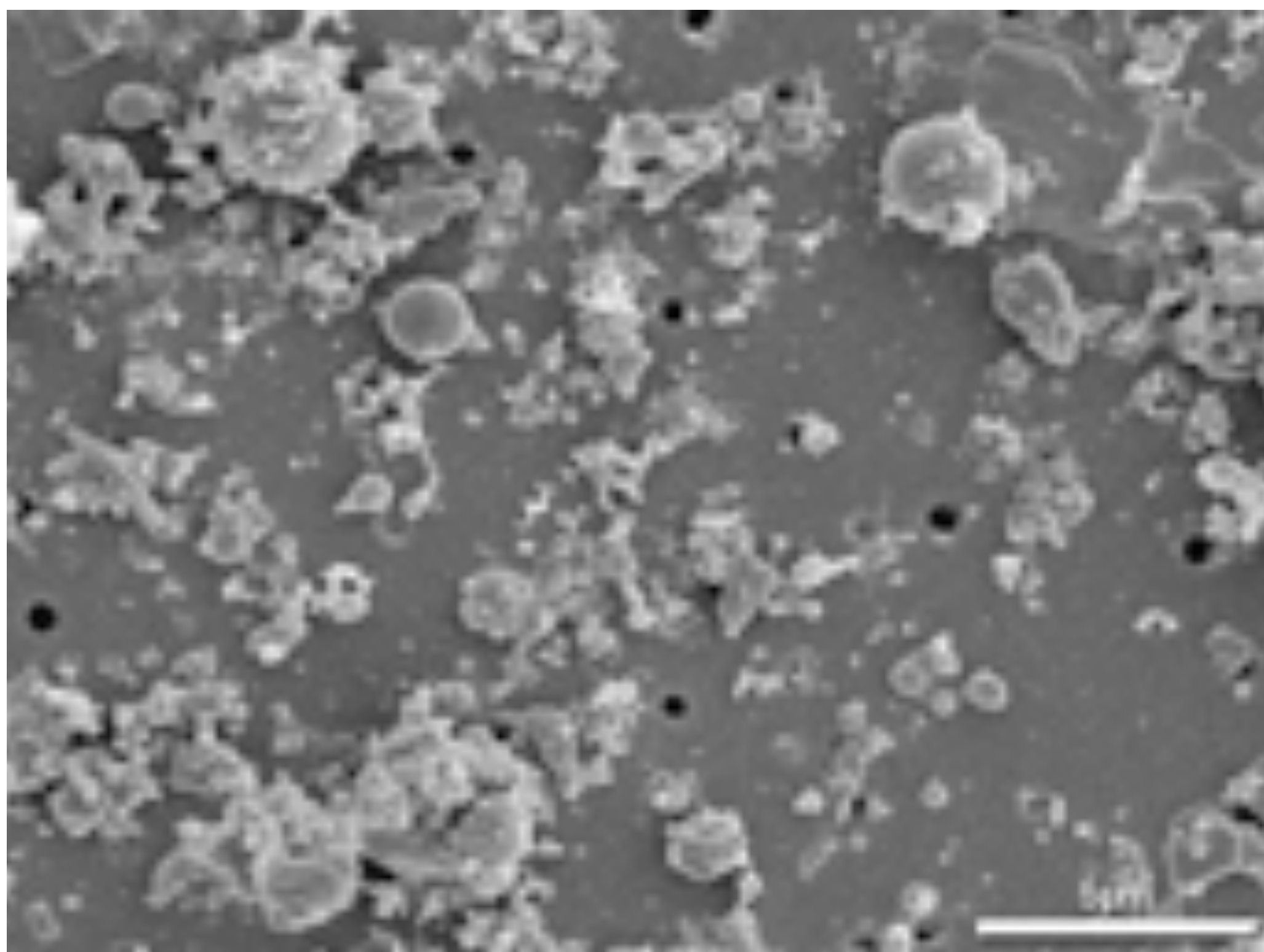
WHEELING, WV-OH

13.1%



DIRTIEST (0%)

Percentile rank for average annual particle pollution out of 339 urban areas using U.S. EPA data from 2015 to 2017 (Clean Air Task Force, 2018).



