



INDUSTRY...AT A GLANCE

December 2022

Drilling Activity in PA

Pennsylvania: A World-Class Player in Shale Gas Production

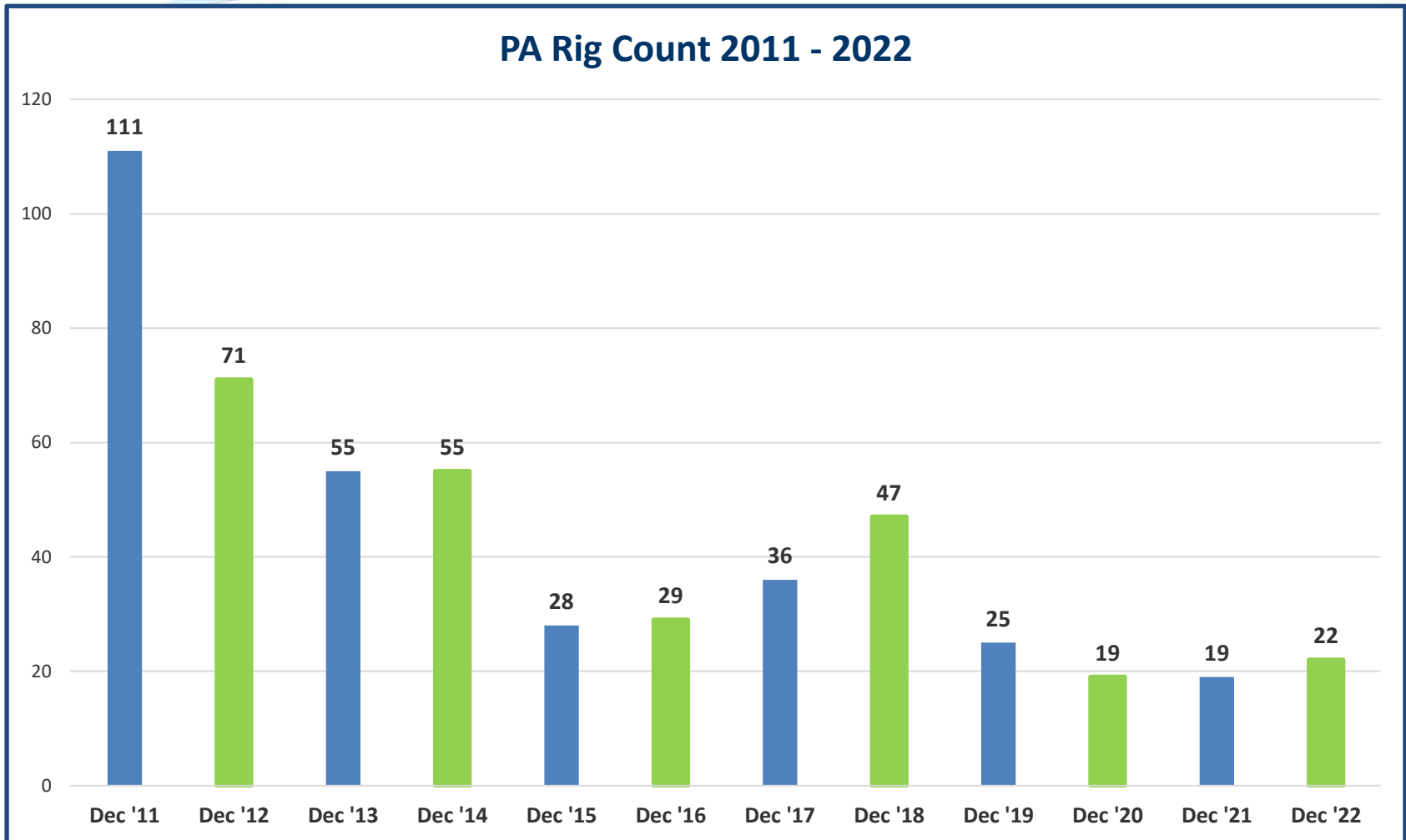
- 🔹 2nd largest natural gas producer in U.S.
- 🔹 Nearly 11,000 producing wells
- 🔹 7.5 Trillion Cubic Feet (2021)
- 🔹 20.5% of total U.S. natural gas production
- 🔹 36 of 67 counties with at least 1 producing well

Drilling Activity in PA

- 🔥 12,495 unconventional wells*
- 🔥 10,976 unconventional wells producing natural gas
- 🔥 3,827 unconventional well pads
- 🔥 20+ billion cubic feet/day
 - 7.5 trillion+ cubic feet/year
 - 32% of total U.S. shale gas production



Drilling rig in Potter County, PA



Keep in Mind...

- 🔥 Rig count not the same metric as 6-8 years ago:
 - Longer laterals
 - More efficient drilling
 - More frac stage completions

- 🔥 But still *an* indicator:
 - Oil v Gas
 - Wet v Dry
 - Basin v Basin

Moving Gas to Market

Moving Gas to Market

Pipelines Bring Major Investment, Jobs to the Appalachian Basin

MORE THAN



27
Pipelines



\$32.6
Billion



3,500
Miles



124k
Jobs

22.7
bcf/d

445k
b/d of NGLs



Moving Gas to Market

Pipeline Project*	Investment (Millions)	Capacity (MMcf/day)
Adelphia Gateway	Undetermined	250
Atlantic Sunrise	\$2,100	650
Birdsboro	\$47	79
Constitution	\$683	650
Eastern Panhandle Exp.	\$250	47.5
Eastern Shore Exp. Project	\$98.6	400
Empire North	\$141	205
Leidy South	Undetermined	580
Monaca Line	\$20	133
Northeast Supply Enhancement	\$927	400
Northern Access	\$500	490
Orion	\$109	135
PennEast	\$1,000	1,107
Risberg Line	\$86	55
Supply Header	\$500	1,511

Upcoming Pipeline Projects for Appalachia

Project Name	Pipeline	Pipeline Corridor	Status	Stated Capacity	Stated Start Date
Greene Interconnect (MVP Partial Service)	EQT/MVP	Regional	EA/EIS Issued	1,000	12/1/2019
Southern Reliability Link	NJ Nat Gas	East/Northeast	Under Late Construction	180	3/1/2020
Gateway	TRANSCO	East/Northeast	Under Early Construction	65	3/1/2020
AquaTrans Power Plants Supply Laterals	EQT	South Ohio	Announced	100	6/1/2020
TP-4555 Bare Pipe Replacement	EQT	Regional	Filed	96	6/1/2020
Line N Expansion - 2020	NFG	Regional	Open Season Completed	215	7/1/2020
PennEast Pipeline	PennEast	East/Northeast	Certificate Issued	1,107	7/1/2020
Empire North Expansion	NFG	Canada	Under Early Construction	205	9/1/2020
Yorktown M&R Replacement & Reliability Project	AGT	Regional	Under Early Construction	22	9/1/2020
Buckeye Xpress	TCO	South Ohio	EA/EIS Issued	275	11/1/2020
Mountain Valley Pipeline	EQT	South Atlantic	Under Late Construction	2,000	12/1/2020
Wright Interconnect Project	Constitution	East/Northeast	Certificate Issued	650	12/1/2020
Constitution Pipeline	Constitution	East/Northeast	Under Early Construction	650	12/1/2020
DTI Supply Header	Atlantic Coast	East/Northeast	Under Early Construction	1,500	12/1/2020
Northeast Supply Enhancement Project	TRANSCO	East/Northeast	Certificate Issued	400	12/1/2020
Greater Philadelphia Expansion	TETCO	East/Northeast	Open Season Completed	475	4/1/2021
2020 Expansion Project	Eastern Shore	East/Northeast	EA/EIS Issued	14	6/1/2021
Brooke County Access	EQT	Regional	Filed	140	8/1/2021
Central Corridor Pipeline Extension	Duke LDC	West	Announced	168	9/1/2021
Atlantic Coast Pipeline (ACP)	Atlantic Coast	South Atlantic	Under Early Construction	1,500	12/1/2021
FM 100 Modernization	NFG	Regional	Filed	330	12/1/2021
Seneca Supply Project	TRANSCO	Regional	Filed	582	12/1/2021
Northern Access 2016- Replacement (Empire)	Empire	Canada	Certificate Issued	350	2/1/2022
Northern Access 2016- Mainline (NFG)	NFG	Canada	Certificate Issued	497	2/1/2022