1. The footprint of the regional petro industry is already huge and will be getting bigger.

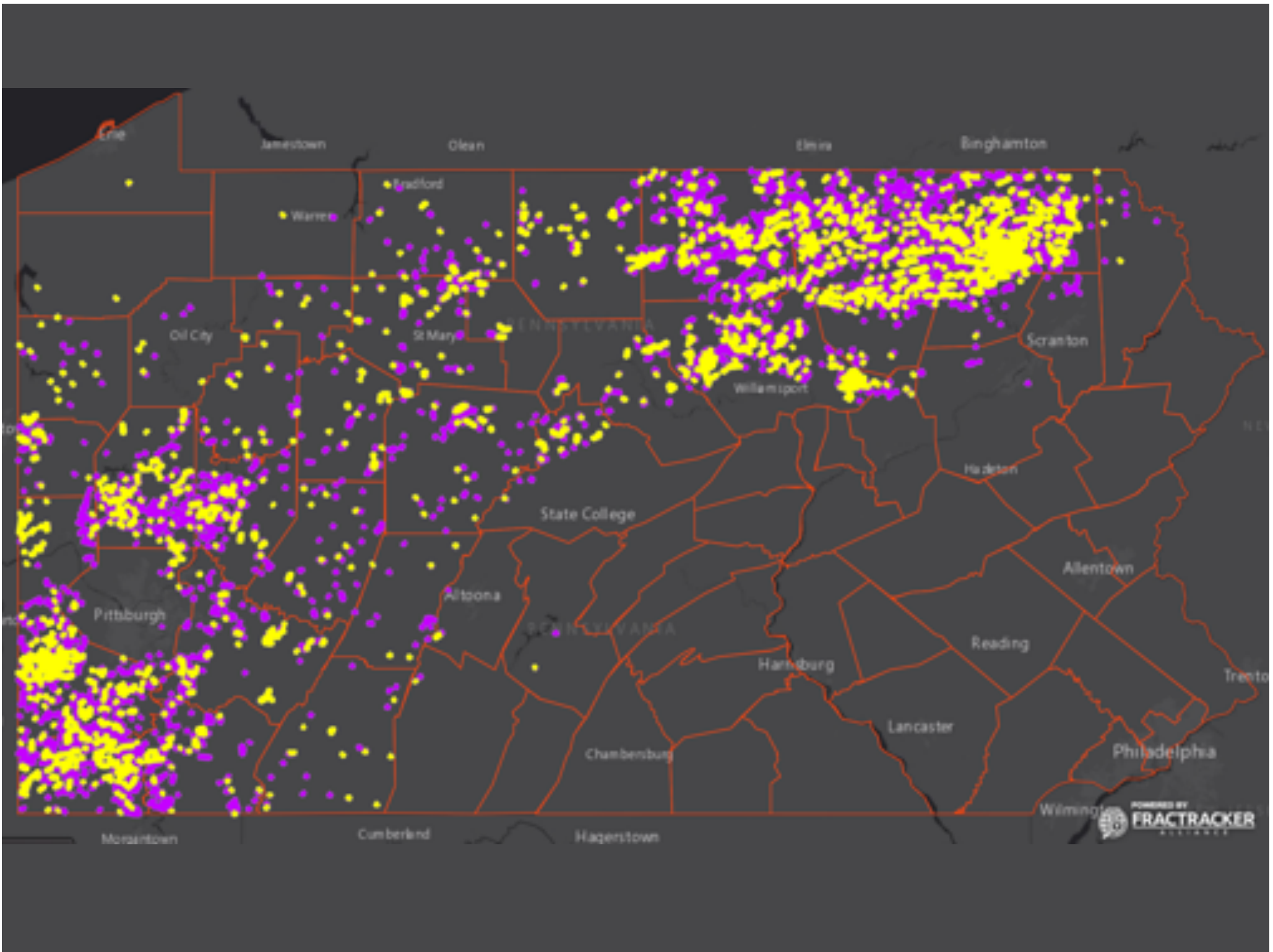
11,682

Drilled Unconventional Wells

13,656

Unconventional Well and Site Violations

Source: Fractracker, updated December 20, 2018



2. The industry uses a piecemeal approach; this makes it tough for communities.

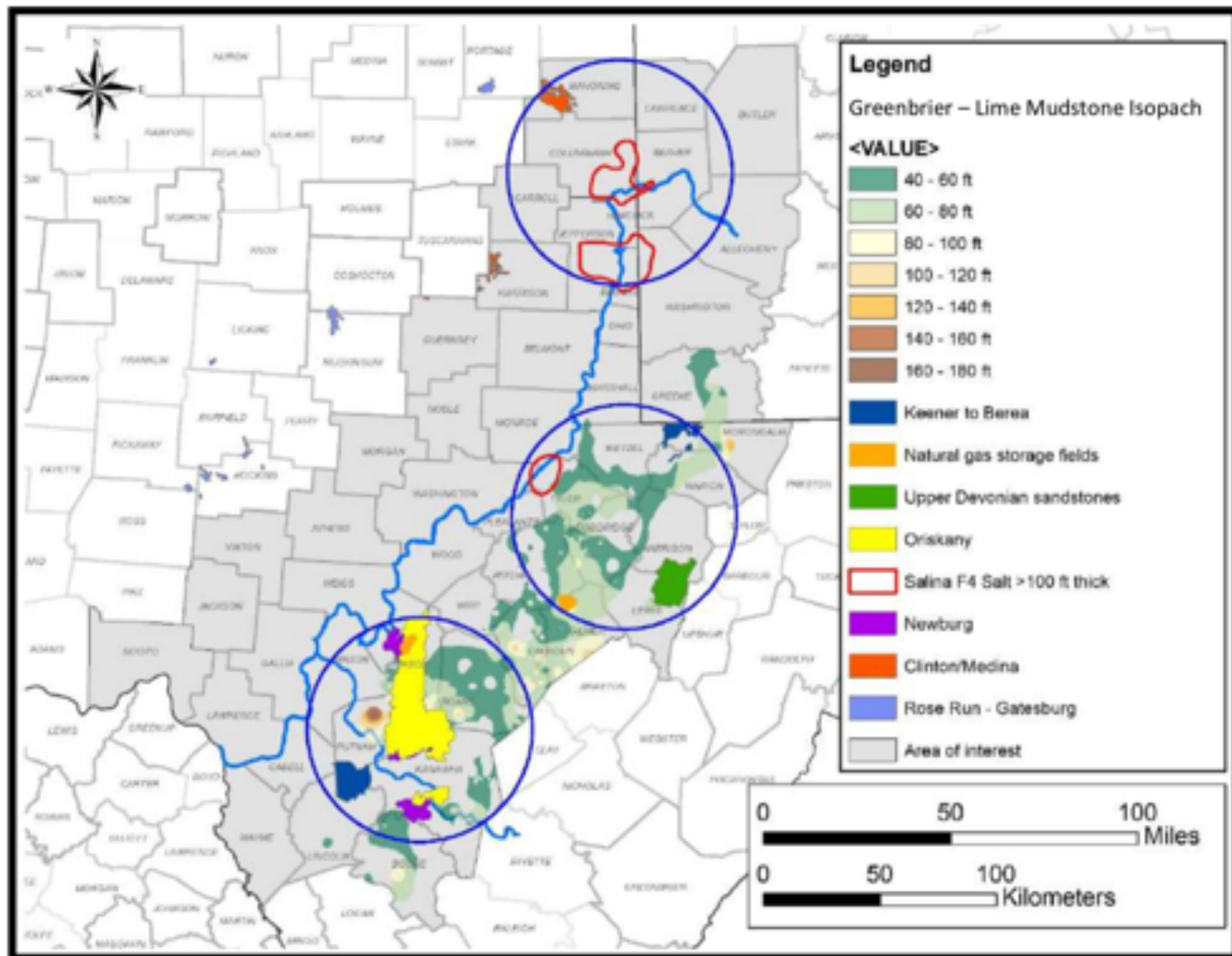
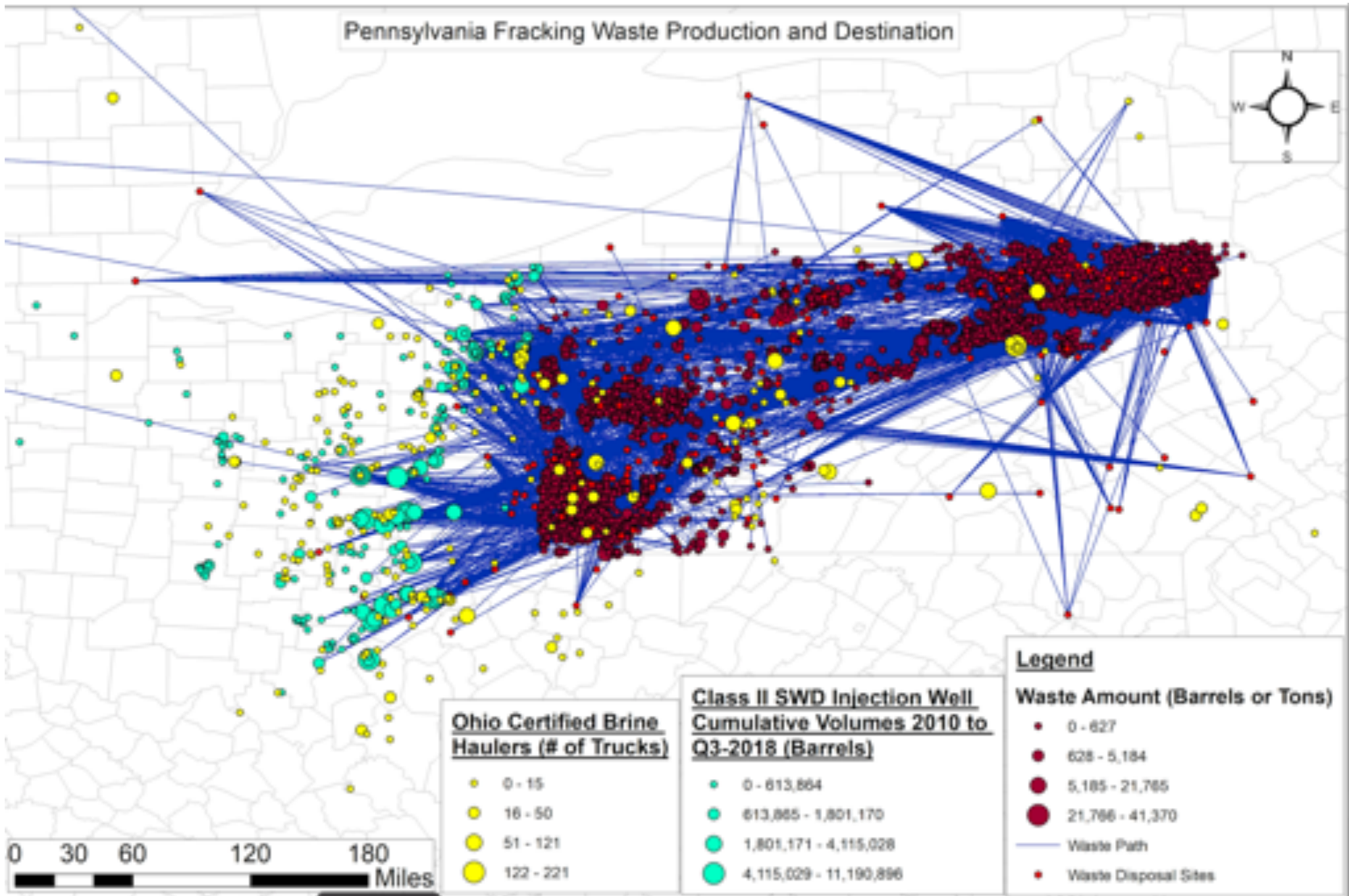


Figure 1. Three prospects evaluated using reservoir characterization data prepared for this Study.