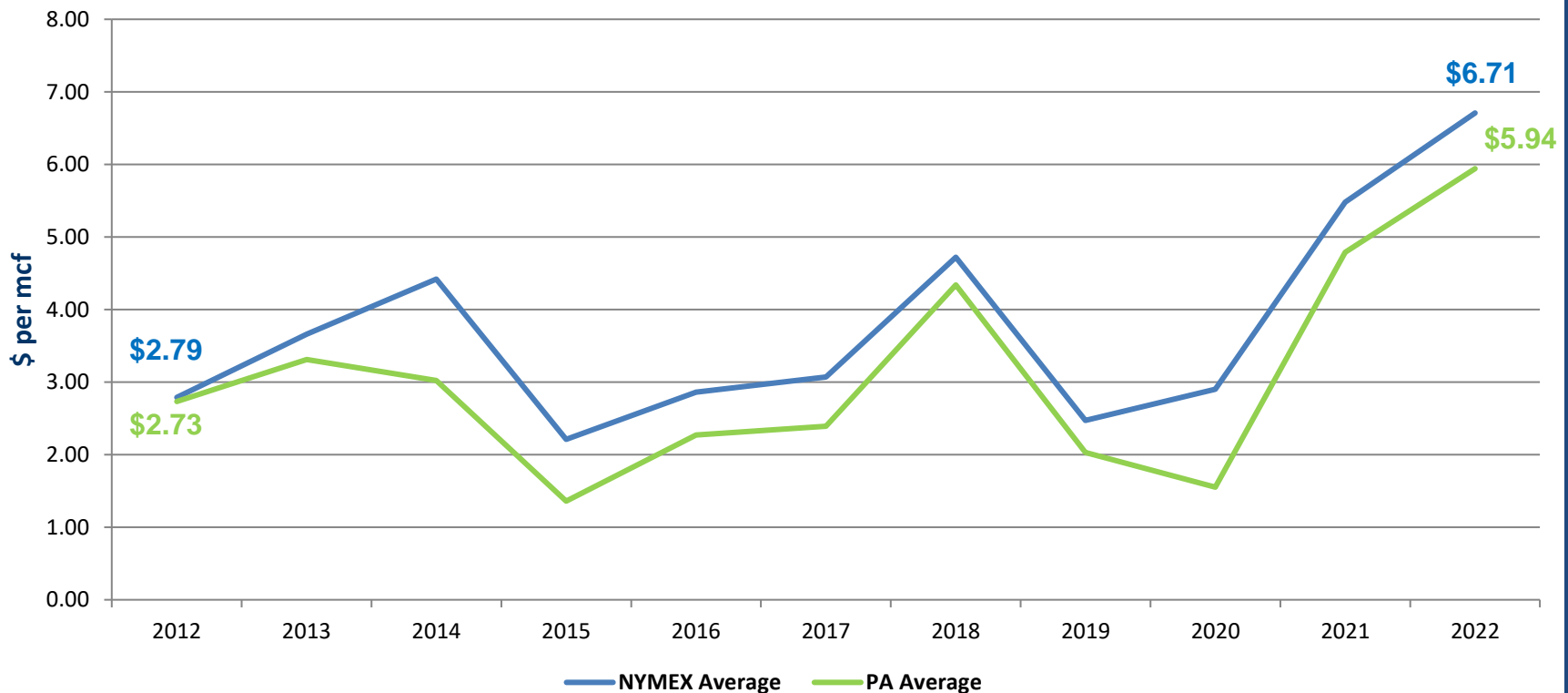
Moving Gas to Market

PIPES Program – Projects Funded to Date

Applicant	Project	County	Amount
Domtar Paper Company LLC	Johnsonburg Papermill	Elk	\$1,000,000
Glenn O. Hawbecker, Inc.	Barkley Gas Line Extension Project	Venango	\$1,000,000
Leatherstocking Gas Company	SR 0029 South Montrose	Susquehanna	\$442,274
Wyoming County Chamber of Commerce	Tunkhannock Natural Gas Extension Project	Wyoming	\$1,000,000
Kings Real Estate Group A	Hamburg Commerce Park	Berks	\$1,000,000
SEDA-COG Natural Gas Cooperative	Centre Hall Natural Gas Project	Centre	\$1,000,000
Monroe County Industrial Development Corp.	Route 611 Gas Corridor - Scotrun Extension	Monroe	\$980,000
Wayne Economic Development Corporation	Canaan Township and Waymart Borough	Wayne	\$1,000,000
McKean County Commissioners	IWI Distribution Lateral	McKean	\$1,000,000
Bedford County Development Association	Natural Gas Pipeline Extension - BCBP II	Bedford	\$100,000
Borough of Chambersburg	Chambersburg Natural Gas Pipeline Project	Franklin	\$584,100
Valley Energy, Inc.	East Athens Natural Gas Extension Project	Bradford	\$850,000
Leatherstocking Gas Company	Wyalusing Gasification	Bradford	\$1,000,000
Lehigh Valley Economic Investment Corp	Arcadia West Business Park	Lehigh	\$1,000,000
Wyoming County Chamber of Commerce	Tunkhannock Natural Gas Extension - Phase 2	Wyoming	\$1,000,000
Wayne Economic Development Corporation	Canaan Township and Waymart Borough	Wayne	\$376,392
Economic Progress Alliance of Crawford	NFG Natural Gas Pipeline Extension	Crawford	\$300,000
Wayne Township	National Fuel Gas Line Extension	Crawford	\$16,331
Lehigh Valley Economic Investment Corp	Keystone Cement Company Pipeline Extension	Northampton	\$320,950
Albert Garage & Farm Equipment	Natural Gas Pipeline	Butler	\$23,666
Eastern Lebanon County High School District	Eastern Lebanon County High School Pipeline	Lebanon	\$980,666
Eureka Resources	Bradford County Natural Gas Pipeline Expansion	Bradford	\$280,000
Oak Tree Development Group	State Road Natural Gas Pipeline	Lancaster	\$154,793
North Station District	North Station Technology Campus	Philadelphia	\$62,147
Chester County Economic Development Council	South Mill Champs Expansion	Chester	\$1,500,000
Pocono Mountains Industries	Gas Line Extension - Airport Road & Airstrip Road	Monroe	\$231,110
Lehigh Valley Economic Investment Corp.	UGI Stroud Township PIPE Grant	Monroe	\$324,061
Lehigh Valley Economic Investment Corp.	UGI Bethlehem Township PIPE Grant	Northampton	\$249,229

Pricing

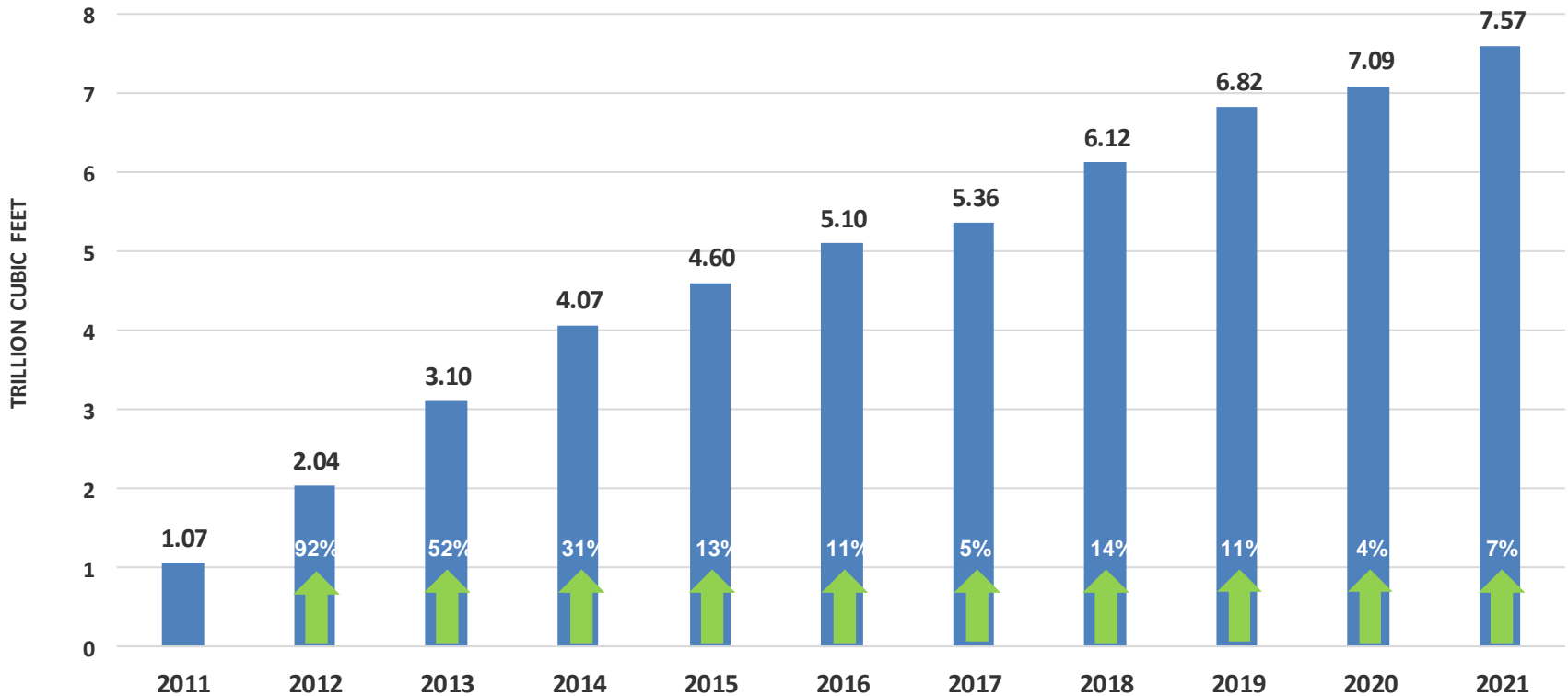
PA Price Basis Differential December 2022*