3. The pollution impacts from the industry are and will be substantial.



Source: PA DEP and Fracktracker Alliance



Andrew Rush/Post-Gazette

Belle Vernon sewage plant to stop accepting contaminated landfill runoff



DON HOPEY AND DAVID TEMPLETON
Pittsburgh Post-Gazette

MAY 16, 2019

10:11 AM

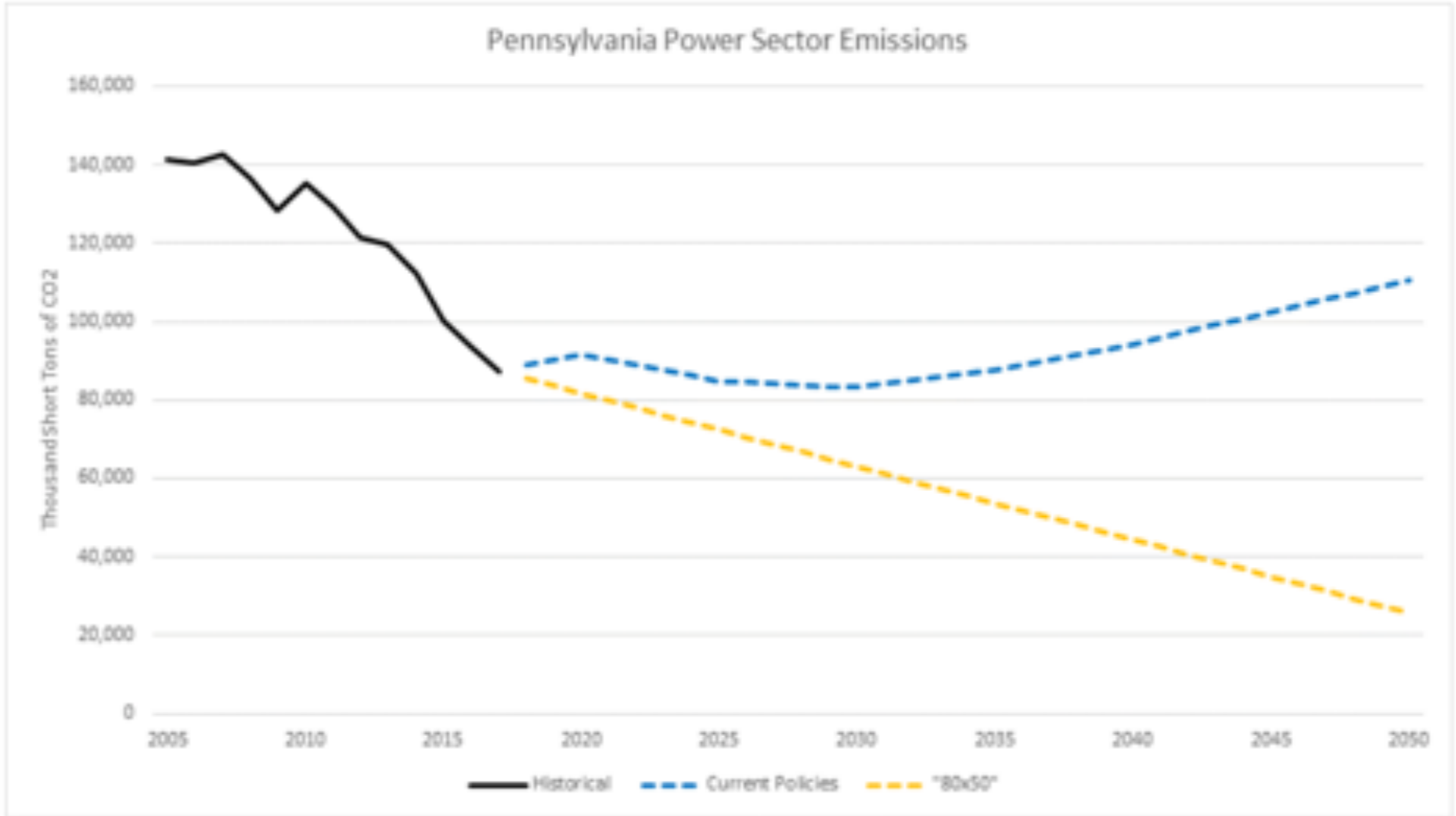


The Belle Vernon sewage treatment plant in Fayette County will no longer accept highly contaminated liquid runoff from a nearby landfill in Rostraver that takes in large amounts of shale gas drilling and fracking waste.

4. The Climate Change implications for development of this industry are disastrous.

PA DEP-Approved Emissions Permit for Shell Petro Facility (tons/yr)

Air Contaminant	Emission Rate (tons)
NOx	348
CO	1,012
PM (filterable)	71
PM10	164
PM2.5	159
SOx	21
VOC	522
VOC (ERC)*	620
HAP	30.5
Ammonia	152
CO2e	2,248,293



Source: NRDC Blog, May 10, 2019

5. There will be significant negative healthcare impacts from the development of this industry.

Table 2. Proposed Major Appalachian Ethane Crackers⁹⁴

Company	Location	Announced Capacity (tpa)	Ethane Feed (1,000 b/d)	Possible Completion
Shell Chemicals	Monaca, PA	1.6 mil.	96	2020-21
Odebrecht/Braskem	Washington Bottom, WV	1 mil.	60	2022+
PTT Global / Daelim Industrial Co.	Shadyside, OH	1.5 mil.	90	2022+

Source: “Ethane Storage and Distribution Hub in the United States,” US DOE, Nov. 2018

Health Impacts – Build Out of 3 Cracker Plants (PA, OH, WV)

Nationally: \$120,298,062 - \$271,992,099 / year

Ohio Cty, WV: \$1,379,030 - \$3,122,224 / year

Wood Cty, WV: \$7,414,500 - \$16,772,932 / year

Belmont Cty, OH: \$5,735,641 - \$12,930,776 / year

Allegheny Cty: \$14,493,848 - \$32,772,984 / year

Beaver County: \$20,541,705 – \$46,434,659 / year

Health Impacts – Build Out of 3 Cracker Plants (PA, OH, WV) 30 Year Costs

Nationally:	\$3.6B - \$8.1B
Ohio Cty, WV:	\$41M – \$94M
Wood Cty, WV:	\$222M - \$503M
Belmont Cty, OH:	\$172M - \$388M
Allegheny Cty:	\$434M - \$983M
Beaver County:	\$616M – \$1.4B



AHN Cancer Institute – Beaver Reaches Construction Milestone

Wednesday, September 5, 2018

<https://www.ahn.org/building-the-future/cancer-institutes/ahn-cancer-institute-beaver>

Ewing sarcoma cases, sources of pollution

Ewing sarcoma cases in the Canon-McMillan School District in conjunction with sources of local pollution:



• = WELL SITE

● Pollution sources

- A. Compressor station, Mount Pleasant
- B. Brighc compressor station, Chartiers
- C. ABB Inc. disposal site
Muse-Bishop Road, Muse
- D. Impoundment
- E. Tanks, well and impoundment
- F. Johnson compressor station, Chartiers
- G. Marathon Cryogenics Plant
800 Western Ave., Chartiers
- H. Uranium mill tailings disposal site, North Strabane
- I. Compressor station J. Compressor station
- K. Compressor station L. Compressor station

● Ewing sarcoma cases

1. Curtis Valent, 23, Cecil, diagnosed in mid-2008; died Jan. 2, 2011
2. Alyssa Chambers, 28, McDonald, diagnosed in late 2008 and survives
3. Kyle Deliere, 27, Cecil, diagnosed in 2011; died Nov. 15, 2013
4. Luke Blanock, 19, Cecil, diagnosed December 2013; died Aug. 7, 2016
5. David Cobb, 38, Cecil, diagnosed in June 2018 and survives
6. Mitchell Barton, 21, North Strabane, diagnosed Dec. 27, 2018 and survives

6. PA residents are paying and will pay a heavy financial price for aligning with the petrochemical industry.

Tax Subsidies

\$1.65 Billion in tax forgiveness over 25 years

- **Shell can use the tax credits to reduce up to 20 percent of its tax bill**
- **The company must invest at least \$1 billion in Pennsylvania and create at least 2,500 construction jobs.**
- **Shell was able to claim a state sales tax exemption beginning Jan. 1, 2014**
- **Shell received \$10 million from the Pennsylvania First Program for site development and infrastructure costs**

Property Value Risks



AMERICAN
ECONOMIC
ASSOCIATION



American Economic Review

The Housing Market Impacts of Shale Gas Development[†]

By LUCIA MUEHLENBACHS, ELISHEBA SPILLER, AND CHRISTOPHER TIMMINS*

American Economic Review 2015, 105(12): 3633–3659
<http://dx.doi.org/10.1257/aer.20140079>

- **2015 Study, Peer Reviewed, Duke University Researchers, PA Data**
- “We calculate the average annual **loss** for groundwater dependent homes within 1.5 km of a well to be **\$30,167.**” (avg. 13.9% decrease)
- “...average annual **gain** for piped-water properties within 1.5 km of a well is **\$4802**” (avg 2.2% increase)
- “...These forces are beginning to show up in the way housing markets located on shale plays operate-- e.g., recent evidence that major national mortgage lenders are refusing to make loans to properties in close proximity to gas wells, and insurance properties are refusing to issue policies on those houses.”

VOC Permit Subsidy

- **DEP approved the conversion of 513 tons of NOx Emission Credits into VOC Emission Credits**
- **Estimated Value of \$10,000/ VOC credit**
- **Subsidy is approximately \$5.1 million**

Social Cost of 2,248,293 tons of CO₂/ year over 30 years

\$1.33 Billion

(FUND Model @ \$19.70/ton)

\$2.7 Billion

(Average Across all SCC Models @ \$40/ton)

\$2.83 Billion

(EPA 2020 SCC model 3% discount rate)

\$0.81 - \$4.18 Billion

(EPA 2020 SCC model 5% - 2.5% discount rate)

Adding up estimate-able costs and subsidies

Average estimate =

\$6.1 Billion in PA costs and subsidies

Range = \$3.48 – \$8.25 Billion

7. Job projections for the industry:

- Mostly out-of-state**
- Temporary**
- Displaced by automation**



EQT management 'up to the challenge,' CEO assures investors after layoffs



ANYA LITVAK ✓

Pittsburgh Post-Gazette

alitvak@post-gazette.com 

JAN 7, 2019

3:26 PM

8. To make plastic

- The world doesn't need it
- For uncertain demand in Asia
- Because that is one scenario where the industry **might** turn a profit.

Waha

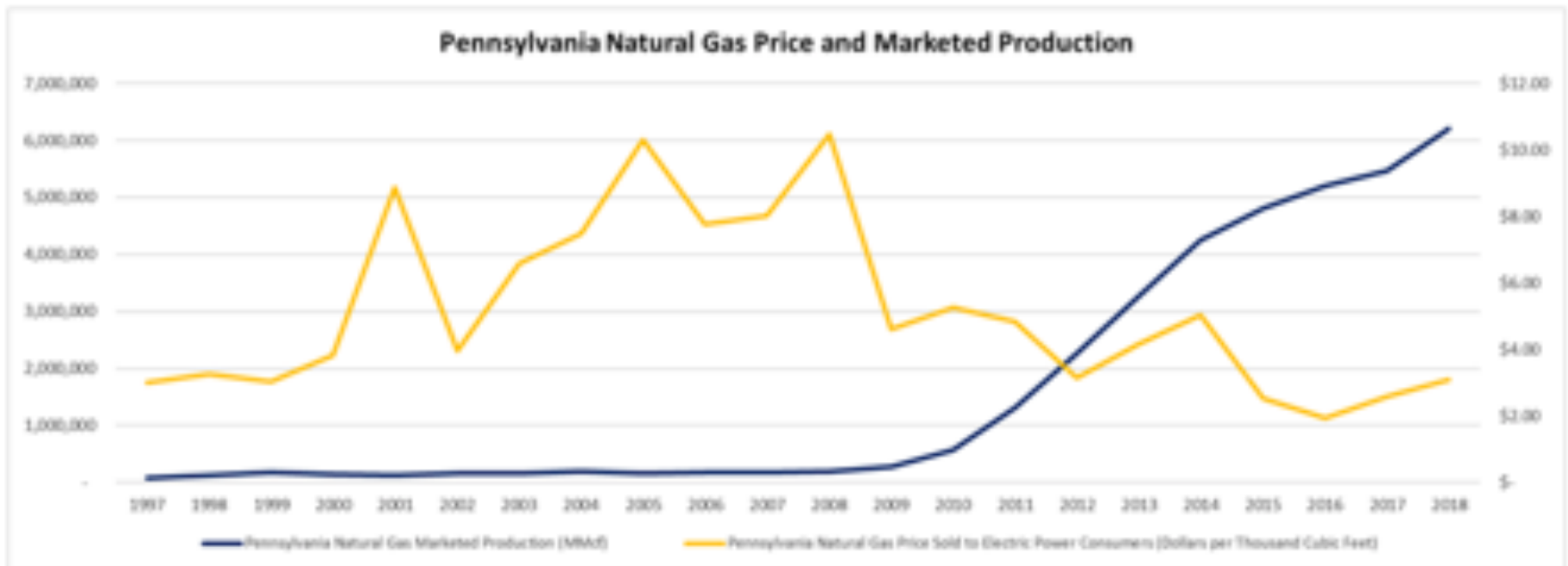
West Texas/SE New Mexico Natural Gas Prices