* December 2022 Monthly Bidweek Price – Platts Inside FERC
Price reflects year-over-year for current month

Natural Gas Production

PA Unconventional Shale Gas Production 2011 - 2021



Source: Marcellus Shale Coalition & PA DEP

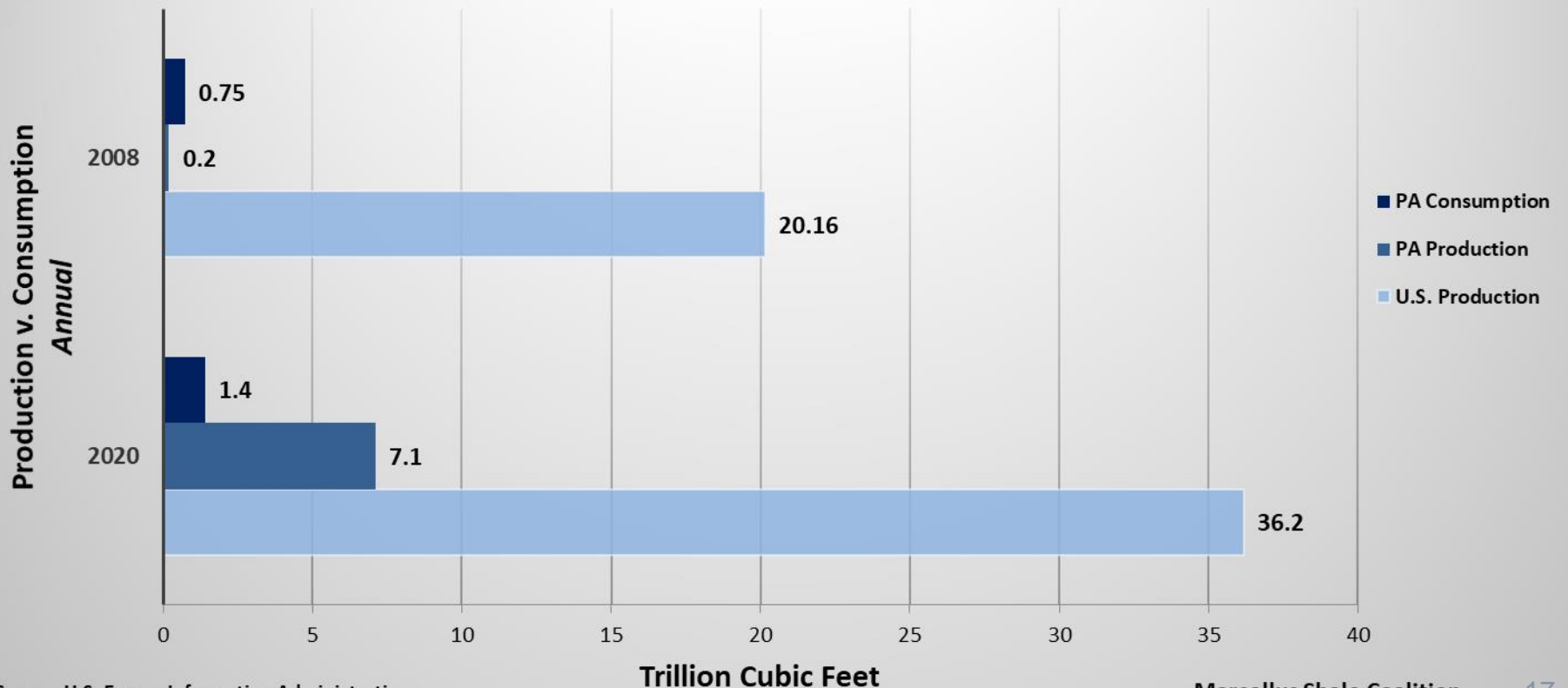
Top Ten Producing Counties by Volume (2021)

County	Production (MCF)	% of PA Production	# of Producing Wells
Susquehanna	1,620,279,080	21.4%	1710
Washington	1,393,348,094	18.4%	1756
Bradford	1,153,969,042	15.2%	1384
Greene	1,087,973,381	14.4%	1275
Lycoming	490,448,115	6.5%	920
Wyoming	402,049,483	5.3%	300
Tioga	290,189,747	3.8%	713
Butler	269,074,219	3.6%	560
Allegheny	173,542,779	2.3%	159
Sullivan	108,153,436	1.4%	121

Pennsylvania Natural Gas

Net Importer to Net Exporter

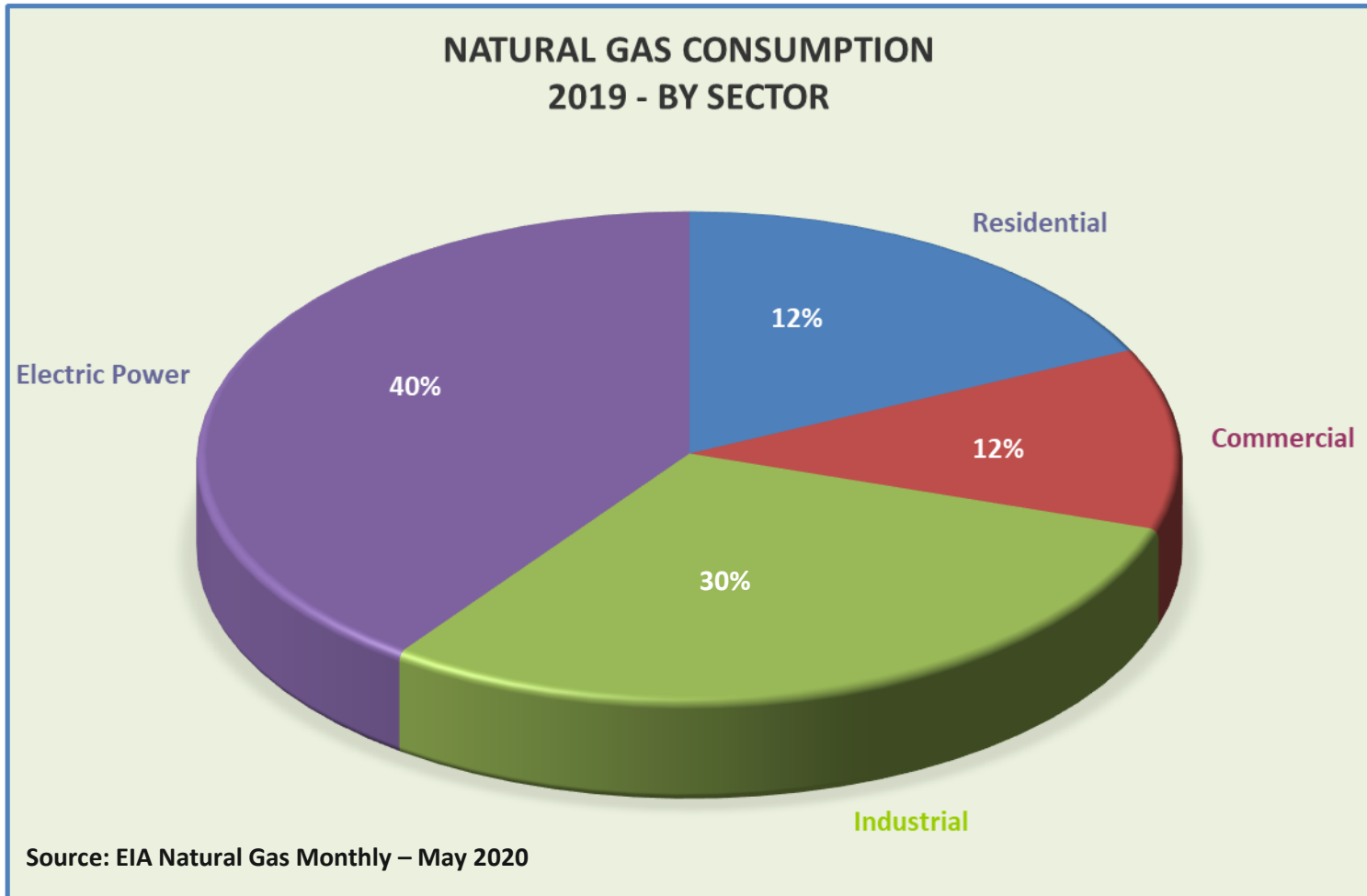
2008 vs. 2020



Source: U.S. Energy Information Administration

Marcellus Shale Coalition

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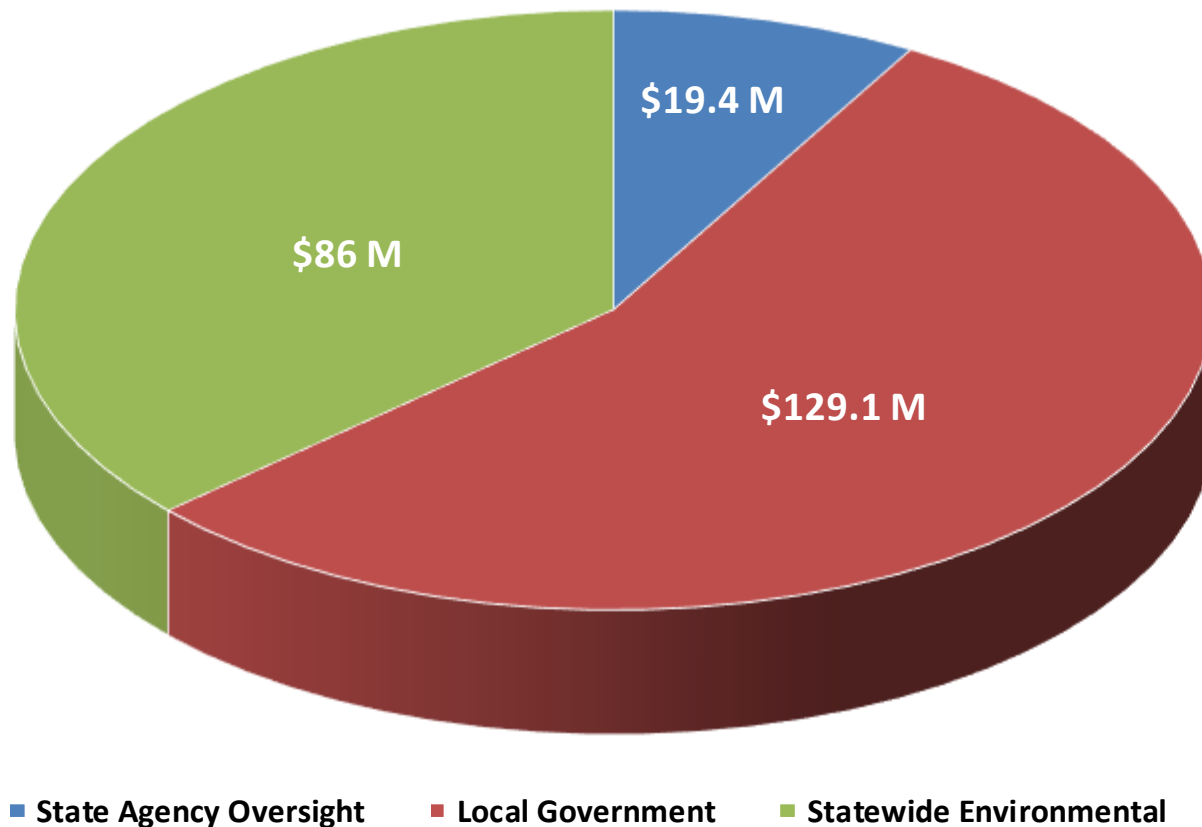
PA's Severance Tax: The Impact Fee

Benefiting PA Communities

Impact Fee Revenues to Date

Year Distributed	Amount
2012	\$204.2 M
2013	\$202.5 M
2014	\$225.8 M
2015	\$223.5 M
2016	\$187.7 M
2017	\$173.3 M
2018	\$209.6 M
2019	\$251.8 M
2020	\$200.3 M
2021	\$146.3 M
2022	\$233.8 M
TOTAL:	\$2.26 Billion

Impact Fee Distributions - 2022



Consumer & Economic Benefits

Lower Prices = Customer Savings

- 💧 Wholesale electric prices down 41% since 2008
- 💧 Natural gas prices for end-use customers down 56% - 76% since 2008
- 💧 Average annual savings > \$1,100 - \$2,200 per household

Benefiting Consumers

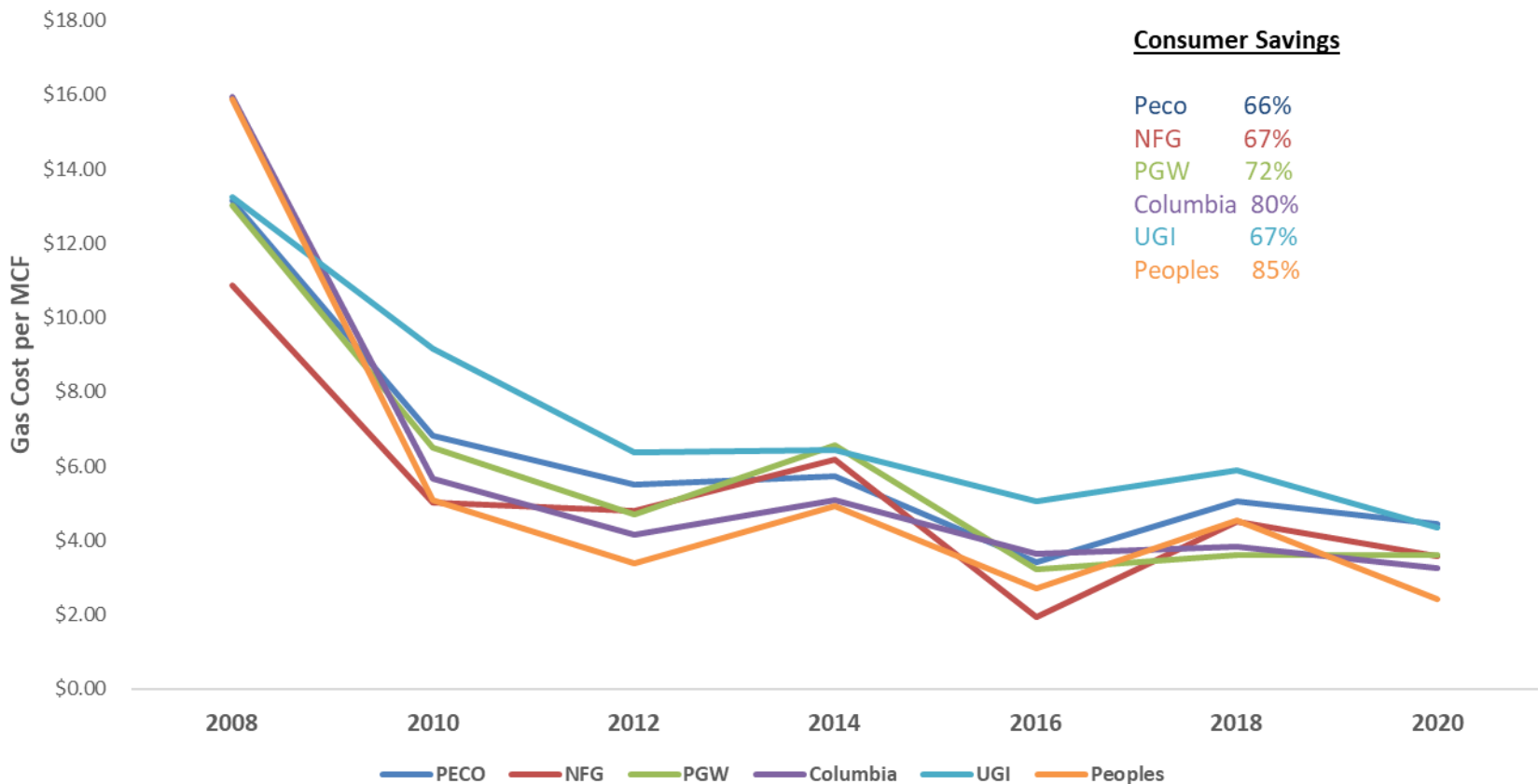
Lower Prices = Customer Savings 2008 - 2021