Published 04/01/2019

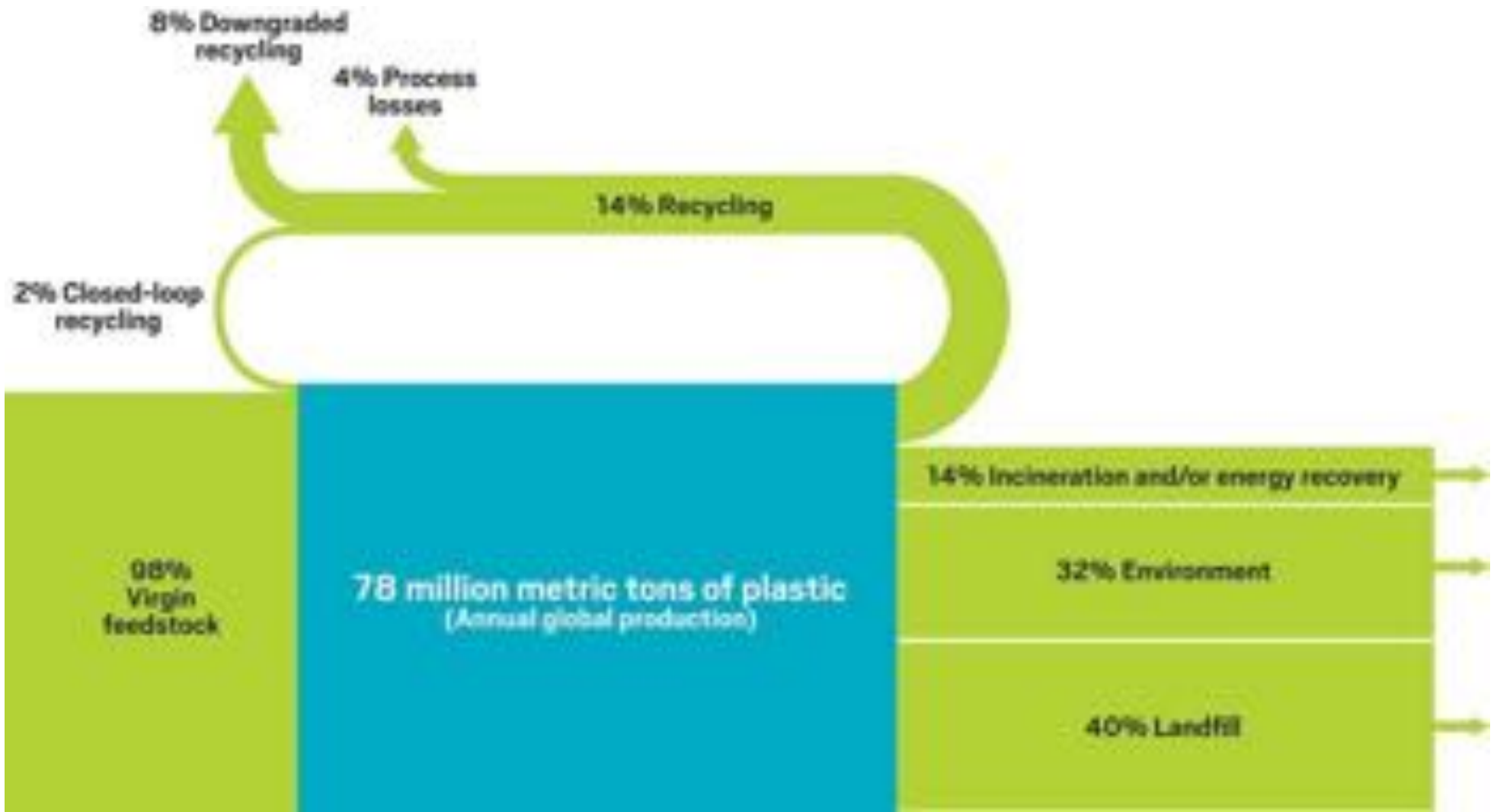


naturalgasintel.com



Source: NRDC Blog, May 10, 2019





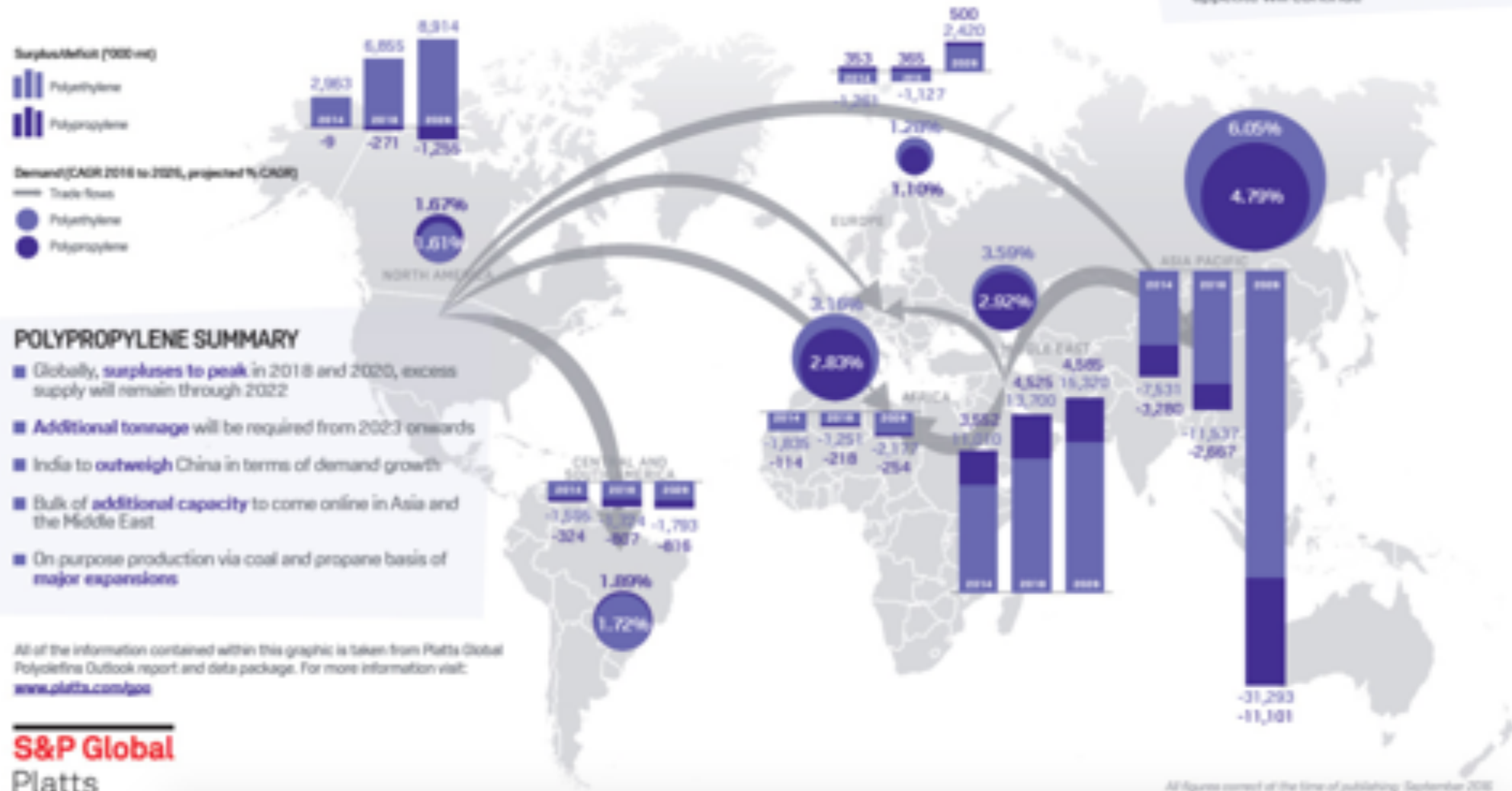
<https://cen.acs.org/environment/pollution/Recycling-needs-revamp/96/i25>



GLOBAL TRADE FLOWS POLYETHYLENE AND POLYPROPYLENE

POLYETHYLENE

- A period of **excessive oversupply** expected between 2016 to 2023
- Post-2024 supply expected to tighten, **additional capacity** will be needed
- Shale-based ethane and coal will be the **dominant new projects**
- India is **key global driver** for demand growth whilst China's appetite will continue



Squeezed margins 2018 - 2025

- 2018-2025: During these eight years, total US PE capacity will rise by 9.6m tonnes – a 59% increase over capacity in 2017
- This increase will occur as US demand growth averages just 1.5%/year.
- Of some 200m tons of global net PE deficits in 2018-2025, China will account for no less than 46%.
- US PE producers have to grow market share in China in 2018-2025 in order to be able to comfortably place their extra volumes
- If the China market is entirely shut off to US producers, the US would either have to cut back on production or export greater-than-anticipated volumes to smaller deficit regions such as South and Central America and Europe.