Utility	PGC Rate / MCF		% Change	Customer Savings**
	2008*	2020*	2008-2020	Annual
PECO	\$13.16	\$4.02	-69%	\$1,645
NFG	\$10.86	\$3.85	-65%	\$1,262
PGW	\$13.02	\$3.57	-73%	\$1,701
Columbia	\$15.94	\$3.85	-76%	\$2,176
UGI	\$13.26	\$5.13	-61%	\$1,463
Peoples/Equitable	\$15.89	\$4.02	-75%	\$2,137

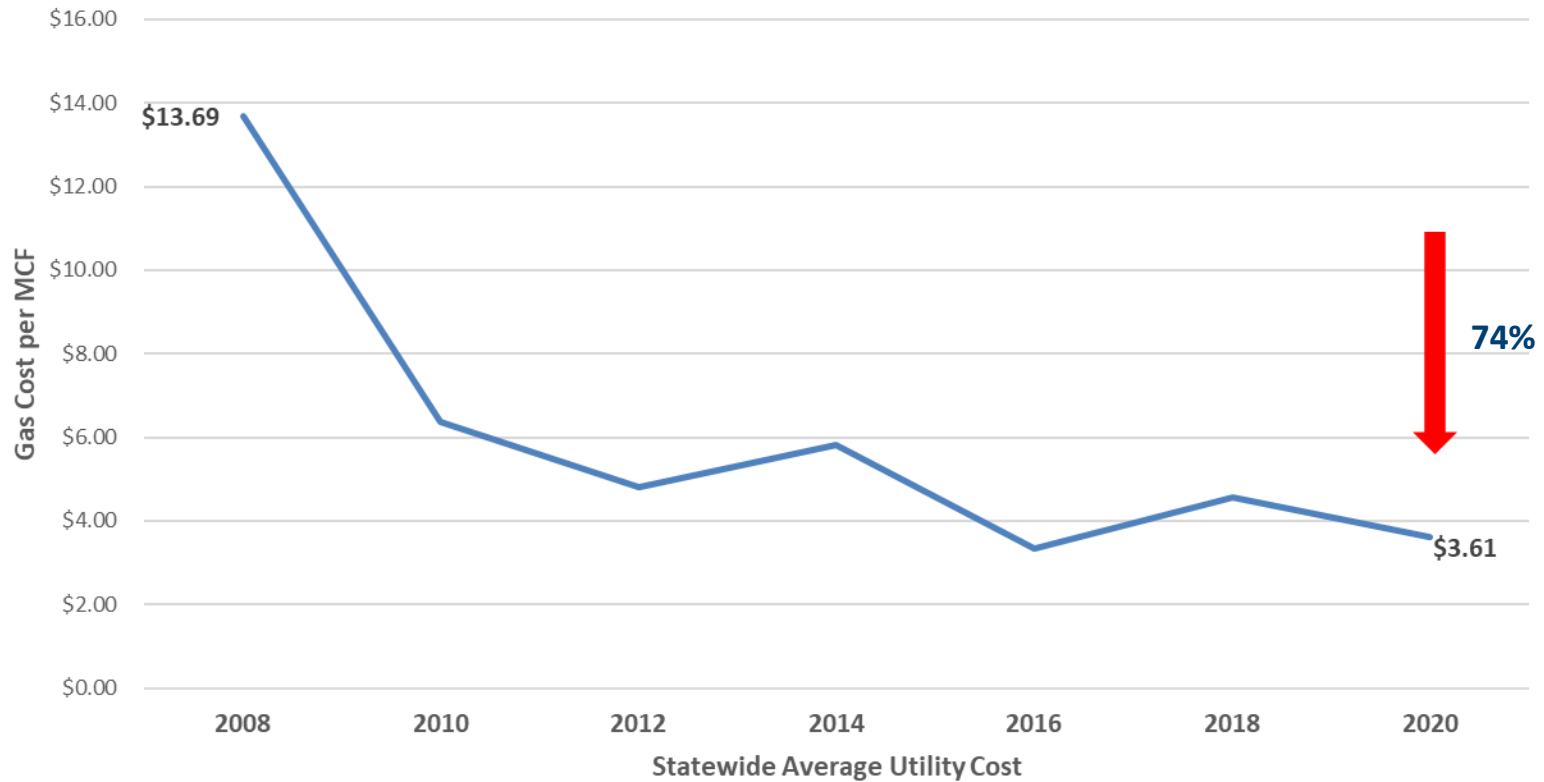
* PUC Purchased Gas Cost (PGC) Rate in Effect Prior to Annual Review

** Residential heating customer using 15 MCF/month

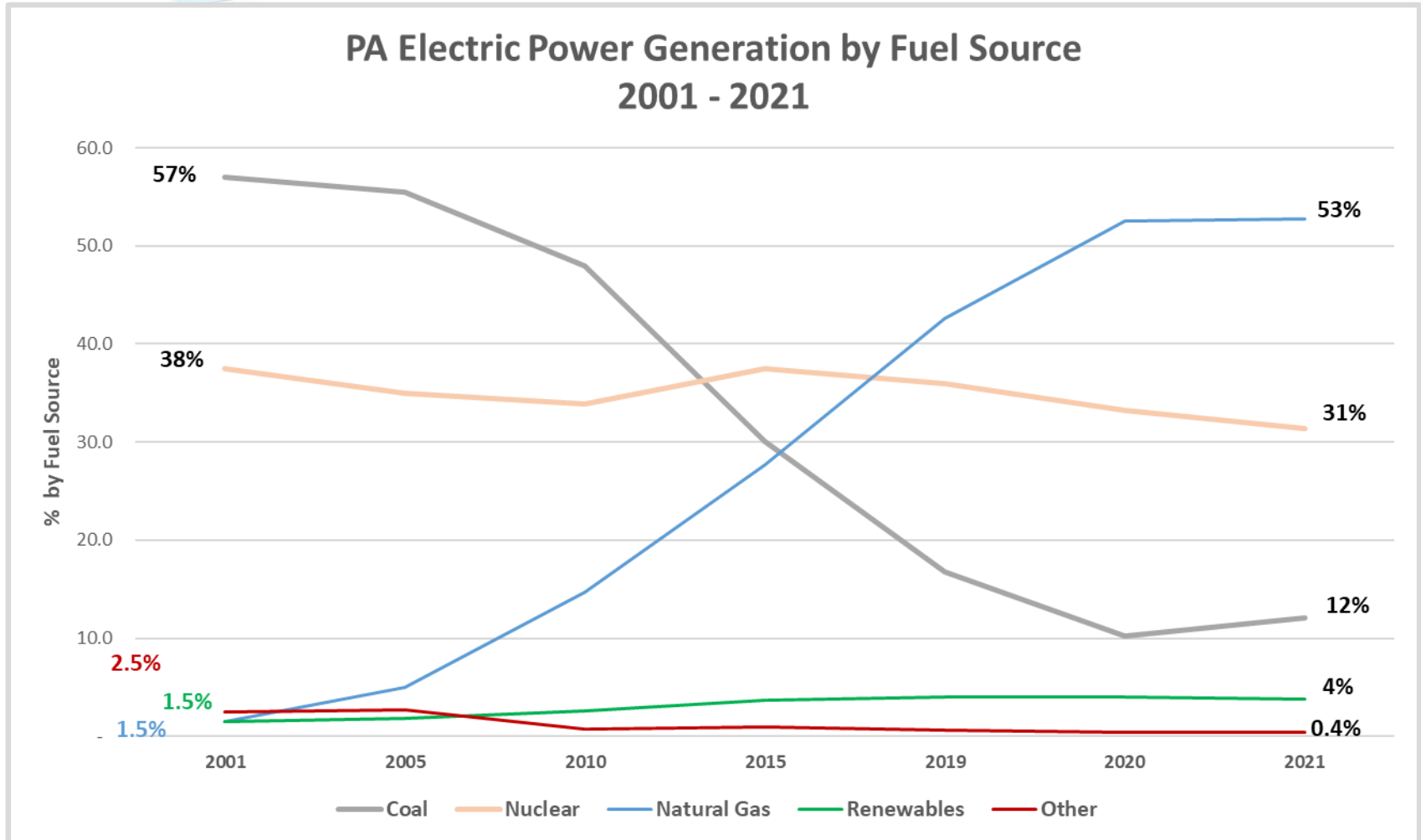
The Marcellus Effect: Lower Natural Gas Costs for Consumers
2008 - 2020