China hits pause on Appalachian energy investment citing trade war concerns



ANYA LITVAK 

Pittsburgh Post-Gazette

[pittsburghpost-gazette.com](https://www.post-gazette.com/stories)

JUN 18, 2018

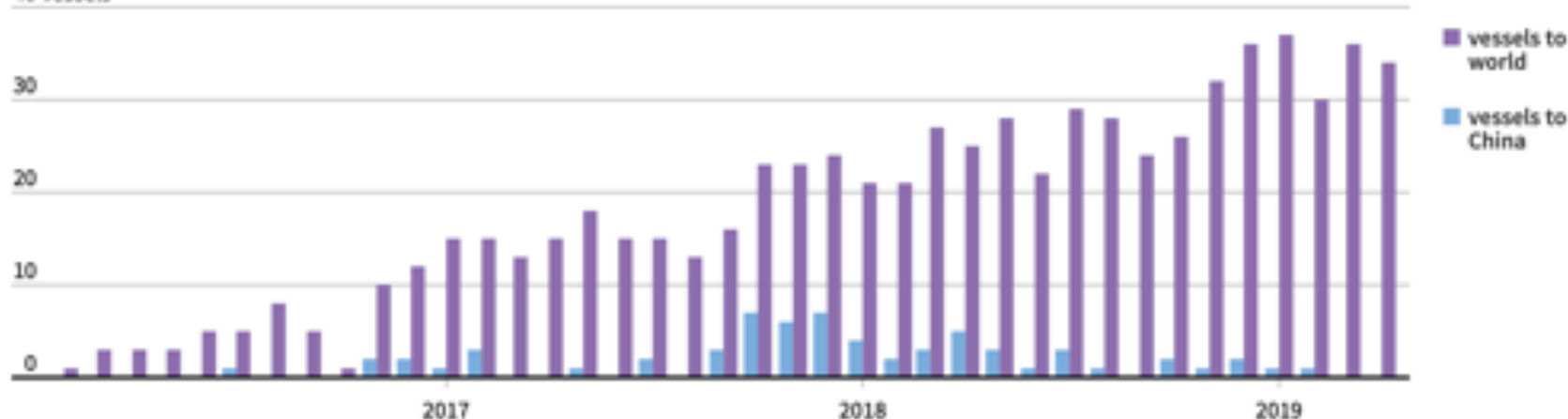
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U.S. LNG shipments to China fall through trade war

The number of vessels carrying liquefied natural gas (LNG) to China from the United States has decreased since the second half of 2018 even as overall U.S. shipments hit new records.

VESSELS CARRYING LNG

40 vessels



LNG SHIPMENTS

140 billion cubic feet



Source: U.S. Department of Energy; Refinitiv Eikon ship tracking data

Stephanie Kelly | REUTERS GRAPHICS

Finance

- The U.S. shale oil industry hailed as a “revolution” has burned through a quarter trillion dollars more than it has brought in over the last decade. It has been a money losing endeavor of epic proportions.
- “the vigorish,” or the vig: “a charge taken (as by a bookie or a gambling house) on bets.”
- Wall Street makes money by taking a cut of other people’s money.

Rex Energy (REXX) Files for Bankruptcy Amid Debt Struggles

May 21, 2018, 09:58:00 AM EDT By Zacks Equity Research, Zacks.com



Shutterstock photo

Rex Energy Corporation REXX, which has been facing trying times of late, recently filed for Chapter 11 bankruptcy protection. Hit by the industry downturn, the company had been contemplating Chapter 11 filing for quite some time. Amid elevated leverage metrics, challenges in refinancing its 2020 debt maturities along with weak natural prices creating further pressure, the company is headed toward

<https://www.nasdaq.com/article/rex-energy-rexx-files-for-bankruptcy-amid-debt-struggles-cm966355>



EQT and CNX sell off more assets narrowing focus on Pa. shale gas

Rebecca Drake/Post-Gazette



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Pittsburgh Post-Gazette
alitvak@post-gazette.com

JUN 29, 2018

11:47 AM

Range Resources (RRC) Agrees to Sell 'Proportionately Reduced' 1% Overriding Royalty of Washington County, PA Leases for \$300M

October 15, 2018 4:18 PM EDT

RANGE RESOURCES CORPORATION (NYSE: RRC) today announced that it has signed and closed on an agreement to sell a proportionately reduced 1% overriding royalty in its Washington County, Pennsylvania leases for gross proceeds of \$300 million.

Range's Washington County properties encompass approximately 300,000 net surface acres that produced 1.7 Bcfe net per day in the second quarter of 2018. The overriding royalty applies to existing and future Marcellus, Utica and Upper Devonian development on the subject leases, while excluding shallower and deeper formations. Post-close, Range maintains a net revenue interest of approximately 82% on the subject Washington County acreage. Cash flow associated with the 1% overriding royalty is expected to be approximately \$25 million in 2019. The net proceeds will be used to reduce total debt by an expected 7%, which lowers annualized interest expense by about \$15 million, resulting in a net reduction in estimated 2019 cash flow of approximately \$10 million.

<https://www.streetinsider.com/Management+Comments/Range+Resources+%28RRC%29+Agrees+to+Sell+Proportionately+Reduced+1%25+Overriding+Royalty+of+Washington+County%2C+PA+Leases+for+%24300M/14706227.html>



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Gibsonia, PA: This Unbelievable, Tiny Company Is Disrupting A \$200 Billion Industry



Main contractor on Atlantic Sunrise, Mariner East gas pipelines declares bankruptcy