The Marcellus Effect: Lower Natural Gas Costs for Consumers
2008 - 2020



PA's Changing Energy Landscape

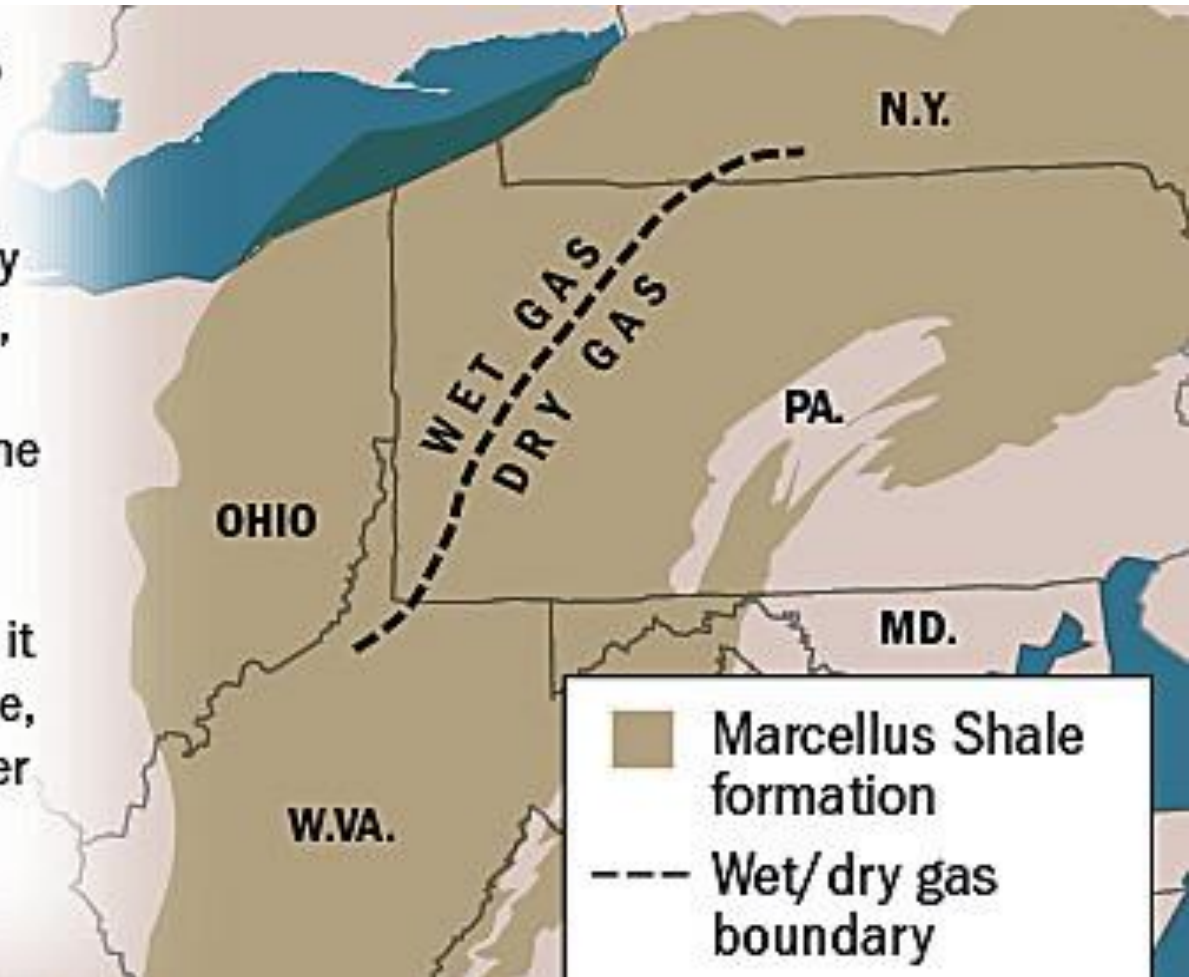


Natural Gas Liquids

Shale Gas in PA

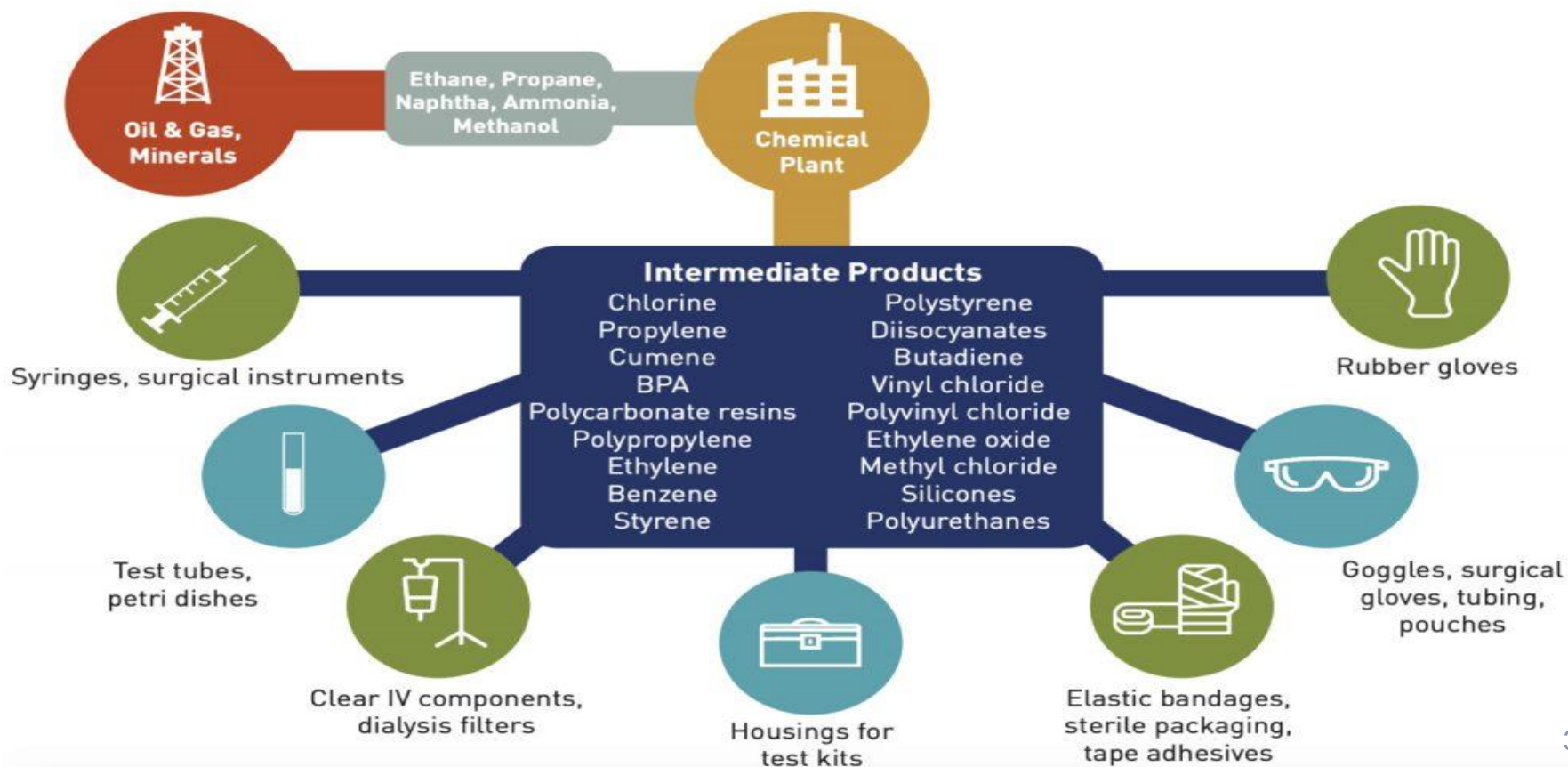
Wet/dry gas boundary

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.



MEDICAL SUPPLIES

Chemistry contributes 25% of the value of material inputs used to make medical supplies.



COVID Vaccines

- 💧 **Refrigeration** – Various chemicals captured as byproduct from butane production to meet extreme temperature storage standards
- 💧 **Vaccine administration:** Syringes, vaccine vials, masks, gloves, face shields, anti-septic, band-aids
- 💧 **Vaccines:** Both Moderna & Pfizer's vaccine contain polyethylene glycol derived from natural gas liquids



- 💧 **Transportation:** Truck fuel to distribution sites
- 💧 **Dry ice:** CO₂ captured during petroleum refinement used for long-haul transport
- 💧 **Health facilities:** heating, cooling & electrical power

Fueling Manufacturing

💧 \$208 Billion Chemical Industry Investment Tied to Shale Gas

- \$109 Billion (completed projects)
- \$31 Billion (under construction)
- \$68 Billion (planning phase)

💧 351 Total Projects

- 786,000 total jobs
- \$61.1 Billion payroll
- \$309.5 Billion economic output

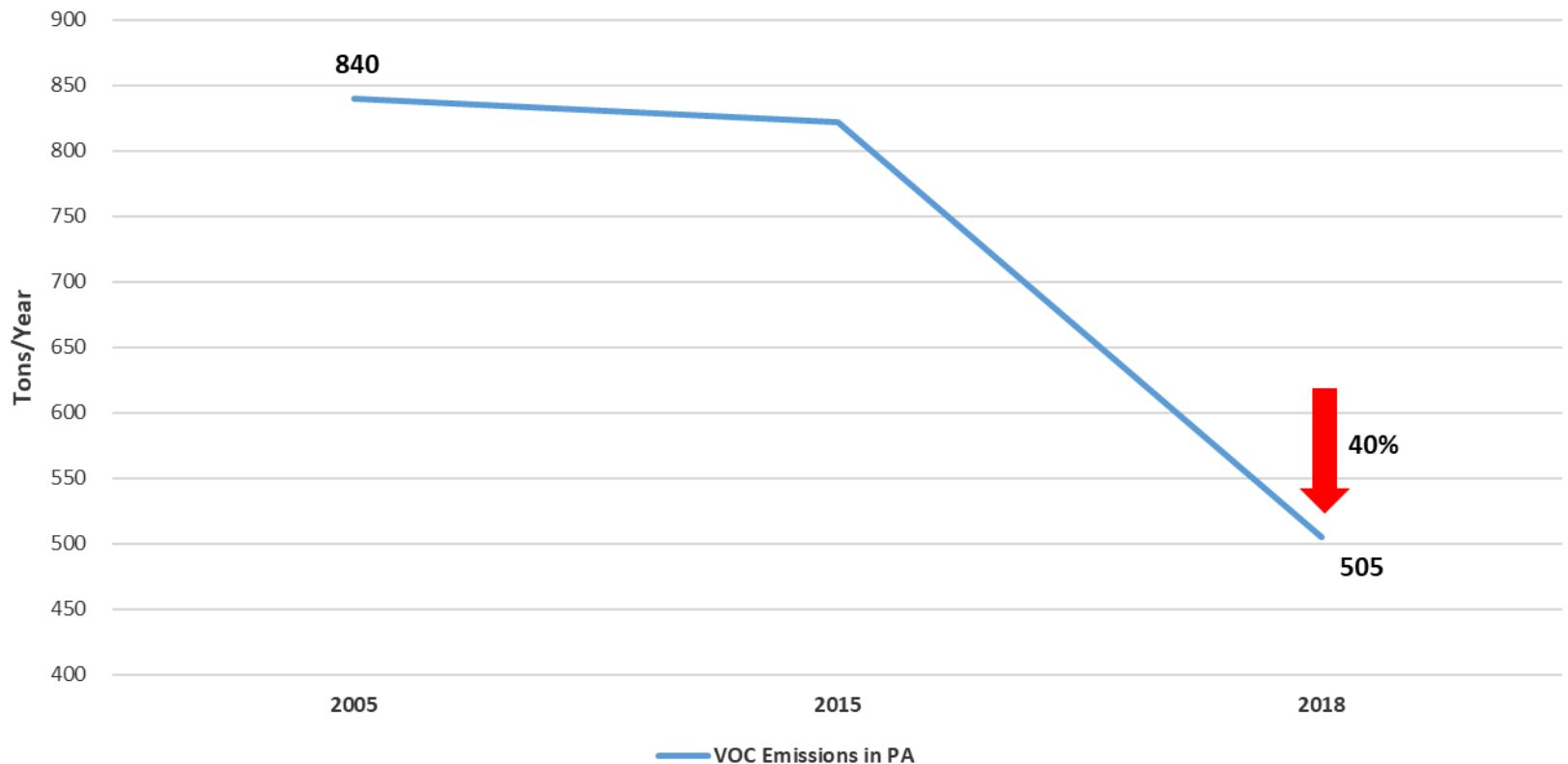


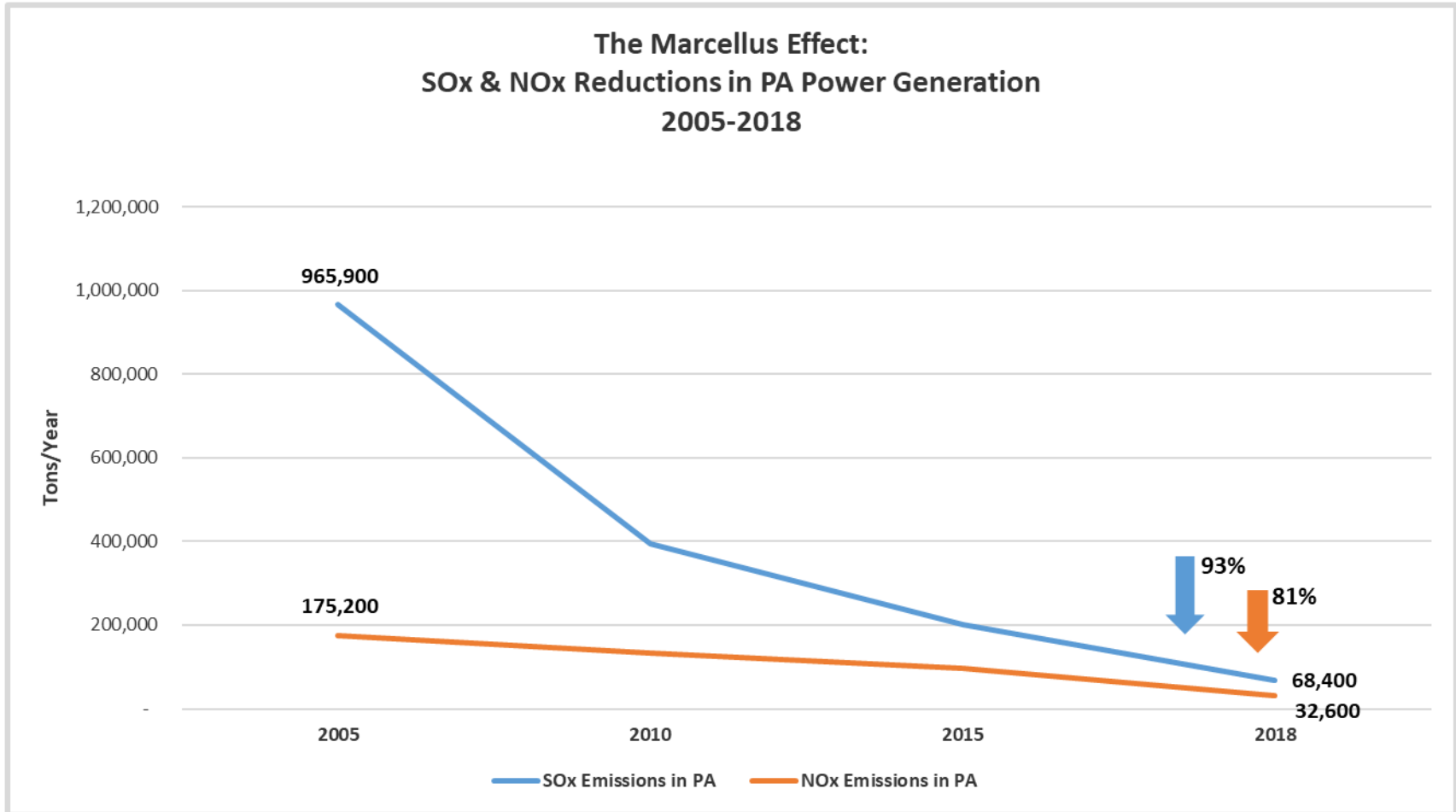
“Thanks to this versatile resource, American chemistry has experienced more than a decade of growth. Our new investment boosts employment, payrolls, and tax revenue in local communities and nationwide.”