AD CRABLE | Staff Writer Oct 30, 2018

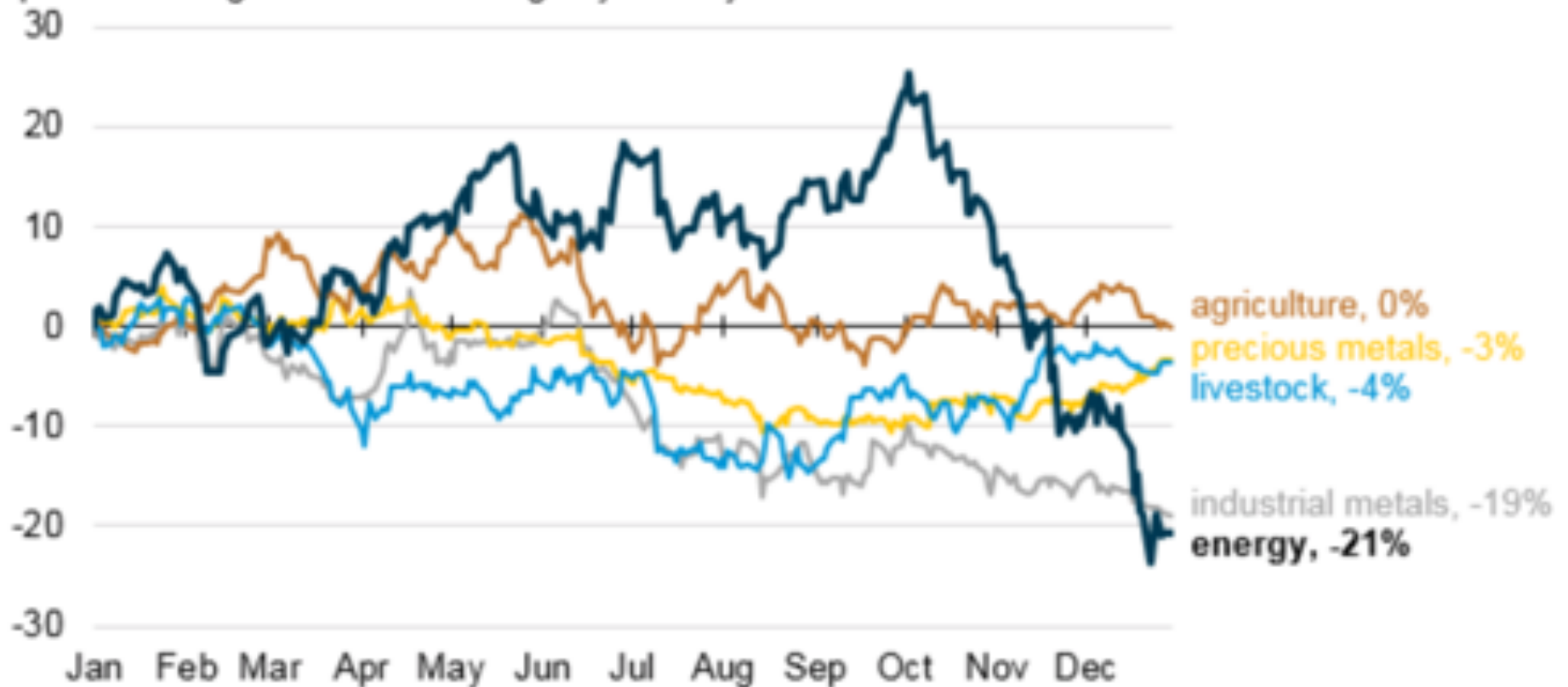


Bloodbath In Oil & Gas Stocks Could Continue

By Nick Cunningham - Jan 03, 2019, 6:00 PM CST

Source:
<https://oilprice.com/Energy/Energy-General/Bloodbath-In-Oil-Gas-Stocks-Could-Continue.html>

Components of the S&P Goldman Sachs Commodity Index (2018)
percent change since first trading day of the year



IEEFA update: 2018 ends with energy sector in last place in the S&P 500

2019 expectation is for more investment with lower returns

Source:
<http://ieefa.org/ieefa-update-2018-ends-with-energy-sector-in-last-place-in-the-sp-500/>

“2018 saw oil and gas stocks act like highly speculative, commodity niche investments. The investment pitch to investors now is quick cash, quarterly payouts and fast talk. Given the sector’s volatility, the loss at the end of the year could just as easily have been an uptick. Either way the stocks lack a long-term value rationale.

Oil company investments used to be blue chip stocks – characterized by steady, stable profit generating companies, who push the market up during periods of growth and slow the market’s trajectory on the way down. But the low-priced, volatile, oil and gas market, punctuated by significant geopolitical realignment, greater competition, a weak business model and public opposition, is no longer a blue chip investment.”

8. The risks to life and property are high.

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION**

In The Matter Of:

ETC Northeast Pipeline, LLC	:	Violations of The Clean Streams Law
6051 Wallace Road Extension, 3 rd Floor	:	Dam Safety and Encroachments Act
Wexford, PA 15090	:	Oil & Gas Act of 2012
	:	Erosion and Sediment Control
	:	Regulations, Chapter 102
	:	Dam Safety and Waterway
	:	Management Regulations, Chapter 105

ORDER

NOW, this 14th day of May 2019, the Commonwealth of Pennsylvania, Department of Environmental Protection ("Department"), has made and determined the following FINDINGS and enters the following ORDER:

H. On or before the date of this Order, while constructing the Revolution Pipeline project, ETC, *inter alia*:

i. Eliminated at least twenty-three (23) streams by removing and/or filling the stream channels with soil during construction activities, resulting in a loss of approximately 1,857 linear feet of stream channel;

ii. Changed the length of at least one hundred twenty (120) streams by manipulating and/or filling the stream channels with soil during construction activities resulting in a net loss of approximately 1,310 feet of stream channel; and,

iii. Eliminated at least seventeen (17) and altered seventy (70) wetland areas by manipulating and/or filling wetlands with soil.









EdgeMarc files for bankruptcy and blames Energy Transfer explosion; Energy Transfer says it was 'an act of God'



ANYA LITVAK ✓

Pittsburgh Post-Gazette
alitvak@post-gazette.com 

MAY 16, 2019

7:00 AM



The early morning fireball that burst from the seams of Energy Transfer's Revolution pipeline in September has surfaced as the central character in the bankruptcy of EdgeMarc Energy.



9. The industry influences democracy.

Lawmaker: Natural gas lobby too influential in severance tax debate

NOVEMBER 27, 2017 | 7:15 PM

BY [SUSAN PHILLIPS](#)

Comments Off

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 Recommend 80

With more than 200 gas industry lobbyists registered in Harrisburg, State Rep. Greg Vitali says the industry has spent \$3.7 million on lobbying the Capitol this year alone.

The industry has also spent \$7.7 million on campaign contributions since 2007. Senate President Pro Temp Joe Scarnati has received \$483,500, according to Vitali's calculations.



Think Tank with
Ben Wattenberg
airs weekly on PBS.

Each half-hour
edition focuses on
deeper trends,
conditions, and ideas
behind a single topic
from the week's
headlines, bringing
viewers something
rare on television:
Perspective.

FAREED ZAKARIA: Oil is a curse. Oil is a curse ironically for wealth or liberty. For wealth it's a curse because it means you don't have to modernize your economy. You don't have to create the framework of laws that actually encourage economic growth.

BEN WATTENBERG: You just call in Exxon/Mobil and give 'em a contract and take the royalty.

FAREED ZAKARIA: I call them, in the book, trust fund states, because it's unearned income. And you look around the world--there's a Harvard study on this--every oil-rich country has among the lowest growth rates in the world, because they don't produce anything. They don't need to. They have it too easy. The odd thing however is that it's also bad for democracy, for liberty, because when a government needs taxation as its form of revenue, when it doesn't have oil in the ground which it can sell it needs to give back something to the citizen. So, I tax you but I have to give something back to you. The bargain between taxation and representation is at the heart of Western liberty. If you think about it, that's why the United States breaks away from the British Empire. We were being taxed but not represented in the British Parliament.

BEN WATTENBERG: That was, was it John Adams? - Taxation without representation is tyranny?

FAREED ZAKARIA: Exactly. Now, the slogan that the Saudis offer their people is very different. The bargain they offer is they say, 'Were not gonna tax you, were not gonna take anything from you, but were not gonna give anything to you.' So

President Trump, **WE represent Pittsburgh**, and WE will build a clean energy future. And **we want to be leaders here and abroad in the fight to tackle climate change** for Pittsburghers and for all Pennsylvanians.

SIGNED:

Congressman Mike Doyle
Mayor William Peduto, City of Pittsburgh
Allegheny County Executive Rich Fitzgerald
Allegheny County Controller Chelsea Wagner
Allegheny County Councilman James Ellenbogen
Allegheny County Councilwoman Denise Ranalli Russell
Allegheny County Councilman DeWitt Walton
State Senator Jay Costa
State Senator Wayne Fontana
State Representative Dom Costa
State Representative Paul Costa

Pittsburgh Council President Bruce A. Kraus
Councilman Reverend Ricky V. Burgess
Pittsburgh Councilman Dan Gilman
Pittsburgh Councilman R. Daniel Lavelle
Pittsburgh Councilman Corey O'Connor
Pittsburgh Councilwoman Natalia Rudiak
Pittsburgh Councilwoman Deborah Gross
State Representative Dan Frankel
State Representative Ed Gainey
State Representative Dan Miller
State Representative Adam Ravenstahl
State Representative Harry Readshaw
State Representative Jake Wheatley

TAKE A STAND.

TAKE A STAND.

State Representative Jake Wheatley



**10. We've been down this road
before and should know
better.**

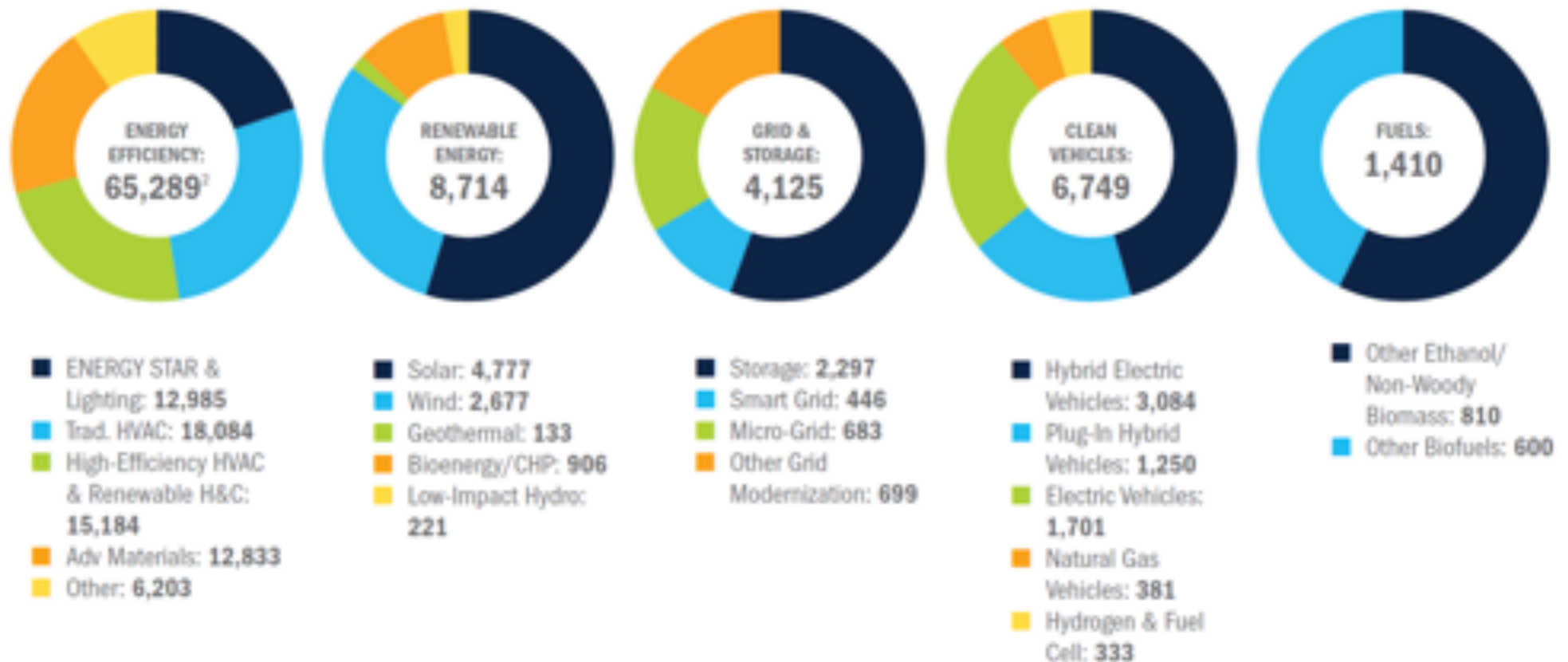
Cultures that lacked the ability to adapt



CLEAN JOBS PENNSYLVANIA

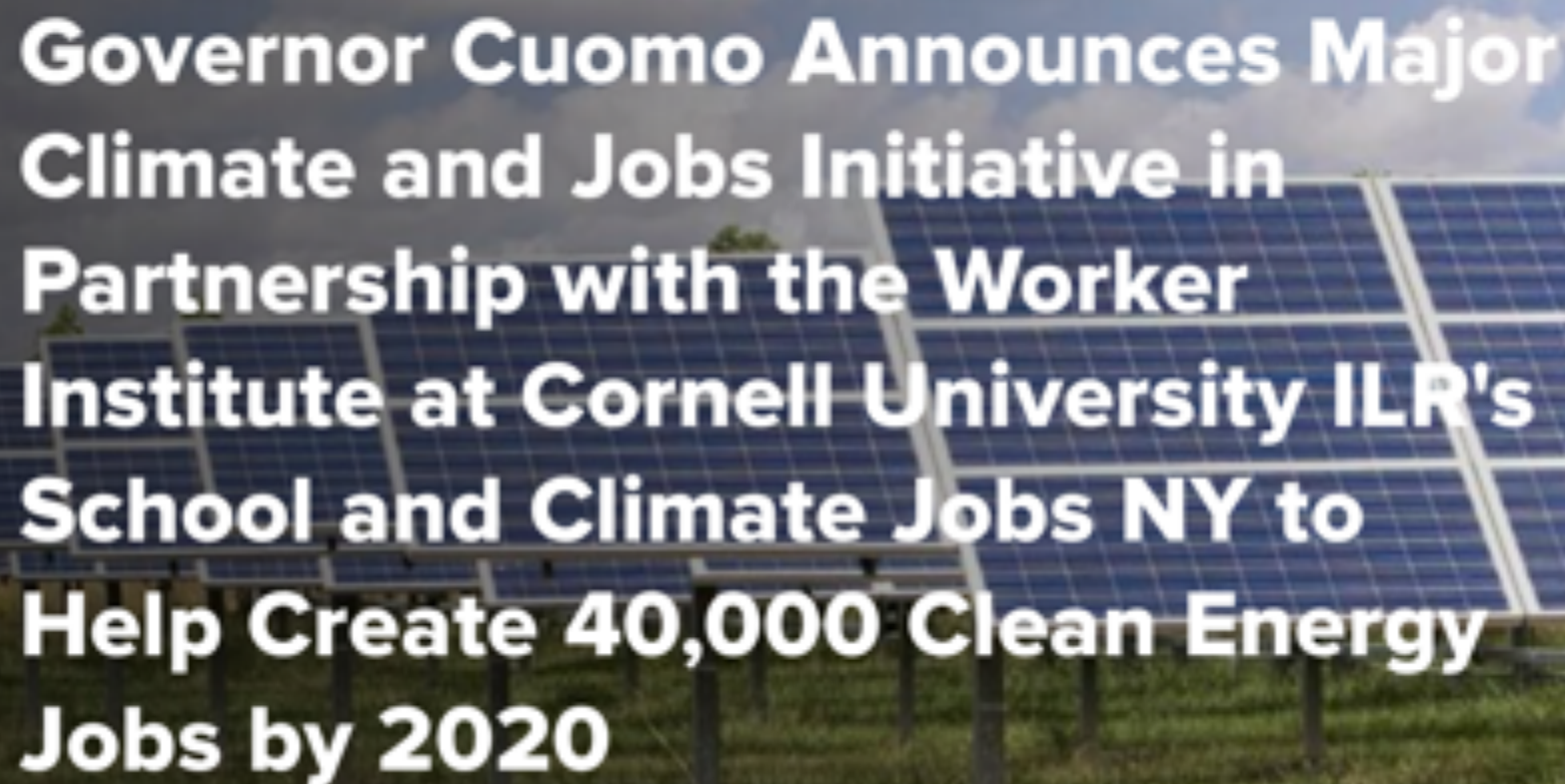
86,285 CLEAN ENERGY JOBS ACROSS PENNSYLVANIA¹

INDUSTRY BREAKDOWN



Source: <https://www.e2.org/cleanjobspa/>

JUNE 2, 2017 | Albany, NY



Governor Cuomo Announces Major Climate and Jobs Initiative in Partnership with the Worker Institute at Cornell University ILR's School and Climate Jobs NY to Help Create 40,000 Clean Energy Jobs by 2020

Initiative Will Accelerate Renewable Energy Growth With up to \$1.5 Billion Investment in Renewable Energy Projects

Largest Clean Energy Procurement by a State in U.S. History Strengthens New York's Position as National Leader on Climate Change

Cultures that lacked the ability to adapt



Cultures that lacked the ability to adapt





THANK YOU!

Mmehalik@breatheproject.org