Chris Jahn, President & CEO, ACC

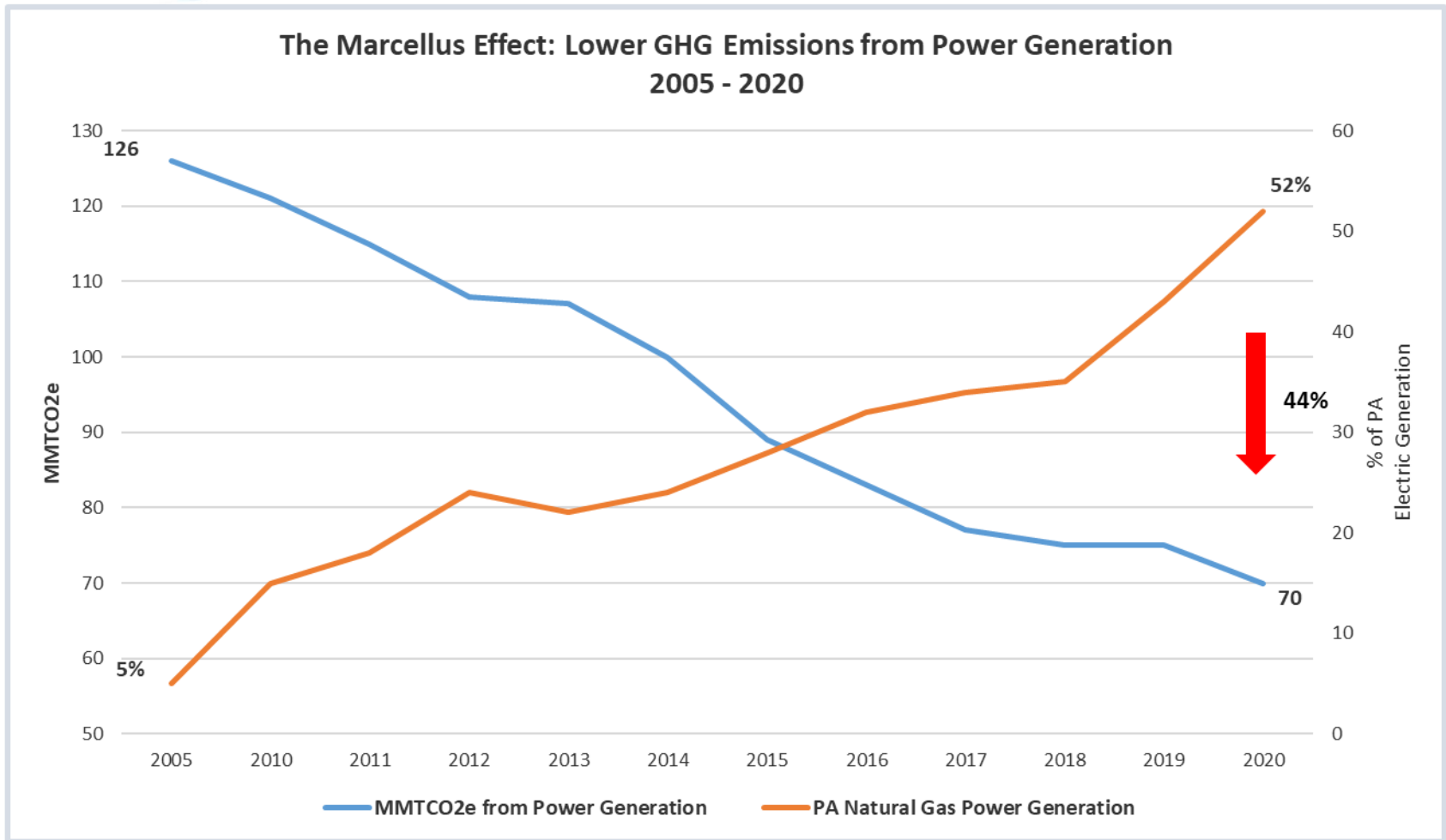
Enhancing Air Quality

**The Marcellus Effect:
Volatile Organic Compounds Reduction in PA Power Generation
2005 - 2018**

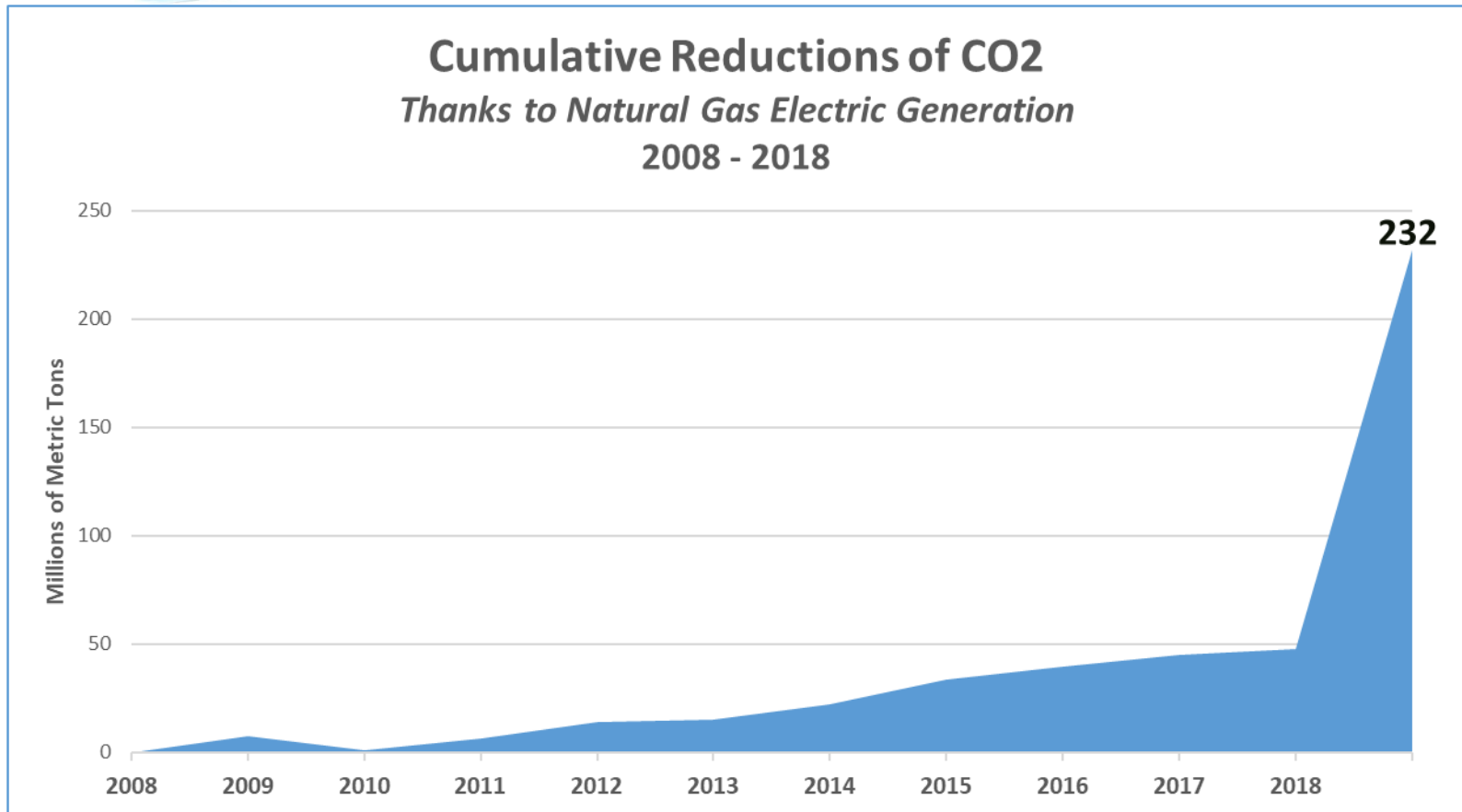




Leading on Climate Change







Leading on Climate Change



Note: 232 M metric tons converts to 252 M short tons

Environmental Benefits are Undeniable

Since 2005...

-  **VOCs down 40%**
-  **NOx down 81%**
-  **SOx down 93%**
-  **CO₂ down 39%**

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